INTERNATIONAL MIRE CONSERVATION GROUP

# NEWSLETTER

**issue 2007/2, June 2007**

The International Mire Conservation Group (IMCG) is an international network of specialists having a particular interest in mire and peatland conservation. The network encompasses a wide spectrum of expertise and interests, from research scientists to consultants, government agency specialists to peatland site managers. It operates largely through e-mail and newsletters, and holds regular workshops and symposia. For more information: consult the IMCG Website: http://www.imcg.net

IMCG has a Main Board of currently 15 people from various parts of the world that has to take decisions between congresses. Of these 15 an elected 5 constitute the IMCG Executive Committee that handles day-to-day affairs. The Executive Committee consists of a Chairman (Jennie Whinam), a Secretary General (Hans Joosten), a Treasurer (Philippe Julve), and 2 additional members (Tatiana Minaeva, Piet-Louis Grundling).

Seppo Eurola, Richard Lindsay, Viktor Masing (†), Rauno Ruuhijärvi, Hugo Sjörs, Michael Steiner and Tatiana Yurkovskaya have been awarded honorary membership of IMCG.

## Editorial

This special issue on peat, peatlands, and energy started as a short article for the last Newsletter but got entirely out of hand. The letter from the International Peat Society to the European Commission on peat renewability challenged us to explain why many of IPS's arguments are irrelevant or incorrect. As it is generally more demanding to refute than it is to utter claims, the paper grew in length to become a wide overview of contra-arguments. We hope that this will stimulate the factual discussion between IPS and IMCG during the joint meeting in Sweden at the end of June.

As the peat industry and its allies increasingly dance on the field of climate change policy, we thought it useful to include an overview on how peat and peatlands are treated in the UN Framework Convention and its Kyoto Protocol. Some insight in this difficult and confusing field may reveal the deeper tactics behind the attempts to re-classifying and re-naming peat.

Energy politics not only threatens peatlands by attempting to increase peat combustion as an alleged 'clean' source of energy, also the 'carrier function' of the often thinly populated peatlands attracts the attention of the energy industry. This Newsletter includes the first information on the IMCG symposium "Wind Farms on Peatland" to be held in Santiago de Compostela (Spain), 27–30 April 2008.

As peatlands, energy, and climate change will remain a coherent subject area for years to come, Olivia Bragg presents a proposal for an EU COST Action.

IMCG – Bundled energy for peatland conservation!

Deadline for the next Newsletter: 15 July 2007.

For information, address changes or other things, contact us at the IMCG Secretariat. In the meantime, keep an eye on the continuously refreshed and refreshing IMCG web-site: http://www.imcg.net

John Couwenberg & Hans Joosten, The IMCG Secretariat
Institute of Botany and Landscape Ecology, Grimmerstr. 88, D-17487 Greifswald (Germany)
fax: +49 3834 864114; e-mail: joosten@uni-greifswald.de

**Contents:**

Editorial ..... 1
A note from the Chair ..... 2
Why burning peat is bad for the climate – An executive summary ..... 3
The International Peat Society: fossil or renewable?. ..... 4
IPCC focuses in on peat ..... 26
Peatlands, Peat, UNFCCC and the Kyoto Protocol ..... 20
The $CO_2$ emission factor of peat fuel ..... 24
Peatlands, Energy and Climate Change IMCG Symposium on Windfarms on peatland ..... 25
Peatlands, Energy and Climate Change Proposal for an EU COST Action ..... 27
Regional News ..... 27
IMCG Main Board ..... 29
UPCOMING EVENTS ..... 30

The IMCG bank acount : IBAN Number : FR76 1670 6050 0750 5170 9901 686; Bic Number (=swift) : AGRIFRPP867;
Name : Ass. International Mire Conservation Group; Address : 159 rue Sadi Carnot 59280 Armentières (France)

ISSN 1682-1653

## A note from the Chair

There has been a lot of activity since the IMCG Field symposium and General Assembly in Finland. In Peatlands International (2/06) several IPS members criticised both the field symposium and IMCG generally. In particular, articles by Markku Mäkelä and Kirsi Lauren criticised the IMCG comments about how few pristine peatlands remain and are reserved in Finland. On behalf of IMCG, I responded to these concerns, suggesting that problems had arisen over the definition of 'pristine' that we used to describe 'remaining in a pure state, … primitive or original' and that such a term had to apply to an entire mire complex, rather than to remnants or segments of that ecosystem.

The second point of contention arose over the fallacious assertion that peat is a renewable biofuel. The IPCC states in its 2006 Guidelines for National Greenhouse Gas Inventories: 'peat is not considered a biofuel … due to the length of time required for peat to re-accumulate after harvest.' And: 'peat is treated as a fossil carbon … as it takes so long to replace harvested peat'. This is a position that IMCG fully supports.

My response (on behalf of IMCG) to IPS criticisms and assertions was to be published in the current (1/07) issue of Peatlands International. Unfortunately, this did not happen and an apology has been issued by the Executive Board of IPS, with the letter appearing on the IPS website and newsletter. It will now be published in the next edition of Peatlands International.

This newsletter is a special edition devoted to some of the assertions that have been made by the peat industry to argue for peat being considered a renewable biofuel and responses to those assertions. It is an issue that will have major ramifications for peatland conservation, particularly in Scandinavia. This summary of the arguments will form the basis for discussions at a joint meeting of IMCG/IPS in Sweden on 28 June, where the issue of renewable biofuels is on the agenda. Please take the opportunity to read the arguments and forward any feedback you might have to the Secretariat.

Jennie Whinam

*The valley of the Ak-Alakha river valley on the Okuk Plateau (Altai Republic, Russian Federation). The Ukok Plateau will be crossed by the Altai gas pipeline that will provide 60-80 bln. $m^3$ of West Siberian gas to western China every year. Construction will start in 2008.* *Photo: Vladislav A. Zagorulko*

**REGISTER**

**Please fill out the IMCG membership registration form.**

**Surf to http://www.imcg.net or contact the secretariat.**

## Why burning peat is bad for the climate – An executive summary

In their effort to promote the use of peat for fuel, many arguments have been brought forward by the industry to differentiate peat from other fossil fuels, including young versus old age, slow versus non-renewability, loose versus compact structure, much versus little water content, little versus advanced transformation, Holocene versus pre-Holocene origin, etc., etc.

Yet none of the above properties differentiates peat from other fossil fuels with respect to the effect their combustion has on the climate. Discussion on the above topics merely distracts from the real problem.

Similar to burning other fossil fuels, **peat combustion releases Carbon from a long-term store**. Without exploitation the Carbon would have remained in this store more or less indefinitely. Here lies the fundamental difference between 'biomass' fuels (like wood and straw) and 'fossil' fuels (like peat and coal).

By burning biomass fuels, organic material is oxidized that would be oxidized by decay in the foreseeable future anyhow. In case of fuel combustion, humans consume the energy, whereas in case of decay microbes consume the energy provided by oxidation. In both cases the same amount of $CO_2$ ends up in the atmosphere.

By burning fossil fuels, organic material is oxidized that otherwise would have remained stored for thousands and thousands of years. In contrast to biomass, peat would – without exploitation – *not* end up in the atmosphere as $CO_2$. This applies whether the peat is 10 or 1,000 or 100,000 years old. Therefore, **combustion of peat leads to a net emission of $CO_2$ to the atmosphere.**

As peat has a lower calorific value than coal, oil or gas, burning peat produces more $CO_2$ per unit of generated energy than most other fossil fuels. This is largely determined by chemical properties that – without substantial net energy losses – cannot be altered. As a consequence, **replacing other fossil fuels by peat will lead to higher $CO_2$ emissions.**

The increased $CO_2$ emission by peat combustion is – with respect to its climate effect – not compensated by peat-formation in still peat accumulating natural peatlands. For compensation of additional emissions an additional sink is needed. Natural, peat accumulating peatlands have always been part of the greenhouse balance and do not constitute this additional sink. Therefore, **peat accumulation in natural mires does not compensate for emissions from peat combustion.**

As combustion of peat results in more $CO_2$ emissions than combustion of coal, life cycle analyses of peat combustion concentrate on the 'before' and 'after' part of the life cycle. These 'before' and 'after' parts do not concern emission values of burning peat, but changes in land use.

The life cycle analyses of peat fuel combustion presented by the Swedish and Finnish peat industry are selective and unfair. They focus on worst case scenarios with respect to the 'before' and best case scenarios with respect to the 'after' components. Accounting under UNFCCC/Kyoto levels the playground, draws the larger, national picture and puts emissions from peatlands in the right perspective. As a result, **the use of peat for energy is unattractive under the 'Kyoto Protocol'.**

The worst case scenario of the pre-extraction phase comprises agricultural peatlands with very high current greenhouse gas emissions. The higher the emissions in the pre-extraction phase, the smaller the net-effect of peat extraction. It is assumed that the carbon store of heavily drained agricultural peatlands will be emitted in foreseeable future anyhow and extraction merely speeds up the process. This ignores that the emissions from agricultural peatlands easily can be reduced by rewetting. Like other fossil fuels, **the peat resource from agricultural peatlands is finite and rapidly decreasing** unless pristine peatlands continue to be reclaimed

The best case scenario of the post-extraction phase (after-use of cut-over peatlands) involves growing of biofuel crops that replace fossil fuels. The larger the area of biofuel crops, the larger the mitigating effect will be. To maximise the area that thus can be used for biofuel crops, the amount of peat extracted per hectare should be minimised. Carrying this (actually perverse) principle to its logical conclusion the most positive scenario for climate is to **refrain from peat extraction and use rewetted peatlands for biofuel cultivation.**

Even within the current, suboptimal, framework of the 'Climate Change Convention' (UNFCCC) and its Kyoto Protocol, conservation of peatlands in UNFCCC Annex I countries can be profitable during the first commitment period (2008-2012). **Avoided emissions from rewetting degraded peatlands can be accounted under the Kyoto Protocol** if they are combined with some form of land use, either under Annex A (agriculture) or LULUCF (cropland and grassland management).

Currently, tens of millions of hectares of drained and degraded **peatlands globally are responsible for over 3 Gtons of $CO_2$ emissions, representing a value of €70,000 million per year**. This forces us to focus on rewetting of drained peatlands to avoid emissions and on cultivating suitable crops under wet conditions. Crops grown on rewetted peatlands ('paludicultures') not only bring employment and revenue as such, but also reduce emissions (possibly to the point of net sequestration).

Peat enterprises and IPS should be taking on *this* challenge instead of trying to increase the market for a fossil, finite, and environmentally damaging fuel like peat:

**The future of peatlands is in conservation.**

Hans Joosten & John Couwenberg

# The International Peat Society: fossil or renewable? An analysis of the IPS stand towards peat renewability and climate change.

*by Hans Joosten*

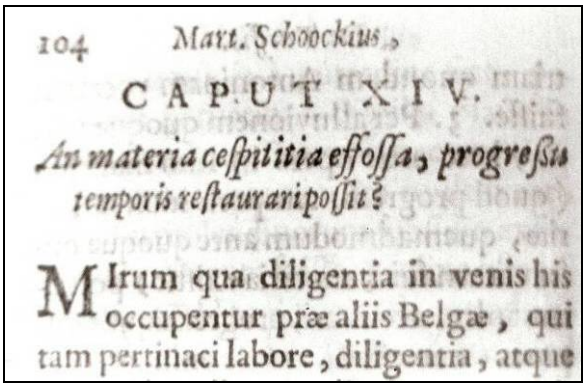
***Introduction***

This year I celebrate the 10th anniversary of my attempts to stimulate within the International Peat Society a factual discussion on the "renewability" of peat and its relation to climate change. The first article was "Peat and the art of energy tax evasion" (IMCG Newsletter 3: 13 – 17, 1997). Further papers followed: "Renewability revisited" (IMCG Newsletter 2004/1: 16 – 20), "And what about peat?" (IMCG Newsletter 2005/1: 12 – 18), "Peat not allowed in EU Ecolabel" (IMCG Newsletter 2005-4: 16-18). While these articles led to some personal acrimony from IPS, there was no discussion on substance, no exchange of arguments.
But this has now changed!
On 3 January 2007 IMCG send a motivated request to the European Commission to refrain from using the misleading label of "peat as a long-term renewable energy resource"[1]. On 22 February 2007 IPS reacted to the Commission "in order to enlighten about the nature of peatlands and peat with existing data, especially views on their impact on climate."[2]
As a preamble to that letter IPS accused the International Mire Conservation Group of using "inappropriate arguments and general opinions provided by institutions and bodies out of context and without references to key sources."
An interesting opinion. And at least an invitation to look closer at IPS's own arguments.

***Delayed insight…***

The rate of renewal of peat is too slow to be relevant for society. This is an ancient truth that until a decade ago was also supported by IPS. Since the entry of Finland and Sweden to the EU, IPS has been preaching the renewability of peat as a "new insight" in order to try and manipulate the political agenda

IPS states: "*The question of whether or not peat is a fossil or a renewable fuel was studied comprehensively, probably for the first time, in 2000 when scientists proposed that peat should be referred to as a 'slowly renewable fuel' (Crill, P., Hargreaves, K., Korhola, A., 2000).*"
Comments: The first scientific study that comprehensively discussed the renewability of fuel peat was published 350 years ago in the very first book on peatlands "Tractatus de turffis ceu cespitibus bituminosis" (Treatise on peat or pitch holding sods) of the Groningen University professor Martinus Schoockius (1658). The book devotes a full chapter to the question "An materia cespititia effossa, progressi temporis restaurari possit?" (Whether excavated sod material can over time be restored?, fig. 1). Since then, all serious publications on peat and peatlands from the 17th to the 19th century have addressed this question. In those days knowledge on the rate of peat renewal was urgent for long-term planning of energy availability in those parts of Europe where peat constituted the major but diminishing source of energy supply. Ever since it had become established knowledge that peat and peatlands are "growing", there has never been doubt that peat is renewable, albeit slowly.


104 Mart. Schoockius,

CAPUT XIV.

An materia cespititia effossa, progressu temporis restaurari possit?

MIrum qua diligentia in venis his occupentur præ aliis Belgæ, qui tam pertinaci labore, diligentia, atque

*Fig. 1: The first comprehensive study about peat as a renewable fuel: chapter XIV of Schoockius (1658). Collection Hans Joosten.*

The economic interest in the renewability of peat as an energy resource vanished in the second half of the 19th century with the emergence of coal and later oil as major energy carriers. Peat renewability again became a topic in the 1960s when restoration of peatlands became relevant from a nature conservation point of view.

**Linnaeus' plea for biofuel**

Reidar Peterson (2004), the 1992-1996 president of IPS, quotes the "Skånska resa" ("Scanian Travels" 1749) of Carl von Linné (1707-1778): "…*To burn a peat moss does twenty times as much damage, as a forest can twenty times grow up before a new and equally good peat moss matures. … It may seem to be a good invention to use the fens for fuel and thus spare the wood; but a forest can grow several times in a seculum, whereas a fen is not filled with peat in several secula*".

[1] see www.imcg.net/docum/peatrenewable.htm
[2] see www.peatsociety.org/user_files/files/ipseuresponse22.2.2007nosig.pdf

**Old vision on new peat**

The first detailed observations on renewed peat accumulation after extraction date from Jürgen Christian Findorff (1720 - 1792): "*In such pits, Nature has been able to work from all sides, and it is therefore not astonishing, that they [...] have been filled up with moss in such a way, that it is hardly possible to notice the distinctive marks of such pits on the surface. Only, this increment is nothing more than a pure white moss, and keeps, in contrast to the neighbouring peat, always the distinctive mark of a light color, of a loose, spongy substance, still being far from putrefaction and from the real peat.*" (Joosten 1995).

IPS is now interested in peat renewability because recently the "renewability question" has changed once again from an academic and conservational issue to an economic topic. Since Finland and Sweden joined the European Union (EU) in 1995, these major peat-burning countries, the peat fuel industry (which largely finances IPS), and IPS have been lobbying the European Commission to gain fiscal advantages for peat. Without such preferential treatment, power plants using peat fuels have difficulties competing with coal and other fossil fuels (Vapo Oy 2006) that have a lower combustion emission factor than peat (see the contribution on $CO_2$ emission factors elsewhere in this Newsletter). Since the Kyoto Protocol of the UN Framework Convention on Climate Change was negotiated (1997) and came in force (16 February 2005), lobbying efforts had to be intensified (see the contribution on UNFCCC and the Kyoto Protocol elsewhere in this Newsletter).

The strategy is to try and disconnect peat from other fossil fuels (such as coal and lignite) and to associate it more closely with living material (biomass fuels).

Before the enlargement of the EU, leading IPS officials – with the rest of the world – held the position that the slow rate of peat renewal makes the renewability of peat irrelevant for society. Some examples:

- In 1994, the Russian IPS-executive board member Savelyev concluded in the IPS-Bulletin: "the reproduction ability of peat reserves has significance predominantly from the geological point of view rather than from the nearest industrial perspective."
- In Telma (the scientific journal of the German IPS branch) of December 1996 the IPS vice-president and leading Belarussian peat scientist Lishtvan wrote that "although peat is regenerating, it can not be considered a renewable resource" (translation HJ). He must have been instructed by his IPS colleagues on the new policy soon after as five months later – at the 1997 Peat Conference in Minsk – Lishtvan publicly defended the "peat is renewable biomass" story that IPS meanwhile had adopted.

Still some industrial realists in the 'IPS peat family' acknowledge the factual non-renewability of peat. Bord na Mona in Ireland, for example, clearly differentiates between peat and renewables/biomass and recognizes in its long-term policies that peat is a finite resource (e.g. in its Submission on the Energy Green Paper: "Towards a Sustainable Energy Future for Ireland" 30 November 2006). Also the Irish governmental national energy agency defines peat as a "fossil sedimentary deposit"[3].

***Selective reading…***

The library of IPS is of restricted size and largely consists of home-made 'grey-literature'. The overwhelming peer-reviewed scientific literature that contradicts IPS's statements is systematically ignored. Texts of the Intergovernmental Panel on Climate Change (IPCC) are presented out of context to pretend the opposite of what IPCC is saying.

IPS states: *"Since then, several new studies (see references) have been carried out, none of which defined peat as a fossil."*

Comments: All the mentioned studies were carried out or commissioned by the peat industry and closely associated institutes. They are not 'key sources' but 'grey literature', which has not been subject to peer review and therefore in science is not recognized as being of high scientific standard. In contrast, in the relevant peer-reviewed scientific journals, peat and the remains that Holocene deposits contain are widely described as "fossil" or "subfossil". Some random recent examples:

Journal of Ecology 94 (2006): 415-430; Earth and Planetary Science Letters 202 (2002): 419-434; Can. J. Bot. 77 (1999): 556–563; Journal of Biogeography 34 (2007): 473-488; Oecologia 130 (2002): 309-314; Grana 44 (2005): 45 – 50; J. Quaternary Sci. 22 (2006): 209-221; Radiocarbon 46 (2004): 455-463; Journal of Paleolimnology (2007) DOI 10.1007/s10933-006-9068-8; The Holocene 17 (2007): 283-288; Vegetation History and Archaeobotany 16 (2007): 183-195; Ecosystems 9 (2006): 1278-1288; Ecography 30 (2007): 120-134; Journal of Animal Ecology 76 (2007): 276-288; Science 284 (1999): 1971-1973; Soil Sci. Soc. Am. J. 71 (2007): 492-499; Phil. Trans. Linn. Soc. B 362 (2007): 309-319; Arctic, Antarctic and Alpine Research 33 (2001): 19-27, Journal of Coastal Research 22 (2006):1423–1436; Global Ecology and Biogeography (2007) doi:10.1111/j.1466-8238.2007.00317.x; Quaternary Science Reviews 25 (2006): 1966–1994; Australian Journal of Ecology 18 (2007): 145–149; Global and Planetary Change 46 (2005): 361-379; Palaeogeography, Palaeoclimatology, Palaeoecology 198 (2003): 403-422; Proc. Nat. Acad. Sc. 102 (2005): 10904-10908; etc., etc.

Interestingly, even Atte Korhola, the only co-author of the Crill et al. 2000 report with substantial palaeoecological expertise, does not shrink from calling Holocene assemblages "subfossil" and "fossil" in his own peer-reviewed scientific papers. Take, for example, a look at:

Journal of Paleolimnology 24 (2000): 93-107; Hydrobiologia (Kluwer) 436 (2000): 165-169; Ecological Applications 11 (2001): 618-630; Journal of Quaternary Science 17 (2002): 287 – 301; Quaternary Science Reviews 21 (2002): 1841-1860; Water, Air and Soil Pollution 149 (2003): 339-361; Arctic, Antarctic and Alpine Research 37 (2005): 626-635.

[3] www.sei.ie/getFile.asp?FC_ID=1975&docID=73

This may sufficiently illustrate that the IPS "peat is not fossil" statement is not scientific argument but industry political spin.

**The definition of "fossil"**

Whether peat is 'fossil' or not is not a matter of fact but a matter of definition. When you define 'fossil' as 'something that has been conserved by burial' (as the etymology of the word would suggest), peat is clearly 'fossil'. When you define 'fossil' as something that is at least 10000 years old, (most) peat is not 'fossil'. It is striking that IPS fails to explain what she means with the terms 'fossil' or 'renewable'.

As long as the connection between a term (like 'fossil') and a concept (like 'older than 10000 years') is clear, logical, and consistently used, no specific definition is better than any other.

As its purpose lies in communication, a definition should strive to adhere to linguistic and scientific conventions. Ultimately, discussion on definition is not productive, however. "*Never let yourself be goaded into taking seriously problems about words and their meanings. What must be taken seriously are questions of fact, and assertions about facts: theories and hypotheses; the problems they solve; and the problems they rai*se" (Popper 1976).

The question of fact we try to address is whether peat combustion is contributing to the greenhouse effect or not. Shakespeare's statement (Romeo and Juliette II, ii, 1-2): "*What's in a name? That what we call a rose. By any other word would smell as sweet*" mutatis mutandis also applies to peat. Calling peat 'fossil' or 'renewable' does not change its emission characteristics.

Calling peat 'renewable', however, distracts from the objective fact that peat combustion leads to greenhouse gas emissions that affect the climate. In focussing on 'fossil / renewable', IPS creates the impression that she aims not at analysis of, but at distraction from the problem.

IPS states: "*The latest, by the International* (sic!) *Panel on Climate Change (IPCC) changed the classification of peat from fossil fuel to a separate category between fossil and renewable fuels (26.-28.4.2006, 25th session of IPCC, Port Louis, Mauritius 2006). Peat has now its own category 'peat'.*"

Comments: IPS has not presented this information in its full context. In the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, it is clearly stated: "*Although peat is not strictly speaking a fossil fuel, its greenhouse gas emission characteristics have been shown in life cycle studies to be comparable to that of fossil fuels (Nilsson and Nilsson, 2004; Uppenberg et al., 2001; Savolainen et al., 1994). Therefore, the $CO_2$ emissions from combustion of peat are included in the national emissions as for fossil fuels.*" And: "*Note that peat is treated as a fossil fuel and not a biofuel and emissions from its combustion are therefore included in the national total.*"[4]

Furthermore in the glossary of those guidelines we can read: "*Peat is not considered a biofuel in these guidelines due to the length of time required for peat to re-accumulate after harvest.*" and "*Note that peat is treated as a fossil carbon in these guidelines as it takes so long to replace harvested peat.*"[5]

The Guidelines give energy peat a $CO_2$ emission factor of 106 g $CO_2$/MJ, i.e. clearly higher than the factors of coal (anthracite 98.3 g $CO_2$/MJ) and oil (74.1 g $CO_2$/MJ).[6] Recent studies from Sweden support this figure for peat (Nilsson 2004). In their most recent National Inventory Reports all European peat burning countries use a similarly high factor, Ireland for its peat power plants even a factor of 140 g $CO_2$/MJ.

***Naturalistic fallacies…***

IPS presents a lot of (often wrong) facts to illustrate that peat differs from coal and lignite and overlooks the fact that most of these differences have no bearing on the issue at stake: the effect of peat combustion on the climate.

IPS states: "*It is misleading to equate currently developing and recently developed peat with lignite and coal.*"

Comments: IMCG does not *equate* peat with lignite and coal; we recommend that with respect to its climatic effect peat should be *treated* like lignite and coal. We recommend this, because

- the combustion of all these fuels implies mobilisation of carbon from a long-term carbon store;
- the combustion of all these fuels leads to net emissions of carbon dioxide to the atmosphere, and
- all these fuels have a rate of renewal that is irrelevant for societal timeframes.

IPS states: "*Coal was formed by plant remains that were compacted, hardened, chemically altered and metamorphosed by heat and pressure over a long geological time. … The plant groups, which were the parent material of coal, included club-mosses, horsetails and tree fern, all of which are now extinct (Prager, Barthelmes and Joosten 2006).*"

Comments: Prager et al (2006) do not state that the mentioned plant groups are extinct, because we know better: they are alive and – in the case of horsetails – still contribute to recent peat formation. Now that this

[4] www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

[5] www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/0_Overview/V0_2_Glossary.pdf

[6] www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf

misconception has been corrected, would IPS change its opinion and treat coal as a renewable resource? I think not… and this exactly illustrates how this and similar statements of IPS (whether they are factually correct or not) have no relevance for the climate debate. The way IPS mistakes facts for value judgements is a classic example of a naturalistic fallacy.

The paper referred to is again no 'key source'. Peatlands International, the glossy magazine of the International Peat Society, is not peer-reviewed and – although good and interesting papers may be found there – the magazine prints almost everything that is sent in, including articles of sometimes questionable scientific quality. My ample experience as an author for this journal has showed that there is no editorial feedback in content and that the journal does not shrink from unilaterally changing the content of a paper, when it does not serve IPS policy.

**Naturalistic fallacy**

A 'naturalistic fallacy' reduces the question of values to a question of facts. From the fact that a ring is made of gold it does not directly follow that the ring is valuable. We must also know that gold is valuable. Under the premise that coal and lignite are bad and biomass fuel is good, IPS assumes that if properties are summed up in which peat differs from the former or is similar to the latter, she has actually shown peat to be good.

IPS argues that peat is "*a much more acceptable fuel from a climate impact point of view*" because
- peat is made of plant species that are not extinct
- peat consists of partly decomposed remains of biomass
- peat is not compacted
- peat has been formed during the Holocene
- peat is no fossil and contains no fossils.

Whereas most of these statements are largely right (see above for the 'fossil' question), there is no logical connection between these facts and the effect of peat combustion on climate. Moreover, such facts have no bearing on the value judgement whether the combustion of peat is 'good', 'wise' or 'acceptable' for society.

IPS continues by giving a definition for lignite: "*Lignite is brown or soft coal, which has a higher moisture content and lower calorific value than black coal. It was formed mainly during the Tertiary period, 2 - 66 million years ago. Many of the genera of trees currently growing in tropical peat swamps have been found in lignite.*"

Comments: Again the focus is on age and botanical composition and again these facts have no relevance for the issue at stake: the (non-) renewability of peat and the effect on climate of using peat for fuel.

IPS states: "*Peat is the partly decomposed remains of the biomass that was produced, mostly by plants, on waterlogged substrates.*"

Comments: The same applies for lignite and coal, so this isn't even an argument to associate peat more strongly with biomass than with lignite or coal.

Talking of decomposition, if we focus on carbon (the most relevant element for climate change) and compare the fraction of the original biomass carbon that remains in the subsequent coalification products, peat is clearly much more closely related to lignite and coal than to biomass (fig. 2).

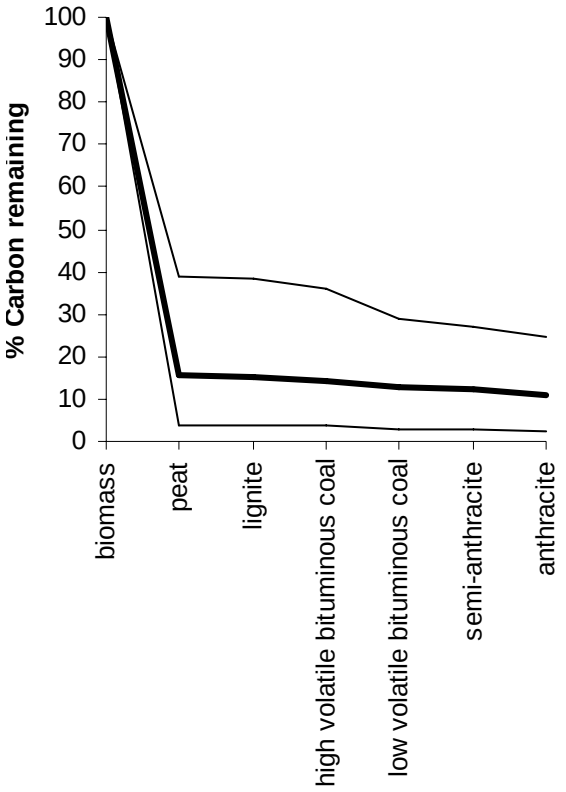



*Fig. 2: The amount of carbon remaining during the successive stages of coalification, expressed as a proportion of the carbon in the original biomass. Thick line: best estimate, thin lines: high and low limits. After: Dukes 2003.*

IPS states: "*Peat is mostly water saturated and therefore not compacted.*

Comments: Is this statement intended to mean that when a fuel has low water content and is compacted, it is fossil, not renewable, and bad for the climate? That would then also apply to wood briquettes and grass pellets (cf. Jones 2006).

IPS states: "*Peat harvested today in Northern hemisphere was formed during the Holocene which is the present time after the retreat of the glaciers once covering most part of Europe.*"

Comments: The Holocene is the period in which most of the present-day peat was formed. The "present time", however, is also the last part of the Quaternary, in which most of the peat and part of the

present-day lignite were formed. It is furthermore the last part of the Cenozoic, in which most of the present-day lignite and all peat were formed, *and* it is the last part of the Phanerozoic, in which all present-day coal, lignite and peat were formed. Moreover the "present time" is the last part of the Modern Times (18th century until today), the Christian Era (0 AD to today), and the Subatlantic (800 BC to today), in which only (a minor) part of the present-day peat was formed.

The IPS choice for the Holocene as a reference period is clearly prompted by the wish to show that peat is young. The overwhelming majority of our present day peat was, however, not formed during the last several hundred years of the Holocene, but during the thousands of years that came before. This illustrates how peat is part of the long term terrestrial carbon store, whose mobilisation has a negative effect on the climate.

IPS states: "*Those parent plant species, which formed the basal peat, are still forming new peat.*"

Comments: This is no criterion for climate neutrality, certainly not after you just have stated that lignite is build up from tree genera currently growing in tropical peat swamps. Or must we conclude that IPS also pleads for a 'renewability' and 'climate neutrality' status for lignite?

IPS states: "*Peat is not a fossil and does not contain any.*"
Comments: See the reference lists above that shows that the scientific world uses the word "fossil" in another sense.

In conclusion, we can choose from a wide variety of features, some of which make peat look more like biomass, while others make peat look more similar to coal. However, these comparisons do not address the climate effect of different types of fuel. The only criterion relevant for comparing the climate effects of different types of fuel is the effect their use has on climate. When we apply this criterion, peat is much more related to coal than to biomass (see below).

**Is the use of peat allowed?**

Naturalistic fallacy is deeply rooted in IPS. Many IPSers seem to assume that, because peat combustion is harmful to the climate, IMCG is always and everywhere fundamentally against peat extraction, period.
In fact, the position of IMCG is much more differentiated. "*The IPS/IMCG Wise Use Guidelines indeed allow peat extraction, provided that the full Framework for Wise Use (Chapter 5 of the book) is applied and a total and integrated cost-benefit analysis has been made that takes all values of peatlands into account*" (Joosten 2005a).
"*There may be honest reasons to locally – and with due observation of the many other values of peatlands – subsidise the use of peat for fuel, including domestic production or local employment. But 'climate change' clearly does not belong to these honest reasons*" (Joosten 2004).
On 22 July 2006, the IMCG Main Board decided on the concrete conditions under which peat extraction can be discussed. These conditions were included in the IMCG general Assembly Resolution for Finland (adopted 27 July 2006) and communicated to IPS in the joint IPS/IMCG meeting of 28 July 2006. They include:
- Only in sites, that have lost their characteristic species assemblage before 1990;
- Not in pristine peatlands;
- Not in sites that may impact pristine sites, Natura 2000 sites and potential Natura 2000 (and equivalent) sites.

IMCG acknowledges that peat extraction may be acceptable when a good balance and a fair trade-off have been made between the loss of peat, peatlands, and associated values on the one hand and the societal benefits on the other. Arriving at good decisions requires an open exchange of information, a good understanding of the facts, and a fair concept of distributional justice.
IMCG does not criticise IPS for pleading for peat combustion. IMCG criticises IPS for trying to manipulate wise societal decision-making on this subject by willingly and knowingly distorting the facts.

***Untimely error…***

With pseudo-scientific figure-juggling IPS tries to play down the negative climate effect of peat fuel. Most IPS allegations are demonstrably wrong.

IPS states: *The surface part of peat below the living ground layer, being less than 300 years old, amounts to 10.2% of the total peat carbon volume on average (Mäkilä 2006). Only the deeper and basal parts of the peat are thousands of years old. The harvested material consists thus of the living biomass above and below ground, the less than 300 years old surface layer (which is comparable to wood biomass, Mäkilä 2006) and older middle and basal peat.*

Comments: IPS is completely wrong in claiming that 300-year-old wood biomass and peat are 'comparable'. They are indeed of a similar age, but from a climate point of view these two types of fuel are completely different. The difference lies in the different future they would have.
Wood that is 300 years old – even if it were to remain in the forest – can be expected to largely change into $CO_2$ within the next decennia or centuries, when the tree dies and the dead wood decays. Using that wood for fuel means that its oxidation is somewhat accelerated and re-directed via an alternative pathway. The end products ($CO_2$ and $H_2O$) are the same and the same amount of $CO_2$ ends up in the atmosphere. The difference is that now humans

instead of microbes consume the energy provided by oxidation.
In contrast, peat that is 300 years old can be expected to largely remain peat for thousands of years to come. Peat is *the* very part of the former biomass that under normal conditions would *not* end up in the atmosphere as $CO_2$. Burning 300-year-old peat mobilizes the carbon that otherwise would have remained in the long term store that it had just entered. Burning peat – whether it is 10 or 300 or 8000 years old – thus leads to a net emission of $CO_2$ to the atmosphere.

**Biomass or peat?**

It is virtually impossible to distinguish between biomass and peat in the uppermost layers of living peatlands. Poschlod & Pfadenhauer (1989) found that apparently brown and dead *Sphagnum* from 15 cm below the surface is still able to produce new shoots, i.e. still belongs to the 'living ground layer'. The statement of Mäkilä (2006) "*Most of the biomass decays in the oxic peat layer at the surface*"(our emphasis, HJ) illustrates this difficulty, but from his article it is not clear how he addressed this issue. From the picture on the website of the Finnish Geological Survey (www.gtk.fi/tutkimus/turve/mak_1_naytteenotto.htm) I get the impression that a substantial part of his "uppermost 300 years of peat" may consist of biomass, i.e. of living material, not of peat.

**Biomass is not necessarily young**

Age is no criterion for something being or not being biomass. There are living plants that are older than 10,000 years and some microbes have survived as individuals for many millions of years (www.extremescience.com/OldestLivingThing.htm).

Because different greenhouse gases have a different lifetime in the atmosphere and a different heat-absorbing ability, their 'global warming potential' depends on the time horizon chosen (Joosten & Clarke 2002). An appropriate time frame to judge effects – for reasons of direct human contact, political decision making, and optimisation between time horizon and discount rate (Fearnside 2002) – is 100 years. This period has also been chosen by the Kyoto Protocol.
The focus of the IPS on 300 years therefore clamours for further analysis. The answer is found in Mäkilä (2006): "*The time scales relevant for the stabilisation of the $CO_2$ concentration in the atmosphere are, according to the IPCC Third Assessment report (IPCC 2001), in the order of 100-300 years.*"
You may check the full IPCC Third Assessment Report[7] and you will not encounter any such statement. But doing so, you will discover the error that Mäkilä has made. Mäkilä gravely misinterprets the IPCC findings that $CO_2$ concentrations in the atmosphere will continue to rise for another 100-300 years *after* the $CO_2$ emissions have decreased (fig. 3). The conclusion of Mäkilä "*Because the renewal time of peat layers under 300 years old is less than the time horizon considered for the stabilisation of the atmospheric concentration, these biomass sources can be regarded as renewable for climate consideration*" therefore is not only linguistically poor, but more importantly, it is completely wrong.

In contrast the Third Assessment Report states:
- "*All of the stabilisation profiles studied require $CO_2$ emissions to eventually drop well below current levels. … Stabilisation at 450 … ppm* (i.e. the level that would keep global mean temperature changes below 2 °C in the next 300 years, HJ) *would require global anthropogenic emissions to drop below 1990 levels within a few decades … and continue to steadily decrease thereafter.*"[8]
- "*stabilization at 450 ppm will require emission reductions in Annex I countries after 2012 that go significantly beyond their Kyoto Protocol commitments.*"[9]

Emission factors indicate that replacement of other fossil fuels by peat will lead to increased emissions per unit of energy produced (see above). The central aim of IPS in this debate, an increasing use of peat fuel facilitated by fiscal advantages, will therefore not lead to the lowering of $CO_2$ emissions. On the contrary, as this extra $CO_2$ source is not associated with an extra sink (see below), it will lead to increased $CO_2$ emissions that obstruct stabilisation of the $CO_2$ concentration in the atmosphere.

***Superficiality…***

In her diligence to 'prove' the climatic innocence of burning peat, IPS sums up a series of arguments that are irreconcilable. She claims, for example, that a minimum of 10 % of the fuel peat consists of young material (which is not true *and* not relevant) and proposes to concentrate peat extraction on agricultural peatlands (where young peat has already disappeared).

IPS states: "*This means that, on average, each peat fuel load contains minimum of 10 % very young peat which, according to current criteria, is renewable biomass.*
Comment: This statement is incorrect, also 'on average', even if it would be true that burning 300-year-old peat has the same impact on climate as burning 300-year-old biomass (it is not, see above). Everybody who has ever seen the extensive black plains where peat fuel is being extracted for many consecutive years can understand what is wrong here:

[7] www.ipcc.ch/pub/reports.htm

[8] www.ipcc.ch/pub/un/syreng/wg1ts.pdf
[9] www.ipcc.ch/pub/un/syreng/wg3ts.pdf

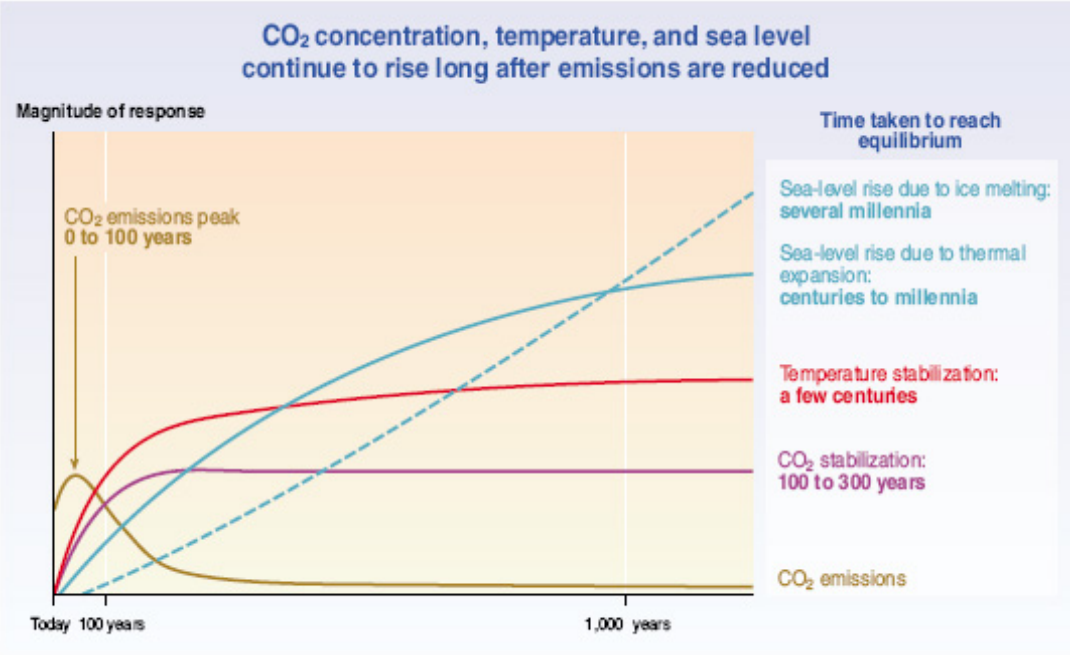



*Fig. 3: The figure from the synthesis report of the IPCC Third Assessment Report that shows how $CO_2$ concentrations in the atmosphere continue to rise and only stabilize 100 to 300 years after the reduction of $CO_2$ emissions (www.ipcc.ch/pub/syreng.htm). Mäkilä (2006) misinterprets this figure to mean that fuels younger than 300 years old have no relevance for climate change.*

**The logical consequence of oversimplification**

The picture of the Synthesis Report reproduced here as fig. 3 is the only place in the IPCC Third Assessment Report (TAR) where you can find back the "*100-300 years*" Mäkelä is referring to. The picture is – as you might expect from a synthesis report – a simplification that integrates the outcomes of different scenarios. In chapter 3 of the report of Working Group I of the TAR, the individual stabilisation curves are presented for eventual $CO_2$ levels between 450 and 1000 ppm. For a level of 450ppm stabilisation is reached after 100 years and for 1000ppm after (more than) 300 years (fig. 4).

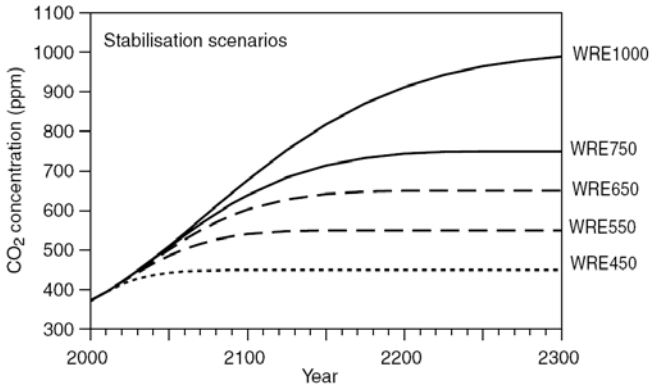



*Fig. 4: Stabilisation curves for different eventual $CO_2$ concentrations in the atmosphere (after Wigley et al. 1996). This is Fig 9(a) from the Technical Summary of the TAR Synthesis Report and is also found in Chapter 10 of Working Group I of the Fourth Assessment Report (AR4).*

As 1000ppm is a very high concentration (it would lead to a rise in global mean temperature of 6°C), and we should better aim at 450 ppm, Finnish logic would imply that wood and peat older than 100 years is not similar to biomass and should not be used if we want to prevent too drastic climate warming…

The mean depth of geological peatlands in Finland is 1.4 m. More than 60 % of the geological peatland area does not reach this depth[10]. For economic reasons fuel peat extraction concentrates on peatlands where peat thickness is 1.5-2 m or more, i.e. on a part that is not representative of the total peatland area. This implies that on peat extraction sites much less than 10% of the peat is younger than 300 years. Mäkilä (2006) himself states that the amount of peat younger than 300 years in thicker mires is only 3-5%. And it will be even less when peatlands already drained for other purposes are used for peat extraction.

On former agricultural areas (where – according to the IPS letter – peat extraction would cause the least environmental harm), the young layers have long disappeared by oxidation, and the same applies, to a lesser extent, to peatlands drained for forestry (see below, Turunen 2004, 2007, Holmgren et al. 2006).

And last but not least, I would not be proud to preferentially destroy the uppermost layers of pristine peatlands. The biological, hydraulic and chemical properties of these layers are of utmost importance for maintaining and restoring peat accumulation capacity. In the same way that a person dies when you remove his skin, most peatlands – especially bogs – stop accumulating peat after removal of the uppermost layers and are much more difficult to restore (Joosten 1995). Focussing on the top-layer on the basis of the false assumption that this part is "*renewable for climate consideration*" (sic!) destroys the prospects for future peat accumulation and frustrates the very renewability you pursue. For maintaining and restoring the peat accumulating capacity it is better – if you *do* need to extract peat – to save as much area with an intact top layer as possible by extracting the deeper layers as well.[11]

So the choice is either to destroy pristine peatlands with their excellent capacity for carbon sequestration and storage *or* to focus on already drained peatlands. In the latter case – currently put forward as the right strategy in Sweden and Finland – it is both inappropriate and incorrect to use the '300 years' argument.

***The proof…***

Her over-simplified way of reasoning shows that IPS does not (want to?) understand what the $CO_2$ problem and the climate change issue is all about.

IPS states: "*What is said here proves that peat is very near to biomass fuels, much closer to them than fossil fuels.*"

Comment: This closeness appears when you compare fuels on a time axis. Arithmetically, peat (with an age of say 4000 years) is then much closer to straw (with an age of 1 year) than to coal (with an age of 300 million years). But is such arithmetic of any relevance for the climate debate? Is burning lignite of 10 million years old better for the climate than burning oil shale of 500 million year old? Is burning last year's straw better than burning 5-year-old willow coppice or 50-year-old wood?

This over-simplified way of reasoning above all proves that IPS does not (want to?) understand what the climate change issue is all about. Whether the $CO_2$ emitted to the atmosphere originates from coal or from biomass is irrelevant for the climate system and for global climate change. The fact that global deforestation leads to increased $CO_2$ emissions is not because forest is fossil and not-renewable (in fact it is neither). It is because the long-term steady-state biomass carbon store of – for example – tropical rainforest (210 tC/ha) is replaced by the much smaller biomass store of grassland (12 tC/ha)[12] and because the difference ends up in the atmosphere.

With respect to climate the important issue is whether the atmospheric $CO_2$ concentration is increasing or decreasing. Or – to put it differently – whether the $CO_2$ is released from a hitherto long-term stable store (like a coal or peat deposit) where, without exploitation, the carbon would have remained more or less indefinitely, or whether the $CO_2$ is released from a supply whose $CO_2$ would end up in the atmosphere on the short term anyhow (like wood or straw). The use of carbon-based fuels can only be climate neutral if you use material that would have oxidized soon anyway (i.e. merely redirect the carbon oxidation pathway) or use material that otherwise would not have existed (e.g. the extra biomass from well-aimed biofuel cultivation).

In climate politics this has been simplified by using the term 'fossil fuel' for carbon derived from the first group and the terms 'renewable fuel' and 'biomass' for the latter. In general, this simplification is valid because most biomass (e.g. agricultural straw or wood from boreal forests) is part of a rather rapidly cycling pool in which the biomass would again become $CO_2$ in the foreseeable future.

This is not so in the case of peatlands: in living peatlands (mires) part of the biomass carbon is split off from the rapidly cycling pool and stored in the long-term stable store called 'peat'. In burning peat, even if it is 'young peat', you are consuming precisely that part that would otherwise remain withdrawn from the atmosphere for a very long time.

[10] http://en.gtk.fi/Research/Sustainable_Use/peat_resources.html

[11] In addition, the calorific value of young peat is much lower than of older, more humified peat (see elsewhere in this Newsletter).

[12] www.esd.ornl.gov/projects/qen/carbon3.html

***Old…***

IPS incorrectly equates the concepts 'non-renewable' and 'old' which appear to be related but are not identical. Because she apparently does not understand the processes involved, she ignores the fact that coal – just like peat – is still being formed today, albeit with such a low rate of renewal that it is irrelevant for society.

IPS states: "*It is unhelpful for IMCG to compare coal and lignite to peat since the time scales involved are so massively different and considering them in this way is misleading. Coal is not renewable in any timescale, only peat is. Coal does not accumulate but peat is when considered from a renewable point of view.*"

Comments: The question is not whether differences are *large* but whether they are *relevant*. As has been explained above, peat fuel is not derived from a rapidly cycling pool, but from a long-term store. It is this qualitative difference that matters, not the quantitative difference of being more or less old. The difference is – so to say – a matter of direction, not of distance.

Furthermore, IPS is mistaken in the idea that something that is old (like coal) can not originate today. Of course it can. Every day, new people of 100 years old 'originate' when they have their 100th birthday. Coals formation is – like living to become 100 years old – a long-term and slow process. But as the basic processes responsible for coal formation (peat accumulation, sedimentation and tectonics) have not changed over the past hundreds of millions of years new coal is being formed at this very moment as it has been forming for hundreds of millions of years (cf. fig. 5). The current rate of coal formation (= the volume that is originating today) is, however, much smaller than the current rate of coal consumption (= the volume of coal burnt today) and therefore irrelevant for our present day society. And the same applies to peat…

**From peat to coal in S-America**

"*Holocene to modern peat is also widespread along the Guyana and Suriname (Guiana) coastal plain adjacent to and southeast of the Orinoco Delta. Studies of the Orinoco Delta and Guiana coastal plain would provide valuable insight into environmental conditions conducive to widespread peat, and ultimately coal, development.*" (Warne et al. 2001).

**From peat to coal in New Guinea**

"*Observations at the Aitape coast (New Guinea) indicate that in this area peatlands are rapidly and regularly covered by marine clastic sediments resulting from at least 4 m subsidence in the last 970-1100 years*" (www.dpiwe.tas.gov.au/inter.nsf/WebPages/UTAR-52X8LP?open).

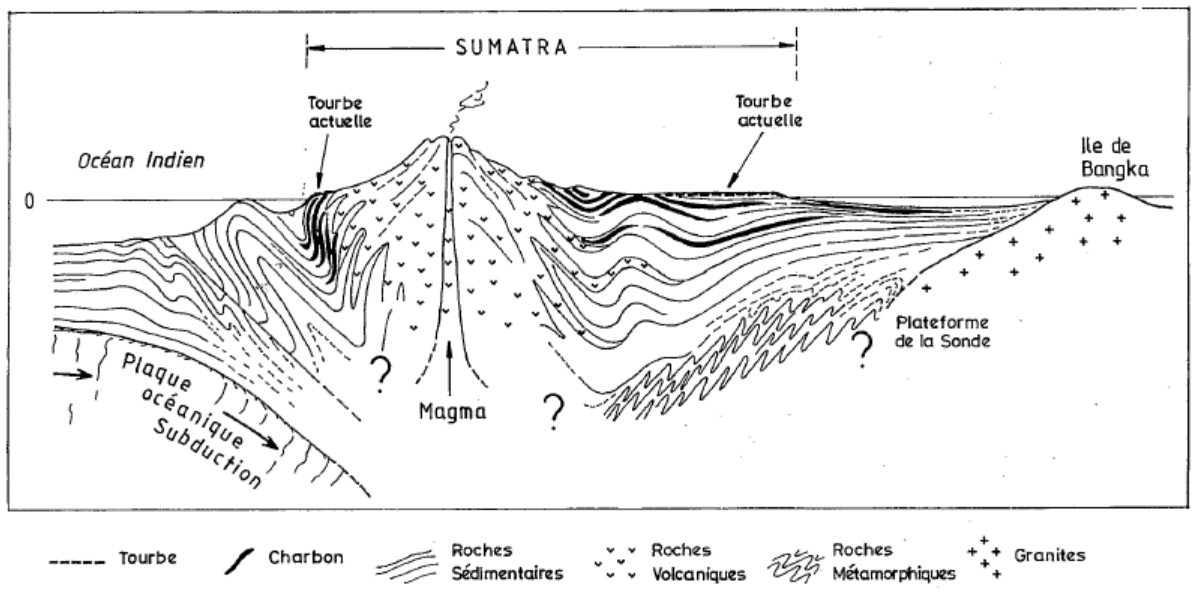



*Fig. 5: SW-NE transect through South-Sumatra, showing a subduction area where peat is currently being buried and will – in time – change into coal. After Sieffermann 1988.*

***Unbalanced…***

The 'accounting' of IPS is based on irrelevant comparisons, unjust claims, and false citations.

IPS states: "*The total area of peatlands in Europe is estimated to be 514,882 km$^2$. … The total production area for fuel peat in the EU amounts to 1,750 km$^2$ (0.34% of total peatland area)*
Comments: Again interesting information, but of no relevance for the discussion. The fact that the volume of coal currently consumed is only a minute fraction of the total coal reserves[13] does not make coal a climatically more innocuous fuel than oil of which the reserves are much smaller. And the same applies to peat.

**Coal is also climatically neutral…**
As coal is still being formed every day (be it in very small quantities) every person using coal for fuel could say: "At present some coal somewhere in the world is newly being formed and that coal compensates my coal consumption. Therefore, my fuel has to be considered climate neutral."
Whereas everybody immediately sees the nonsense of such claim, this is actually the way that IPS reasons when she claims that current global peat accumulation compensates for the negative climate effect of peat combustion.

IPS states: "*The annual harvested peat in the world equals, according to Joosten and Clarke (2002), about 15 million tonnes of carbon. The present sequestration rate of carbon in all mires of the globe is estimated to be 40 - 70 million tonnes annually (Joosten, H. and Clarke, D. (2002) p. 35), thus exceeding the annual use of peat 3 - 6 times.*"
Comments: As we have already been explaining for 10 years (Joosten 1997), this sustainability claim is wrong and unjust for a variety of reasons:

- In almost all individual countries of Europe, in the whole of Europe, and over the whole Earth the peat balance is negative, i.e. more peat is disappearing than is being formed (Joosten & Clarke 2002, *cf*. Hooijer et al. 2006). Next to the actual extraction of peat, enormous peat losses occur in agricultural, forested, burning and cutover peatlands. The peat lobby balances all of the gain (all peat accumulation in a country or a region) with only part of the losses (only from their peat extraction). Such procedure is unfair: Why should natural peat accumulation only compensate the losses caused by anthropogenic peat combustion and not also the collateral losses from peat extraction (drained neighbouring sites), and not also the losses caused by peatland agriculture and not also the losses caused by peatland forestry? It might be understandable (but irresponsible!) that the peat extraction and combustion lobby makes such an excessive demand, but it is inexcusable that IPS as a worldwide organisation representing all peatland-related interests supports such one-sided and short-sighted claim.
- The peat that is currently accumulating is not accumulating on the area allocated for peat extraction sites but 'elsewhere'. Much of that peat is not available for exploitation, because of technical or conservational reasons. Peat that is not available is not a 'resource' and may – with respect to the sustainability of the fuel – not be used for balancing losses through peat combustion.
- Peat extraction and combustion not only implies burning peat but also destroying the peat accumulating capacity of the peatland ecosystem, i.e. destroying 'renewability' itself. If you extract peat from a large pristine bog, it may take a while before your annual extraction volume exceeds the annual peat accumulation in that bog. But unless peat is actively and rapidly regenerating on the cutover sites, extraction will come to an end because all resources will be gone (and all peat carbon will have ended up in the atmosphere). The area of cutover bogs that have successfully been restored to new long-term peat accumulating ecosystems is still negligible and only a minute fraction of the area degraded by peat extraction. With respect to the volume of peat, the relationship is even more negative as the cut-over and degraded peatlands of the world are losing much more peat than is regenerating (see above). 'Renewability' is nice, but for *sustainability*, peat accumulation really has to be renewed in cut-over sites.
- The peatlands 'elsewhere' whose $CO_2$ sequestration is claimed for balancing $CO_2$ emissions from peat combustion were already part of the greenhouse balance long before the anthropogenic rise of atmospheric $CO_2$-levels. To be climatically neutral an additional $CO_2$ source from peat combustion can only be compensated by an additional sink, not by already long-term existing peatlands.

IPS states: "*The Geological Survey of Finland studied the Finnish peat reserves and found out that the country's peat resources in the year 2000 equalled those of 1950 in spite of historical and today's widespread use for agriculture and forestry (Turunen, J. 2004). Furthermore, Finland is a leading country in the industrial use of peat and its peatlands have been used also for the construction of water reservoirs and as a basis for road infrastructure. In spite of such use Finland's peat carbon stocks are in balance*."
Comments: The IPS statement that "*Finland's peat carbon stocks are in balance*" is again a grave misquote of the literature. In fact Turunen (2004) writes: "*the use of peatlands, for example forestry drainage, agriculture, energy production, road building and peat harvesting have together decreased the total mire area and peat storages* […]. *The estimated decrease of total C storage (peat only) from 1950 to present was estimated as 4 - 74 Tg or 0.1 - 1.4 % of the original C storage.*" This loss is of

[13] http://en.wikipedia.org/wiki/Coal

the same magnitude as the total Finnish peat extraction volume over the period 1950 – 2000 (39 Tg, Turunen 2004).
Most probably a considerable part of the increased 'peat' carbon sequestration after drainage will eventually turn out to be 'litter' (Joosten 2000) that would make the peat balance even more negative. "*If a conservative estimate of 2.2 Tg yr$^{-1}$ (Minkkinen et al. 2002) for C accumulation into peat is used the total C storage of Finnish peatlands has decreased approximately 74-144 Tg*" (Turunen 2004). In the revised version of his 2004 paper, Turunen (2007) comes to the conclusion that the C storage of peat in Finland has decreased with about 73 Tg, i.e. almost double the amount of the total peat extracted during that period (38.5 Tg)…

***Sinks…***

IPS pretends that the carbon dioxide losses from peat combustion can easily be compensated by subsequent restoration or reclamation of the cut-over peatlands. Because of the disproportional carbon content of peatlands this claim is wrong.

IPS states: "*Many peatlands in Europe, which were drained and used for agriculture and forestry in the past, are now sources of green house gases owing to degradation and oxidation of the unsaturated peat layer.*
Comments: Correct, but a surprising statement after you just have (falsely) claimed that the peat carbon stock in Finland has not decreased in spite of draining 60 % of the peatland area…

IPS states: "*If these areas are not significant sources of food or other income for local people, they could be used for peat production and transformed afterwards relatively easily to carbon sinks. This could be done by restoring them to peat-forming mires, by reclaiming them to forests or by planting energy crops. These types of carbon sinks will be needed in coming decades.*"
Comments: Peatlands from which the peat is extracted and that afterwards are restored to mires, forests or energy crop plantations are not net sinks but net sources of carbon, because the growing biomass stock cannot, within a measurable time, compensate the carbon losses from the extracted peat stock (*cf*. Holmgren 2006). This is clear when you consider that a peatland in the boreal zone on average contains at least 7 times more carbon per ha than old forest on mineral soil (IPCC 2001, Alexeyev & Birdsey 1998). As peat extraction focuses on deeper peatlands than average (see above) this discrepancy is even larger.
Furthermore, the question of whether "*peat production areas* can *be turned into carbon sinks*" is not relevant for the climate debate. The question is whether they factually *are* turned into carbon sinks. A rapid survey of IMCG (2006) has shown that restoration to new peat accumulating ecosystems is currently happening on only a minute proportion of cut-over peatlands. The vast majority of cut-over peatlands continue to emit carbon from the remaining peat.

**Peat is on the wrong side of the problem**

Peatland associated energy and climate policy is at a crossroads. On the one hand IPS is desperately clinging to defending and expanding peat combustion on the basis of the false argument that this could mitigate climate change, whereas in reality peat combustion is as harmful to the environment as coal combustion.
On the other hand, tens of millions of hectares of drained peatlands are responsible for annual $CO_2$ emissions of over 3 Gtons (Assessment of peatlands, biodiversity and climate change 2007). This equals 20% of the GHG emissions of the Annex 1 Parties to the UNFCCC (*cf*. Climate Change Secretariat UNFCCC 2005) and represents a value[14] of 70 milliard (thousand million) EURO per year!
A modern peatland organisation would focus on

- Rewetting of drained peatlands to diminish GHG emissions. This largely concerns lands with limited conservational value and little agricultural claims as many areas are strongly degraded, abandoned or only marginally used
- Cultivation of suitable crops under wet conditions ('paludicultures') on these peatlands to substitute fossil fuels and raw materials
- In this way avoiding GHG emissions both from the peatlands and fossil resources
- Stimulating research into new paludiculture crops, cultivation techniques, and applications
- Lobbying to widely implement such practises (Joosten & Augustin 2006).

The economic and political facilities are available in the framework of the Kyoto Protocol (see contribution of John Couwenberg in this Newsletter) and in voluntary carbon markets. The cultivation and emission technological expertise is rapidly increasing. The challenge is now to stimulate the implementation of traditional bio-resources and of second generation biofuels, by aimed research and developing political and economic incentives.
This will be beneficial for climate mitigation (by avoiding peatland emissions and replacing fossil resources by renewables), for employment and livelyhood in many rural areas, and for biodiversity conservation (as largely valueless lands are upgraded).
Peat enterprises and IPS should take *that* challenge instead of trying to increase the market for a fossil, finite, and environmentally damaging fuel like peat.

**Peatlands are part of the solution!**

IPS states: "*The possibility to reuse energy peat production sites as new carbon sinks is another*

[14] in EUA Dec08 Futures prices of 7 June 2006, www.climatecorp.com/pool.htm

*difference between peatlands and fossil fuel producing coal mines and oil wells.*"
Comments: Again an untrue statement. At present, it is common policy to rehabilitate open cast lignite and coal mines to – for example – forests (e.g. Pe?ka-Gos?ciniak 2006, Sperow 2006, Ussiri et al. 2006). Depleted gas and oil reservoirs are prime candidates for $CO_2$ storage (IPCC 2005[15]). All these reuse options, however, do not make lignite, coal, gas or oil into climate neutral fuels. Similarly, after use of cut-over peatlands does not make peat climatically neutral.

IPS states: "*This difference is clearly shown in life cycle analyses.*"
Comments: This is first of all not true (see below). Furthermore, it is again comparing apples with oranges: the after use options are simply not included in most life cycle analyses of the other fossil fuels (e.g. Pingoud et al 1999, Nilsson & Nilsson 2004, Holmgren et al. 2006).

***Comparisons***

To delude into thinking that peat combustion is climatically innocent, IPS compares it with the worst and most senseless use of peatlands: having them abandoned and keeping them drained. Even compared with that, the climatic effects of combustion are worse.
The scenario results are furthermore flawed by using a 300 years perspective instead of the normal and internationally accepted standard of 100 years. In this way results look much less negative than they are.

IPS states: "*A very recent report by the VTT Technical Research Centre of Finland (Kirkinen, Hillebrand and Savolainen, 2007) concluded that the climate impact of peat per energy unit is, over a 300 years' perspective, about 10% of the impact of coal, if the peat is produced from former agricultural areas, and roughly more than half of the impact of coal, if peat is produced from fertile areas drained for forestry.*"
Comments: Former agricultural areas and drained eutrophic peatlands are huge emittors of the greenhouse gases (GHG) carbon dioxide ($CO_2$) and nitrous oxide ($N_2O$). In several countries impressive rewetting activities are undertaken to reduce these GHG emissions (e.g. in Germany, Poland, Belarus, *cf*. Joosten & Augustin 2006). IPS thus compares the GHG effect of peat extraction and combustion with the worst and most senseless use of peatlands: to have them abandoned and keep them drained.
Only in comparison to such senseless and damaging waste peat extraction for fuel looks just a little bit worse (but still *worse*!) on the GHG emission scale. To present that as a positive fact is perverse.

This way of reasoning is similar to pretending that burning coal leads to no extra $CO_2$ emission when you use coal that would burn anyhow, e.g. that from burning coal seams (*cf*. Prakash & Gupta 1999[16], fig. 6), that only in China emit 75 – 350 Mtonnes of $CO_2$ per year (Voigt et al. 2004[17]). Instead of solving the problem, the problem is abused for covering up own weaknesses.

*Fig. 6: Burning coal seams in China, the parallel to drained and abandoned agricultural peatlands. According to IPS reasoning a source of low climate impact fuel. Photo: Anupma Prakash, www.ehponline.org/docs/2002/110-5/forum.html*

The gas that Russia is providing for energy generation in Europe would – with the same crooked reasoning – be carbon neutral, because the Russians would otherwise burn it off. Actually, burning Russian gas should even entitle you to carbon credits, because otherwise it (methane) would be released directly into the air. By burning this methane, you decrease the greenhouse effect…
The last logical step in this questionable way of reasoning would be the claim that peat extraction is climatically neutral when it takes place on areas where peat extraction anyhow would take place…

**Peat from agricultural areas?**
Agricultural areas are not a realistic prospect for sustainable peat extraction, because
– in the major peat burning countries the agricultural peatlands have only shallow peat layers. In Finland, for example, from the 700,000 ha of former agricultural peatlands currently only 85,000 ha are left, the rest has largely disappeared because of complete oxidation of the shallow peat layer. In 2000 42,000 ha of peatlands in Finland were under peat extraction (Turunen 2004); most peat extraction does *not* occur on agricultural areas (Holmgren et al. 2006);
– agricultural peatlands are no renewable resource. Or would IPS propose to drain pristine peatlands to create new agricultural peatlands?...

[15] www.ipcc.ch/activity/srccs/index.htm

[16] www.coalfire.caf.dlr.de
[17] www.ehponline.org/docs/2002/110-5/forum.html

And again IPS is extremely selective in citing from the literature. Figures 7 and fig. 8 below clearly show that almost all peat fuel life cycles (which include mitigating after use options for peatland but not for coal…) lead to greater radiative forcing than coal. Only peat extraction from agricultural peatlands with subsequent afforestation leads to lower values.
But even in these extreme cases the radiative forcing remains positive, i.e. climate heating. Holmgren (2006), who included afforestation after use both in the peat and coal life cycle analyses found that – all other things being equal – the use of fuel peat led to higher radiative forcing than the use coal.

**After-use**

The after-use of cut-over peatlands may mitigate the climatic effects of peat combustion more 'effectively' than the after-use of lignite and coals mines. This is attributable to the poor spatial energy concentration of peatlands. To gain a specific amount of energy, much more peatland area must be destroyed and can subsequently be afforested or reforested. The same would apply should the peat industry focus more on shallow peatlands (or extract only surficial peat): the greater the area you exploit, the greater the area you can subsequently use to 'compensate for the damage' and the lower the 'life-cycle peat combustion emission factor' would be. The logical end-point of such development – and the most positive for climate – is indeed no peat extraction at all and use of the (rewetted!) area directly for biomass cultivation!

Interesting is again the use of the "*300 years' perspective*", instead of the internationally accepted standard reference time frame of 100 years (see above). A reason for focussing on this deviating time frame becomes immediately clear from figures 7 and 8. On the normal 100 years timeframe hardly any difference in radiative forcing can be observed between the different peat and coal extraction scenarios. The differences become clearer only when taking a longer-term view.
In discussions on the carbon storage effect of peatland drainage in relation to afforestation the opposite trend is observed: the effects are positive in the first decennia and change to the negative only after 100 years (with cutting) resp. 300 – 400 years (without cutting of the forest) (Laine & Minkkinen 1996).
This shows how sensitive perceived climate effects are to the chosen period of observation and illustrates the necessity of using standard time frames (without neglecting the other ones!).
It furthermore demonstrates how easily the outcomes of scenario studies can be manipulated by a seemingly innocent alteration of the time frames.

***Wise***

IPS ignores the fact that the joint IPS/IMCG Wise Use approach is not about concrete outcomes and decisions but about the quality of the process leading to outcomes and decisions. The limited ability and willingness to exchange ideas and information show that IPS has not sufficiently assimilated the Wise Use philosophy.

IPS states: "*The IPS has combined with IMCG to develop a procedure for the reasoned and wise use of peat and peatlands globally (Joosten, H. and Clarke, D., 2002). This contains sound advice for the peat industry that, in turn, has to follow the 'wise use' approach.*"
Comments: The Wise Use book distinguishes between different types of conflicts. The difference in opinion as to whether peat combustion is harmful to the climate or not is clearly a 'conflict dealing with facts'. A consensus about such questions can, according to Joosten & Clarke (2002), easily be reached when
- all parties involved really want to know the right answer;
- agreement exists on the content of the terms (in this case words like 'peat', 'peatland', 'fossil', 'renewable', 'biomass' etc.) and the period of time and the location and area under consideration; and
- all available information on the subject is exchanged.

The selective use of data, the aberrant use of terms and concepts, and the limited willingness to exchange ideas and information in an open discourse, give the impression that IPS does not really want to know the right (state-of-the-art) answer.

IPS states: "*In most cases previous extraction sites are destined to become $CO_2$ sinks again.*"
Comments: But only *after* the original stores have been turned by peat extraction into such large $CO_2$ sources that the mentioned sinks cannot compensate for thousands of years…

IPS states: "*In conclusion, in order to put $CO_2$ emissions into context, it is important to emphasise that most of the carbon liberated from peatland in the world today is taking place in tropical Southeast Asia where, in 1997, between 0.87 and 2.57 Billion tonnes of carbon (equivalent to 2.9-8.5 Bt $CO_2$) were released to the atmosphere as a result of forest and peat fires in Indonesia in only 4 months (Page, et.al. 2002).*"
Comments: An obvious attempt to play down own weaknesses by pointing at problems of others. A problem may look smaller by comparison with bigger problems, but in reality the problem remains as big as it is.

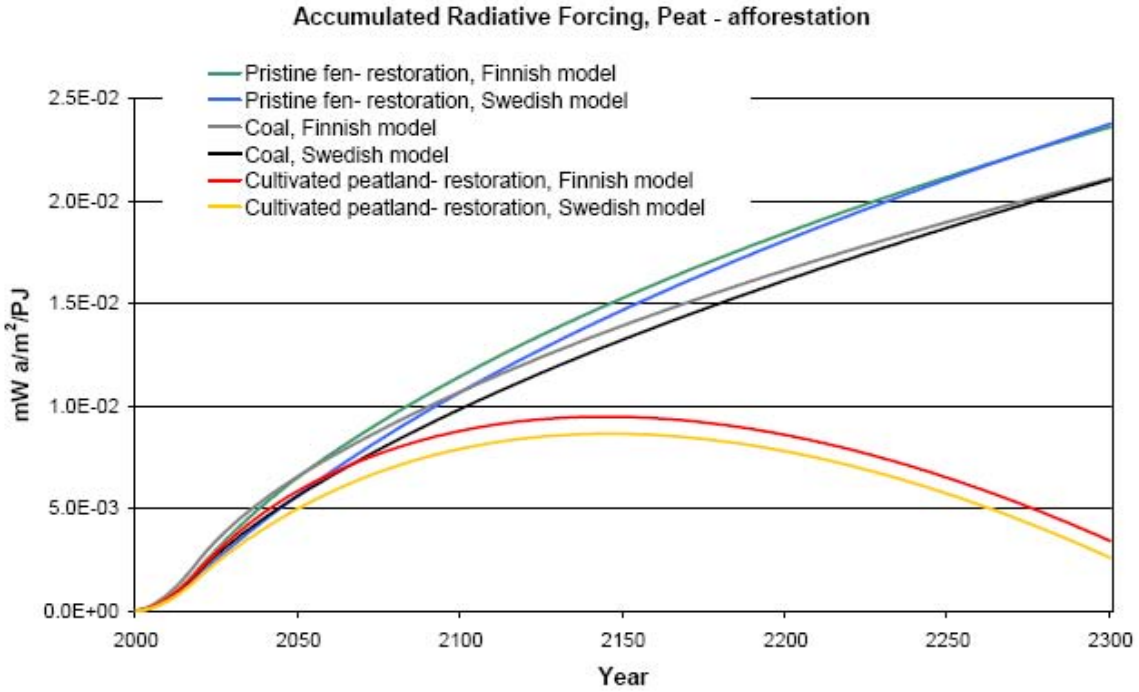



*Fig. 7: Cumulative radiative forcing of different peat chains and a coal chain as a function of time. From: Holmgren et al. 2006.*

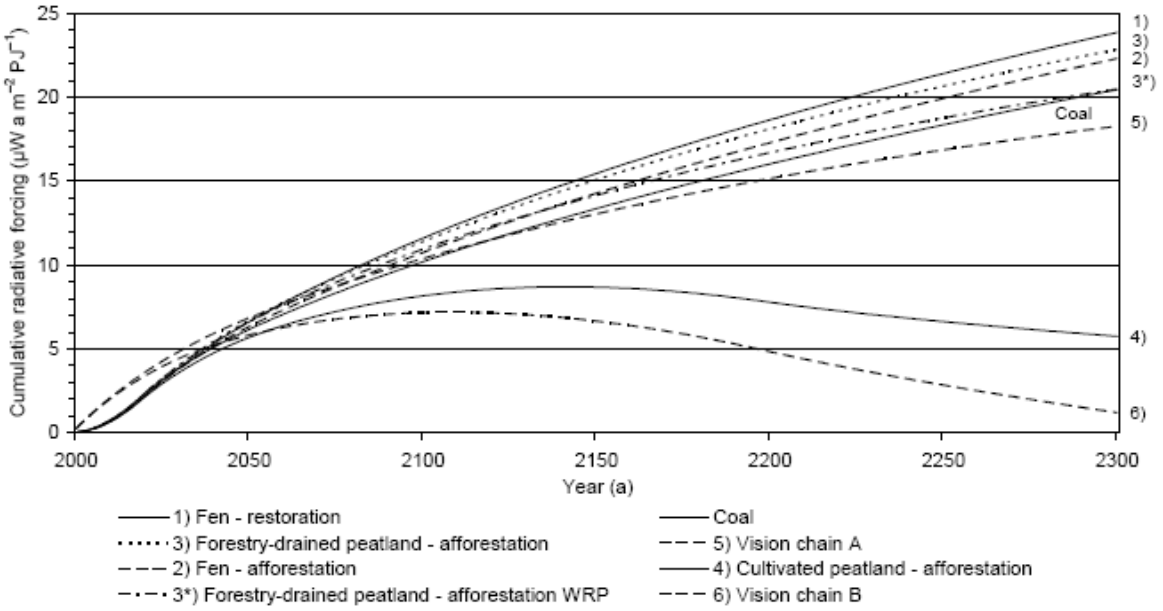



*Fig. 8: Cumulative radiative forcing of different peat chains and a coal chain as a function of time. In Vision chain A peat is extracted with a new peat cutting technology from a forestry drained peatland that is afforested afterwards. In Vision chain B peat is extracted by the new technology from a cultivated peatland that is is afforested afterwards. From: Kirkinen et al. 2007.*

IPS states: "*In the 10 years since then it is estimated that an average of around 2 Bt of $CO_2$ is released every year from peatland in Southeast Asia as a result of peatland deforestation, drainage, degradation and fire. This is equivalent to about 30% of global $CO_2$ emissions from fossil fuels (Hooijer et al., 2006, p.29).*"

Comments: IPS has a peculiar way with dealing with 'references to key sources'. Hooijer et al. (2006) write on p. 29 about "*a total $CO_2$ emission figure for SE Asian peatlands of 2000 Mt/y …, equivalent to almost 8% of global emissions from fossil fuel burning*" (our underling). Is this again just a mistake or a primitive attempt to try and play down the

importance of peat fuel in the peatland associated climate debate?

IPS states: "*The European Union should focus especially on wise use of tropical peatlands in agriculture and forestry in order to prevent senseless release of $CO_2$ in to the atmosphere.*"
Comments: The EU will earn more credibility in countries with huge peatland emission problems if she first puts her own affairs straight. How should she otherwise explain that peat fuel burning in Europe is considered to be climatically innocent and peat soil burning in SE Asia a threat to the global climate?

***Misguided…***

IPS states: "*The IPS is of the view that peat is a much more acceptable fuel from a climate impact point of view than fossil fuels*
Comments: A view that is in conflict with the facts cannot contribute to a wise use of peatlands (Joosten & Clarke 2002).

IPS states: "*and peat can be used in a wise way for the benefit of mankind now and in the future.*"
Comments: At least that is a position we share!

IPS states: "*On behalf of the Executive Board of IPS, with the guidance of the Scientific Advisory Board of IPS,*
Comments: I would not know where to hide for shame as a scientist if I had guided such a letter… Furthermore, I would feel abused if I would discover that the letter that I had 'guided' was send to the European Commission on February 22, made public on the IPS website on March 7 (pdf file created on 07.03.2007 at 07.58.43 h AM), and only then discussed at the IPS Scientific Advisory Board meeting in Tullamore on March 9…

**Scientific guidance?**

The Scientific Advisory Board (SAB) of IPS consists of the 2nd Vice President of IPS and the Chairs of the eight Commissions of IPS. The SAB was created in November 2004 to offer 'the IPS Commissions a better forum for communication and coordinating their projects' (www.peatsociety.org/index.php?id=89). Although the Board comprises several honourable scientists, the task of the SAB is not to give scientific guidance. The Board was created to contribute to 'the balance of industry and science IPS stands for' (www.peatsociety.org/index.php?id=27). The contested letter to the European Commission illustrates how in fact the title 'scientific' is abused for short-sighted interests of (part of?) the IPS industry block.

***Conclusion***

Back to the question addressed in the title of this contribution: is the IPS a fossil or renewable, i.e. markedly outdated and old-fashioned or able to address the challenges of a changing world?
The letter to the European Commission shows that the Society has at least started to try and discuss important issues. That is certainly progress compared to the approach of 10 years ago. The weakness of the contribution – full of crooked reasoning, inconsistencies, naturalistic fallacies, half-truths, manipulations and mistakes – however, irresistibly forces the old saying of Ovid upon me: *Ut desint vires tamen est laudanda voluntas*: though the power be lacking, the will is to be praised all the same.
Maybe 'slowly renewable' would be the appropriate label for IPS under these circumstances. But it is clear that until now IPS's rate of renewal is – similar to that of peat – too slow to be relevant for society.

***References***

Alexeyev, V.A. & Birdsey, R. A. 1998. Carbon storage in forests and peatlands of Russia. USDA Forest Service. General Technical Report NE-244, 137 p.

Alm, J., Schulman, L., Silvola, J., Walden, J., Nykänen, H. & Martikainen, P.J. 1999. Carbon balance of a boreal bog during a year with an exceptionally dry summer. Ecology 80: 161-174.

Climate Change Secretariat UNFCCC 2005. Greenhouse Gas Emissions Data for 1990 – 2003 submitted to the United Nations Framework Convention on Climate Change. Key GHG data. United Nations Framework Convention on Climate Change, Bonn, 157 p.

Crill, P., Hargreaves, K. & Korhola, A. 2000. The role of peat in Finnish greenhouse gas balances. Ministry of Trade and Industry - Studies and Reports, 20/2000, 71 p.

Dukes, J.S. 2003. Burning buried sunshine: human consumption of ancient solar energy. Climatic Change 61: 31–44.

Fearnside, P.M. 2002. Why a 100-year time horizon should be used for global warming mitigation calculations. Mitigation and Adaptation Strategies for Global Change 7: 19-30.

Frolking, S. & Roulet, N.T. 2007. Holocene radiative forcing impact of northern peatland carbon accumulation and methane emissions. Global Change Biology 13: 1079–1088.

Holmgren, K. 2006. Climate impact of energy utilisation scenarios of forestry drained peatlands. IVL report B 1683, IVL, Stockholm.

IPCC 2001. Climate Change 2001: Working Group I: The scientific basis. www.grida.no/climate/ipcc_tar/wg1/ index.htm

Holmgren K., Kirkinen, J. & Savolainen, I. 2006. The climate impact of energy peat utilisation – comparison and sensitivity analysis of Finnish and Swedish results. IVL B-rapport 1681, Stockholm, www.ivl.se/rapporter/ pdf/B1681.pdf

Hooijer, A., Silvius, M., Wösten, H. & Page, S. 2006. PEAT-CO2, Assessment of $CO_2$ emissions from drained peatlands in SE Asia. Delft Hydraulics report Q3943.

Assessment of peatlands, biodiversity and climate change. Information paper for CBD SBSTTA, July 2007.

Jones, J. 2006. A fuel of convenience. Why pellets are packing the power. Renewable Energy World 9 (3): 32-41.

Joosten, J.H.J. 1995. Time to regenerate: long-term perspectives of raised bog regeneration with special emphasis on palaeoecological studies. In: B.D. Wheeler, S.C. Shaw, W.J. Fojt & R.A. Robertson (eds.): Restoration of temperate wetlands. Wiley, Chichester, pp. 379 - 404.

Joosten, H., 1997. Peat and the art of energy tax evasion. International Mire Conservation Group Members= Newsletter 3: 13 - 17.

Joosten, H., 2000. The role of peat in Finnish greenhouse balances. International Mire Conservation Group Newsletter 2000/3: 2 – 4.

Joosten, H. 2004. Renewability revisited: on folly and swindle in peat energy politics. IMCG Newsletter 2004/1: 16 – 20.

Joosten, H. 2005a. And what about peat? EU eco-labels under revision. IMCG Newsletter 2005/1: 12 – 18.

Joosten, H. 2005b. Peat not allowed in EU Ecolabel: on peat extraction, ecolabelling and restoration. IMCG Newsletter 2005-4: 16-18.

Joosten, H. & Augustin, J. 2006. Peatland restoration and climate: on possible fluxes of gases and money. In: Bambalov, N.N. (ed.): Peat in solution of energy, agriculture and ecology problems. Proceedings of the International Conference Minsk, May 29 – June 2, 2006. Tonpik, Minsk, 412 - 417.

Joosten, H. & Clarke, D. 2002. Wise use of mires and peatlands. International Mire Conservation Group and International Peat Society, Saarijärvi, 304 p.

Kirkinen, J., Minkkinen, K., Penttilä, T, Kojola, S., Sievänen, R., Alm, J., Saarnio, S., Silvan, N., Laine, J. & Savolainen, I. 2007. Greenhouse impact due to different peat fuel utilisation chains in Finland — a life-cycle approach. Boreal Env. Res. 12: 211–223.

Laine, J., and Minkkinen, K., 1996, Forest drainage and the greenhouse effect. In: Vasander, H. (ed.): Peatlands in Finland. Finnish Peatland Society, Helsinki, pp. 159-164.

Mäkilä, M. 2006: A lot of under 300-year-old peat deposits in Finland. Peatlands International 2006/1: 7-9.

Minkkinen, K., Korhonen, R., Savolainen, I. & Laine, J. 2002. Carbon balance and radiative forcing of Finnish peatlands 1900-2100 . the impact of forestry drainage. Global Change Biology 8: 785-799.

Nilsson, K., 2004. The carbon dioxide emission factor for combustion of Swedish peat. IVL B-report B1595, Stockholm. www.ivl.se/rapporter/pdf/B1595.pdf

Nilsson, K. & Nilsson M. 2004. The climate impact of energy peat utilisation in Sweden – the effect of former land-use and after-treatment. IVL B-rapport 1606, Stockholm.

Page, S.E., Siegert, F., Rieley, J.O., Boehm, H-D,V., Jaya, A. & Limin, S. 2002. The amount of carbon released from peat and forest fires in Indonesia during 1997. Nature 420: 61-65.

Pe ka-Go ciniak, J. 2006. Restoring nature in mining areas of the Silesian Upland (Poland). Earth Surface Processes and Landforms 31: 1685 – 1691.

Petterson, R. 2004. Cultural aspects of peat and peatlands – a Swedish approach. In: Päivänen, J.(ed.): Wise Use of peatlands. Proceedings of the 12th International Peat Congress. International Peat Society, Jyväskylä, pp. 568-572.

Pingoud K., Mälkki H., Wihersaari M., Hongisto M., Siitonen S., Lehtilä A., Johansson M., Pirilä P. & Otterström T. 1999. ExternE National Implementation Finland. VTT Publications 1999, VTT, Espoo.

Popper, K. 1976. Unended quest. An intellectual autobiography (1986 edition). Flamingo-Fontana Paperbacks, Glasgow, 270 p.

Poschlod, P. & Pfadenhauser, J. 1989. Regeneration vegetativer Sproßteilchen von Torfmoosen - Eine vergleichende Studie an neun Sphagnum-Arten (Summary: Regeneration of vegetative parts of peat mosses - a comparative study of nine Sphagnum species). Telma 19: 77-88.

Prager, A., Barthelmes, A. & Joosten, H. 2006. A touch of tropics in temperate mires: on Alder carrs and carbon cycles. Peatlands International 2006/2: 26-31.

Prakash, A. & Gupta, R. P. 1999. Surface fires in Jharia coalfield, India - their distribution and estimation of area and temperature from TM data. International Journal of Remote Sensing 20: 1935 – 1946.

Roulet, N.T., Lafleur, P.M., Richard, P.J.H., Moore, T.R., Humphreys, E. R. & Bubier, J. 2007. Contemporary carbon balance and late Holocene carbon accumulation in a northern peatland. Global Change Biology 13: 397–411.

Schoockius, M. 1658. Tractatus de Turffis ceu cespitibus bituminosis. Johannes Cöllenus, Groningen, 264 p.

Sieffermann, R.G. 1988. Le système des grandes tourbières equatorials. Ann. Géo. 544: 642-666.

Sperow, M. 2006. Carbon sequestration potential in reclaimed mine sites in seven east-central states. J. Environ. Qual. 35:1428-1438.

Turunen, J. 2004. Development of Finnish peatland area and carbon storage 1950-2000. Geological Survey of Finland, Peat Research Report 47/2004.

Turunen, J. 2007. Development of Finnish peatland area and carbon storage 1950 – 2000. Submitted to Boreal Environmental Research.

Vapo Oy 2006. Local fuels – Properties, classifications and environmental impacts. Vapo, 23 p. http://tinyurl.com/35oc9n

Ussiri, D. A. N., Lal, R. & Jacinthe, P. A. 2006. Soil properties and carbon sequestration of afforested pastures in reclaimed minesoils of Ohio. Soil Sci. Soc. Am. J. 70: 1797-1806.

Voigt, S., Tetzlaff, A., Jianzhong Zhang, Künzer, C. Zhukov, B., Strunz, G., Oertel, D. Roth, A., van Dijk, P.M. & Mehl, H. 2004. Integrating satellite remote sensing techniques for detection and analysis of uncontrolled coal seam fires in North China. International Journal of Coal Geology 59: 121-136.

Warne, A.G., White, W.A., Aslan, A. & Guevara, E. H. 2001. Extensive Late Holocene peat deposits in the Orinoco delta, Venezuela. A modern analog for coal development in a tropical delta. GSA Annual meeting. http://gsa.confex.com/gsa/2001AM/finalprogram/abstract_18566.htm

Wigley, T.M.L, Richels, R. & Edmonds, J.A. 1996. Economic and environmental choices in the stabilisation of atmospheric $CO_2$ concentrations. Nature 379: 242-245.

Hans Joosten is (with Donal Clarke) author of the IPS/IMCG Wise Use book. He is founding member of the Dutch National Committee (NC) of the International Peat Society (IPS), chairman of the Section Geosciences of the German Peat Society, laureate of the 2005 C.A. Weber medal of the German Peat Society ("for his research into peat formation and peatland ecology, as well as for developing a framework for the Wise Use of Mires and Peatlands"), awardee of the IPS 2006 Wim Tonnis Peat Award ("for his distinguished contribution to peat and peatland science and industry, especially in the promotion of Wise Use"), Secretary-General of the International Mire Conservation Group, and associate professor in Peatland Science and Palaeoecology at Greifswald University (Germany).

## Peatlands; Peat, UNFCCC and the Kyoto Protocol

*by John Couwenberg*

The United Nations Framework Convention on Climate Change (UNFCCC)[1] was adopted along with the UN Convention on Biological Diversity (CBD) and the Convention on Combating Desertification (CCD) at the United Nations Conference on Environment and Development (UNCED), also known as the Earth Summit, held in Rio de Janeiro in 1992. Its main objective is formulated in article 2 of the convention:

> *"The ultimate objective of this Convention [...] is to achieve [...] stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner."*

This objective shall be achieved by reducing emissions of greenhouse gases (GHGs) to the atmosphere and sequestering carbon in terrestrial ecosystems. Currently, the Convention has been signed by 189 countries, divided into two groups: i) industrialised or developed countries and countries with economies in transition, referred to as Annex I countries, and ii) developing countries (Non-Annex I countries).

The UNFCCC treaty urged countries to take measures, but set no mandatory limits on greenhouse gas emissions for individual nations and contained no enforcement provisions. Such binding emission limits were later agreed in an extension to the original treaty: the Kyoto Protocol. More than 160 countries have ratified the Kyoto Protocol, representing over 60% of emissions from Annex I countries[2]. By ratifying the Protocol, Annex I countries accept emission reduction obligations. Non-Annex I countries have no GHG emission reduction obligations but can transfer emission reductions to Annex I countries.

In the first commitment period (2008-2012), Annex I countries have to reduce their collective emissions of greenhouse gases by 5.2% compared to the year 1990. The goal is to lower overall emissions of six GHGs – $CO_2$, $CH_4$, $N_2O$, $SF_6$, HFCs, and PFCs. National limitations range from 8% reductions for the European Union and some others to 6% for Japan, 0% for Russia, and permitted increases of 8% for Australia and 10% for Iceland.

The Kyoto agreement offers flexibility in how countries may meet their targets. Although the majority of emission reductions has to be achieved on the national level, Annex I countries can use emission allowances of other Annex I countries through Emissions Trading (ET). Furthermore, they can acquire foreign GHG emission reductions by carrying out projects in other Annex I countries (Joint Implementation, JI) or non Annex I countries (Clean Development Mechanism, CDM). By increasing biological sinks, which remove carbon dioxide from the atmosphere, in the Land Use, Land Use Change and Forestry (LULUCF) sector, emissions partially can be compensated. Up to 3% of the total 5.2% of emission reductions may be offset by LULUCF activities.

The Convention requires precise and regularly updated inventories of GHG emissions from industrialized countries (Annex-I). These are presented as two figures, one without LULUCF and one with LULUCF. Under the Kyoto Protocol countries are obliged to account for all emissions from the so called Annex A sectors (energy, industry, solvents, agriculture and waste), but the accounting of the LULUCF sector is partly voluntary and restricted to emissions and removals from specific activities (see below). In contrast, the Convention reports include all emissions and removals from LULUCF activities. In other words, reporting to the Convention is not the same as reporting to the Kyoto Protocol. As countries are penalised if they do not meet their reduction target, accounting to the Kyoto Protocol is far more interesting from a political and economic point of view. There are some ways to account reduced emissions under the Kyoto protocol without actually reducing them.

Under the Kyoto Protocol there are two main groups of LULUCF activities. Article 3.3 of the Protocol addresses afforestation, reforestation and deforestation (ARD) since 1990; accounting of ARD activities is mandatory. Article 3.4 of the Protocol identifies four additional land use activities (Forest Management, Cropland Management, Grassland Management and Revegetation); accounting of these activities is elective, which means that countries may choose whether or not to account for these. Of course countries are unlikely to select activities that constitute a net source of GHGs. With net emissions from Cropland Management and Grassland Management, Finland, for example, has chosen only Forest Management as additional LULUCF activity (Fig. 1).

[1] A glossary of terms and abbreviations can be found at the end of this article

[2] Not all Annex I countries have ratified the protocol; notable exceptions are USA and Australia.

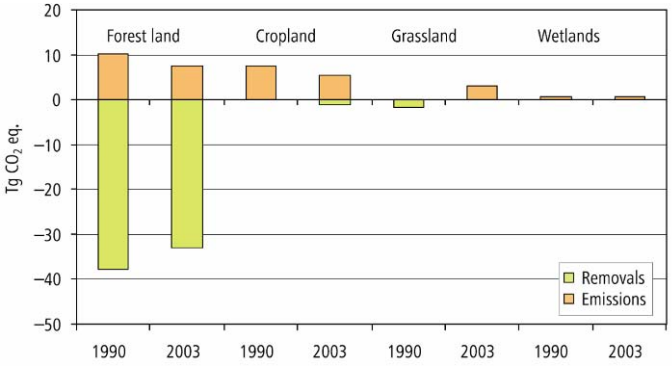



*Fig. 1: GHG removals and emissions in the LULUCF sector in Finland in 1990 and 2003. The Forest Land category includes ARD activities (obligatory) and Forest Management (voluntary). ARD activities constitute a net-emission of ~3.5 Tg CO2 eq, Forest Management activities a net-sink of ~28 Tg. (from: unfccc.int/resource/docs/natc/finnc4.pdf)*

Emissions and removals from agricultural activities are included in Annex A of the Kyoto Protocol, which means that accounting is mandatory. However, when reporting rules for the LULUCF sector were set up, $CO_2$ emissions and removals from agricultural soils were included here as well (Cropland and Grassland Management). Reporting these emissions both under Annex A and LULUCF would result in double counting. Instead of removing this inconsistency from the reporting rules it was decided that parties may again *choose* whether to report these emissions and removals under the Agriculture sector (Annex A) or the LULUCF sector. Because accounting on LULUCF management activities is facultative under the Kyoto Protocol, many countries have of course opted to report $CO_2$ emissions from agricultural soils under this sector and not select them for accounting3.

In article 2 of the Kyoto Protocol countries are urged to promote sustainable development and to protect and enhance sinks and reservoirs and take into account commitments to other environmental agreements. Furthermore, countries are requested to phase out fiscal incentives, tax and duty exemptions as well as subsidies that run counter to the objective of the Convention. Incentives to follow this request are only weak. There are no serious consequences with respect to LULUCF activities like drainage of peatlands for agriculture as these need not necessarily be accounted under the Protocol.

Apart from deforestation the Kyoto Protocol fails to address adequately land use related losses in carbon stores (reservoirs). Even accounting of GHG emissions related to deforestation (reduction of the forest carbon store) is mandatory only for Annex I countries, whereas the major deforestation and degradation problems are found in non-Annex I countries. Currently, LULUCF activities other than afforestation are not liable for credit under the Clean Development Mechanism (CDM). Under negotiation is an avoided emissions mechanism to provide technological and financial support for developing countries (REDD: Reducing Emissions from Deforestation in Developing Countries). Besides deforestation, there is focus on protecting biodiversity and avoiding further degradation of soils. At the moment the proposals only aim at voluntary reporting, capacity building and other 'soft' incentives.

REDD discussions also address such perverse situations as the deforestation and degradation of tropical (peat swamp) forest for the production of palm oil, which is used in Annex I countries instead of fossil fuels. Although the emission of GHGs from forest and peat degradation surpasses the savings from the substitution of fossil fuels and GHG emissions actually increase as a result, these emissions are not accounted. Annex I countries will in fact account reduced emissions from use of bio- instead of fossil fuels.

Public pressure partly has been successful in changing German and Dutch government positions with respect to palm oil, but only more binding obligations can help avoid this and similar so called leakage problems.

*Peatlands and peat*

The drainage of peatlands and subsequent GHG releases to the atmosphere is insufficiently addressed in the framework of the Kyoto Protocol. Following the sectoral approach of the Protocol, accounting of peatland related emissions is presented below.

The Convention only addresses antropogenic GHG emissions, which means that emissions from pristine peatlands are excluded from reporting. Consequently, reduction of naturally occurring $CH_4$ emissions through drainage may not be accounted as emission reduction. Drainage as a $CH_4$ emissions reduction measure would furthermore disagree with the Kyoto Protocol objectives i) to protect carbon reservoirs and ii) to honour other international conventions like CBD and Ramsar.

If a peatland is drained for afforestation, GHG emissions from peat degradation must be reported under ARD activities. Accounting of these emissions is mandatory. Emissions associated with maintenance of drainage ditches fall under Forestry Management and their accounting is facultative. On an annual basis these emissions are usually much smaller than biomass increase of tree stands and Forestry Management as a rule constitutes a net-sink. Therefore countries are likely to include it in their accounting under the Kyoto Protocol.

With respect to emissions from peatlands drained for agriculture a difference needs to be made between $CO_2$ and other GHGs. $CO_2$ emissions from agricultural activities can be accounted either under Annex A or under LULUCF. Accounting under LULUCF (cropland or grazing land) is facultative and thus the preferred way of most countries (i.e. not

[3] Accounting of other GHG emissions from the agriculture sector ($CH_4$, $N_2O$) is still covered under Annex A emissions and therefore mandatory.

accounting these emissions). Emissions from other GHGs (notably $N_2O$ and $CH_4$ from ditches) must be accounted under Annex A emissions (mandatory).
Emissions from peat used ex-situ as horticultural substrate are treated like other emissions from agriculture. The Kyoto Protocol does not cover the emissions caused by 'production' of horticultural peat though, or those caused by 'production' of energy peat. Emissions from burning peat for energy are included under the energy sector of Annex A (mandatory accounting). Classification of peat as a biomass fuel would only leave GHG emissions other than $CO_2$ in this sector, whereas $CO_2$ emissions would be under facultative LULUCF accounting and could thus be left out of the picture.
Obviously only a full accounting and full coverage of emissions and activities can prevent all the trickery.

*Peat used for energy*
The Finnish and Swedish peat industry has been trying to convince the public by life cycle analyses designed to show that using peat for energy results in less GHG emissions than using coal. As combustion of peat results in more GHG emissions than combustion of coal – a fact that can hardly be influenced (see elsewhere in this Newsletter) – the crux is in the 'before' and 'after' part of the life cycle analyses. Already the UNFCCC and Kyoto Protocol offer the framework to include the complete life cycle of peat used for energy.
Emissions from the combustion itself are covered as stationary emissions, those related to peat transport as fugitive emissions under energy sector reporting (Annex A). The GHG emission factor for combustion of peat can be adjusted to meet national or regional circumstances (see elsewhere in this Newsletter). In contrast to other fossil fuels, peripheral emissions for example from peatland preparation and extraction (incl. storage) are not covered under the energy sector, but under the land use sector (LULUCF).
Under LULUCF, it is also possible to account for the 'before' and 'after' components of the life cycle. If peat is extracted from pristine areas, emissions/removals occurring before drainage (including $CH_4$!) are excluded from accounting, as these are not anthropogenic and therefore not covered by UNFCCC. If peat is extracted from areas drained for forestry, previous emissions from the forest should have been included under LULUCF. The area given up for peat extraction can simply be deducted from the total area of forest (deforestation). Removal of additional biomass and soil should be accounted as clearance activity under LULUCF. If peat is extracted from peatlands already drained for agriculture, previous emissions would have been included under LULUCF and/or Annex A. Emissions from clearance should again be accounted under LULUCF.
As for after use, the UNFCCC/Kyoto framework again offers all the possibilities for accounting. If the area is simply 'given back to nature', transitional emissions should be accounted under the LULUCF sector; ensuing emissions/removals cannot be accounted as they are not anthropogenic. Conversion to forest is accounted as afforestation and conversion to agricultural land should be accounted under LULUCF. Ensuing emissions/removals from the after use can also be accounted under LULUCF.
Of course accounting on many if not most of the before and after use components of the life cycle is facultative. If a country selects to account for emissions/removals from one of the facultative LULUCF categories, then all emissions/removals from this category must be included. To include only those specific activities related to fuel peat extraction and leave out other emissions/removals from the same LULUCF sectors is not possible as it would invite selective inclusion of low emission activities and exclusion of high emission activities. This would result in a picture that looks good on paper, but is much worse in reality; it would leave the impression that the interest is not in saving the planet, but in using GHG emissions as merely another business tactic to make money.
The life cycle analyses of peat fuel combustion presented by the Swedish and Finnish peat industry are selective and unfair. They focus on worst case scenarios with respect to the 'before' and best case scenarios with respect to the 'after' components (see elsewhere in this Newsletter). Accounting under UNFCCC/Kyoto levels the playground, draws the larger, national picture and puts emissions from peatlands in the right perspective. As a result, the use of peat for energy becomes much less attractive.

*The future of peatlands is in conservation*
Even without full accounting of LULUCF activities and even without inclusion of avoided emissions, conservation of peatlands in Annex I countries can be a profitable business during the first commitment period (2008-2012). Simply 'giving back to nature' peatlands drained for agriculture decreases the area of crop- and grasslands in comparison to 1990, which means a decrease in total emissions from crop- and grasslands compared to 1990 as well. Of course this would be a mere 'bookkeeping' trick if nothing is undertaken to restore these peatlands and really reduce emissions. Besides, really reducing emissions through restoration is even more lucrative.
Controlled rewetting of degraded peatlands drained for agriculture will drastically reduce emissions. These avoided emissions can only be accounted if they are combined with some form of land use, either under Annex A (agriculture) or LULUCF (cropland or grassland management). Crops grown on rewetted peatlands like reed (*Phragmites, Typha, Phalaris*) grown for thatching, biomass fuel or industrial raw material (cellulose), alder (*Alnus*) grown for timber or fuel, or peatmoss (*Sphagnum*) grown for horticultural purposes, not only bring employment and revenue as such, but also reduce emissions (possibly to the point of net sequestration). These reductions can be accounted under Annex A or LULUCF cropland /

grassland management. This is not as straightforward as one might hope, however.

The guidelines for reporting on GHG emissions and removals distinguish three tier levels. The basic approach (tier 1) is to multiply activity data (e.g. area of cropland on organic soil) and multiply with an emission factor. Emission factors are based on (very) broad climate and management classes. For tier 2, country-specific emission factors are applied as well as more detailed classes of management systems. At tier 3, higher order methods are used including models and inventories adapted to national circumstances, repeated over time, and at sub-national to fine grid scales. For tiers 2 and 3 countries will need to provide additional documentation to support their methods and parameters. Obviously, higher tiers involve additional resources and institutional and technical capacity.

In order to include GHG emission reductions through 'paludiculture' on rewetted peatlands, countries will need to provide detailed information, enabling them to report at a higher tier level. With respect to rewetted peatlands this means reliable figures are needed that relate changes in peat stocks and GHG emissions to peat types, water levels and land use activities. Eddy covariance techniques as well as long term time series estimating peat volumes and subsidence combined with modelling approaches can be used to arrive at better estimates for emission parameters. Recently, country and land use specific emission factors with respect to peatland use were determined in a Finnish project in order to be able to apply for higher tier reporting.

***Glossary***

| | |
|---|---|
| Annex I | An annex under the UNFCCC that lists developed countries and countries with economies in transition that have committed themselves to limit human-induced emissions and enhance their GHG sinks and reservoirs. |
| Annex A | An annex to the Kyoto Protocol that specifies sources and sectors that are counted toward a Party's emission limitation and reduction commitment. Accounting of emissions and removals from Annex A sources and sectors is mandatory. Annex A sources and sectors are energy, industrial processes, solvent and other product use, agriculture and waste. |
| Annex B | An annex to the Kyoto Protocol that specifies each Annex I Party's emission limitation and reduction commitment. |
| ARD | Afforestation, Reforestation and Deforestation – LULUCF activities related to changes in the forest area of a country. |
| CBD | United Nations Convention on Biological Diversity |
| CCD | United Nations Convention on Combating Desertification |
| CDM | Clean Development Mechanism – A Kyoto Protocol mechanism that allows Annex I Parties to purchase emission allowances from projects in non-Annex I Parties that reduce or remove emissions. |
| ET | Emissions Trading – Kyoto Protocol mechanism that allows Annex I Parties to transfer emission allowances to other Annex I Parties. |
| GHG | Green House Gas |
| IPCC | Intergovernmental Panel on Climate Change – IPCC was established to assess scientific, technical and socio- economic information relevant for the understanding of climate change, its potential impacts and options for adaptation and mitigation. IPCC publishes reports, papers and guidelines for national GHG inventories. |
| JI | Joint Implementation – A Kyoto Protocol mechanism that allows Annex I Parties to purchase emission allowances from projects in other Annex I Parties that reduce or remove emissions. |
| LULUCF | Land Use, Land Use Change and Forestry – a GHG inventory of emissions and removals related to land use activities other than those listed in Annex A. LULUCF activities are divided into Afforestation, Reforestation and Deforestation (ARD) and Forestry Management, Cropland Management, Grassland Management and Revegetation. Accounting is mandatory for ARD activities, facultative for the other activities. |
| UNFCCC | United Nations Framework Convention on Climate Change – the 'Climate' convention |

# The $CO_2$ emission factor of peat fuel

*by John Couwenberg*

$CO_2$ emission factors (CEF) for fossil fuel combustion are expressed as tonnes of $CO_2$ emitted per TJ of energy. As such they are determined by how much $CO_2$ and how much energy are produced by combustion of 1 tonne of fuel.

The *amount of $CO_2$* produced by combustion depends on the carbon content of the fuel and on the so-called oxidation factor – how much of the carbon is oxidised during combustion. Typically, peat combustion results in 99-100% oxidation of the carbon in the peat.

The carbon content of a fuel is an inherent chemical property and does not depend upon the combustion process or conditions. In peat, the carbon content depends on degree of humification and varies from 45% to 60% of total dry weight.

The *amount of energy* produced by combustion of a fuel is referred to as its calorific value. Calorific value is also an inherent chemical property, dependent on the composition of chemical bonds in the fuel. A commonly used proxy for calorific value is the so called 'fuel ratio' between fixed carbon and volatile matter[21] (figure 1). These two fractions show different combustion characteristics, influencing calorific value. The fuel ratio and calorific value may vary within fuel types. In peat, they increase with the degree of humification (figure 2).

Another factor is the moisture content. Moisture content varies from 15% for peat briquettes up to 55% for milled peat. Like mineral soil content (ash), moisture content influences combustion properties and negatively affects calorific values (figure 3).

The IPCC Guidelines (IPCC 2006) provide a default for peat calorific value of 9.76 GJ/t peat and an emission factor of 28.9 gC/MJ = 106 g $CO_2$/MJ (compared to <100 g $CO_2$/MJ for various types of coal). Countries may adjust these values to national circumstances.

There is not much room for adjustment, however, as the emission factor for peat is largely determined by chemical properties that – without substantial net energy losses – cannot be altered. Besides selecting more humified peat with a low ash fraction, moisture content can be lowered to reduce the emission factor and lower the climate impact of fuel peat combustion.

Anderson, A.R. & Broughm, W.A. 1988. Evaluation of Nova Scotia's Peatland Resources. Nova Scotia Department of Natural Resources - Mineral Resources Branch, Bulletin ME 6

Borman G.L. & Ragland K.W. 1998. Combustion Engineering. WCB McGrawhill, Boston

Ekono. 1981. Report on energy use of peat. Contribution to UN Conference on New and Renewable Sources of Energy, Nairobi.

IPCC. 2006. 2006 IPCC Guidelines for National Greenhouse Gas Inventories, prepared by the National Greenhouse Gas Inventories Programme, Eggleston H.S., Buendia L., Miwa K., Ngara T., and Tanabe K. (eds). IGES, Japan.

[21] Volatile matter includes all products, other than moisture, given off as gas or vapour by a fuel (measured at 950°C). Fixed carbon is the non-volatile matter in fuels, other than ash. The ratio of fixed carbon to volatile matter is referred to as fuel ratio.

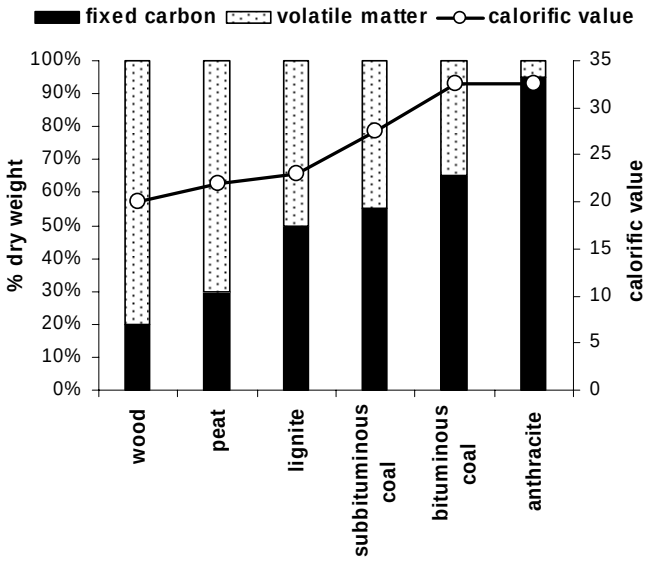



*Fig. 1 – Typical fixed carbon, volatile matter and calorific values (MJ/kg) for wood, peat and coal on a moisture and ash free basis (after Borland and Ragland, 1998)*

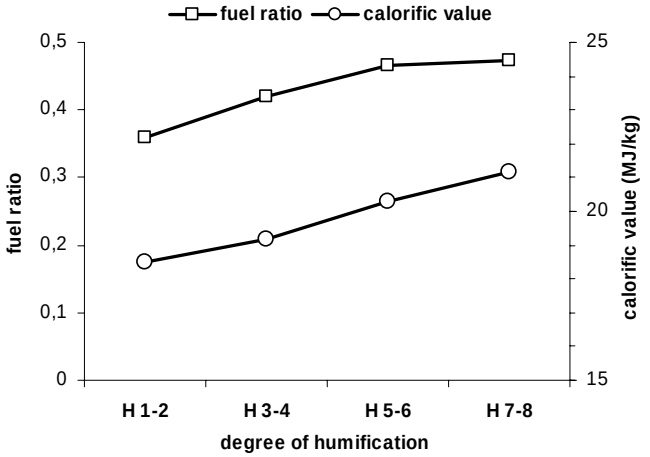



*Fig. 2 – Calorific value and fuel ratio of air dried Sphagnum peat at different degrees of humification. Data from Anderson & Broughm (1988)*

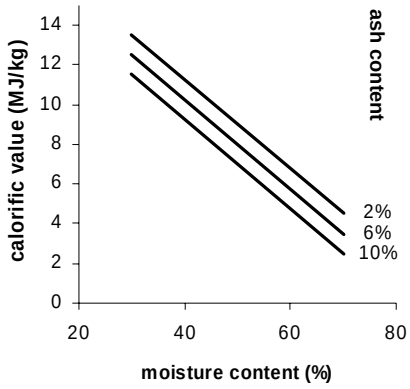



*Fig. 3 – Net calorific value of peat depends on moisture and ash content (after Ekono 1981)*

## Peatlands, Energy and Climate Change
## IMCG Symposium on Windfarms on peatland

*Santiago de Compostela (Spain), 27–30 April 2008*

Block I of IMCG's 2007–2010 Action Plan focuses on the implications for peatlands of energy-related issues. These include the utilization of oil and gas reserves, fuel peat policy, and the development of renewable energy resources for climate change mitigation (e.g. wind, hydropower, energy crops, biomass). This symposium will be the first activity within the theme, and it will focus on the intersection of European policy for wind farm development with peatland interests.

In line with the UNFCCC/Kyoto agenda, it looks as though the European Union will require its members collectively to derive 20% of energy requirements from renewable sources by 2020. Wind power generation is currently regarded as the most viable technology, and already wind farms seem to be appearing everywhere. Especially in upland locations and oceanic countries, many of the preferred sites are on peatland.

In the UK, work began on Europe's largest wind farm to date at the 55 $km^2$ Whitelee site on peaty moorland to the south of Glasgow (140 turbines, 322 MW) in October 2006. Debate continues over an even larger proposal for the peat-covered west-coast island of Lewis (initially 234 turbines, *ca*. 702 MW), and further giant developments on peatland are expected.

The strings of turbines on the Galician mountain ridge mires in northern Spain already stretch as far as the eye can see (IMCG Newsletter 2007/1, page 14).

Environmental impact studies usually predict rather small effects on the peatland habitat. But wind farm construction in Ireland triggered multiple 'bog slides' – the most catastrophic at Derrybrien – which seemed to belie this expectation and led us to question whether the planning process took account of the special characteristics of peatland[1]. Certainly, the engineering work (peat removal, road construction, blasting) required to install a wind farm resembles operations that have in the past been associated with the degradation of peatlands, loss of biodiversity and impairment of their ability to deliver other goods and services. On the other hand, some of the peatlands targeted are substantially degraded, and opportunities for their restoration are flagged as potential secondary benefits from wind farm development.

This symposium will provide a forum for scientists, policy-makers and practitioners dealing with these matters to exchange insights and experience; and to begin working towards a common understanding of the issues, the formulation of principles for 'wise/best practice' and the identification of research needs and priorities. The attractive location of Santiago de Compostela (UNESCO World Heritage since 1985) in northern Spain will allow us to visit virtually unknown mires in the Galician mountains, both with and without wind farm development, and a subsidiary aim will be to promote a wise use plan for these mires. We shall also launch the more general IMCG initiative on peatlands and energy, and we hope that by then we shall be in a position to take this forward through a European COST action (see below).

Essential details of the Symposium are as follows:

*Dates* (in 2008): Sunday 28 April (21:00) to Wednesday 30 April (*ca*. 23:00); optional post-symposium excursion Thursday 1 and Friday 2 May, returning to Santiago de Compostela late evening.

**Venue:** The University of Santiago de Compostela, Spain. Santiago International Airport, 12 km from the town centre, is served by several airlines including low-cost companies (e.g. Ryanair, Vueling, Easyjet, Air Berlin). There are connecting flights from Madrid and Barcelona to Santiago. Other nearby airports are at A Coruña (60 km) and Vigo (75 km), and Porto (Portugal) is within ca. 2.5 hours by car.

**Outline programme:**

SYMPOSIUM

| | |
|---|---|
| Sunday 27 April | Arrival in Santiago de Compostela. Reception and dinner 21:00 hrs. |
| Monday 28 April | Full-day excursion to wind farms on blanket bogs in O Xistral and Buio. Departure 08:00 hrs. |
| Tuesday 29 April | Official reception, scientific and poster sessions. |
| Wednesday 30 April | Scientific sessions, synthesis and conclusion, closing dinner 21:00 hrs. |

POST-SYMPOSIUM EXCURSION

| | |
|---|---|
| Thursday 01 May | 08:00 hrs: departure from Santiago towards O Xistral; full-day excursion visiting mires, dinner and overnight stay at Lugo. |
| Friday 02 May | 08:00 hrs: departure from Lugo towards Os Ancares; full-day excursion visiting mires, returning to Santiago in the evening. |

**Indicative costs:**

***Symposium*** (27–30 April) including field excursion, symposium documentation, receptions and all meals and refreshments (except breakfast) from dinner on Sunday 27 April up to and including dinner on 30 April, **400 €** (50 € reduction for IMCG members, 50€ surcharge for late booking; concessions and accompanying persons 200 €).

[1] Lindsay, R. and Bragg, O. (2004) *Wind Farms and Blanket Peat. The Bog Slide of 16th October 2003 at Derrybrien, Co. Galway, Ireland*. Report to V.P. Shields & Son, Loughrea. University of East London.

***Accommodation***. There is a wide range of hotels in the centre of Santiago. The organisers will provide a list of recommended establishments to allow delegates to choose and book their own accommodation. Prices (per room per day, with breakfast and including VAT) range from around 40€ (single)/50€ (double) to 200 €. Also ample possibilities for budget hostel-type accommodation are available.

***Post-symposium excursion*** (01–02 May) including travel, meals and overnight accommodation **150 €**.

If you are interested in attending and/or making a presentation at this symposium, please contact Eduardo Garcia Rodeja at edcone@usc.es

In Spain wind power has reached an extraordinary development, only surpassed by Germany. Galicia, with 2,603 Mw [2007/01/01], produces 22.41% of the total wind power in Spain. The total amount of planned wind power in Galicia is 3,400 Mw for the year 2010 and 6,500 Mw for 2012. At present, Galicia is ranked sixth in the world with respect to installed power with the greatest density of installations world-wide (88 $kW/km^2$).

About 80% of the 10,000 ha of Galician mountain peatlands are located in 'Serra do Xistral' and 'Buio'. The area has been declared Site of Community Importance (SCI), a large step in the direction of integration in the EU Nature 2000 Network. The area moreover significantly contributes to the Biosphere Reserve of 'Terras do Miño'. Although the peatlands were the most relevant argument to justify these conservation measures, paradoxically they are now seriously threatened by various activities, including the development of the 'Galician Wind Power Plan'. This plan has brought about a huge expansion of wind farms affecting all types of mires, from blanket bogs to fens and raised bogs in a variety of geomorphologic locations.

In the year 1998 there were not wind farms in the 'Serra do Xistral and Buio', but at present there are 23 wind farms, with 4-6 ha of surface directly occupied in average, and 680 wind mills that produce about 580 MW. Furthermore, the Galician Government is still planning to increase the number of wind farms in this area.

*Wind farm on Pena da Cadela blanket bog at Galicia. The picture at the top was taken in 1998, before road opening (middle picture) and wind farm implementation (2000, bottom picture) on a blanket bog at Galicia (photos by Xabier Pontevedra)*

## IPCC focuses in on peat

Until recently, the United Nations Framework Convention on Climate Change (UNFCCC) and the IPCC have not highlighted the huge $CO_2$ emissions from degraded peatlands in their reports nor in their policies. With the publication of the 'Summary for Policy Makers, Working Group III', a contribution to the IPCC Fourth Assessment Report, this has now changed.

The IPCC report makes clear how large the impact on climate change of peatland degradation and fires is. The report furthermore concludes that restoration of drained and degraded peatlands is among the key low cost green house gas mitigation strategies.

Even with this recently gained attention, it is very worrying that the issue of peatland degradation may have to wait until 2012 when new targets will be set for greenhouse gas reduction.

http://www.ipcc.ch/SPM040507.pdf

## Peatlands, Energy and Climate Change
## Proposal for an EU COST Action

The concern of IMCG about the complex of relationships between peatland interests and energy/climate change issues (e.g. oil and gas exploration/exploitation, fuel peat policy, renewable energy and water storage needs for climate change mitigation and adaptation) is reflected by Block I of the IMCG Strategy and Action Plan 2007-2010 and summarised on page 14 of the last IMCG Newsletter (2007/1). It is proposed that we should try to move forward in this area through international co-operation, which could be promoted by raising an EU COST action. This might run from 2008, with annual conferences and/or workshops.

COST (Cooperation in the field of Scientific and Technical Research) is an EU instrument to support co-operation among scientists and researchers, with 35 member countries including non-EU members. A COST action is intended to provide a forum for ideas that allows areas of future co-operative research to be identified, specifically within the context of the European Research Area (although global relevance is allowed!). It consists of funding for co-operation (not actual research), providing scientific secretariat services and support for workshops/conferences, publications, short-term scientific missions etc. For more information, see http://www.cost.esf.org/

The COST countries are: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, and UK. Non-COST countries can also be involved.

In order to raise an action, we shall need signatures from a minimum of five COST countries that want to participate - and a country's participation begins with the scientists who want to be involved. Therefore we are looking for contacts amongst the scientific community who are working on pertinent topics or interested in developing work within this field.

If you think this is something that might be of interest to you or to colleagues – in your country or ANY other country – please send your comments and ideas to Olivia Bragg <o.m.bragg@dundee.ac.uk>

## Regional News

### News from Finland
### The case of Viurusuo: deeds contradict the words of the peat industry

Viurusuo mire in Outokumpu town, eastern Finland, has been known to be an interesting eccentric bog since the dissertation of Kimmo Tolonen in 1967. With respect to its structure it is a typical eastern Finnish eccentric bog, but its vegetation greatly resembles the more oceanic bogs in western Finland with *Calluna vulgaris*, *Sphagnum cuspidatum* and *S. tenellum* as dominant species in the central parts of the mire. The largest part of the mire (about 300 hectares) is untouched. There are ditches in the northern marginal area, but the southern margin (2.5 km) with abundant groundwater seepage and some springs is in a natural state. There are also two ponds in the central parts of the mire. The bird fauna is rich, with a number of threatened species like *Larus ridibundus* and *Cygnus cygnus*. A number of regionally threatened vascular plant and moss species occur, with as most remarkable one the northern moss species *Cinclidium subrotundum* at its second southernmost locality.

In 1978 the Ministry of Trade and Industry and the Ministry of Forestry and Agriculture (at that time also responsible for nature conservation) agreed that Viurusuo mire was to be used for peat mining. However, already then its biodiversity values were assessed to be high.

In 1995 Vapo Oy (a state owned company for the use of peat and timber) submitted an application to start peat extraction in Viurusuo mire and to discharge the waste waters into Lake Sysmäjärvi. In 2000 the permission for peat mining and waste water discharge was given, but in 2001 the administrative court of Vaasa declined the permission and returned the case to be re-assessed by the Eastern Finland Environmental Permit Authority.

In spite of all talk of the peat industry about sustainability and wise use, a new application from Vapo followed. In her objections, the North Karelia Regional Environment Centre showed the harmfulness of peat mining in Viurusuo mire and also local inhabitants and the Finnish Nature Conservation Association made critical statements about the project.

In 2003 the Eastern Finland Environmental Permit Authority declined the permit for peat mining, as did the administrative court in 2005. Vapo Oy made an appeal to the Supreme Court, which in 2006 reversed the decisions of the lower courts and returned the case to the Eastern Finland Environmental Permit Authority for a new process.

All in all, in the province of North Karelia 115 000 hectares of peatlands outside of nature reserves are technically suitable for peat mining. While the total area used for peat mining in the whole of Finland is currently some 60 000 hectares, it is clear that it is

possible to find an alternative site for Viurusuo mire without any complication.
Unfortunately, the environmental legislation of Finland is deficient. Biodiversity values of mires cannot be taken into account in the permit processes, only impacts on the environment. Therefore, in the case of Viurusuo, the main emphasis has been whether the two ponds in the mire are so unique and valuable that because of them the whole mire should be protected from peat mining. The question thus is whether peat mining threatens two little ponds covering altogether 1,5 hectares, whereas 300 ha of really unique bog are not being considered. This is ridiculous in the light of what is really important for biodiversity conservation in Viurusuo mire.
The process is starting again and the North Karelia Environment Centre as well as the North Karelia region of the Finnish Nature Conservation Association together with local inhabitants have again raised strict (and detailed, covering some 30 pages) objections against peat mining in Viurusuo mire.

Raimo Heikkilä
Finnish Environment Institute,
Biodiversity Research Programme
raimo.heikkila@ymparisto.fi

---

## News from Indonesia
## No forest cutting for oil palm

Indonesia will not allow oil palm growers to cut primary forests for establishing plantations. The country is set to overtake Malaysia this year as the world's largest palm oil supplier and plans to add 1.5 million hectares of the crop over the next three years. Companies want to plant more oil palm trees as prices of the vegetable oil, used also as biofuel, cooking oil and to make soap, have almost doubled in the past year on surging demand not only from the EU (biodiesel), but even more from China and India, the world's biggest buyers of palm oil.
The Indonesia government plans to add 7 million hectares of plantations by 2011, according to its biofuels plan. The country is trying to reduce its emissions of greenhouse gases, 75 percent of which result from deforestation and associated peat fires.
China National Offshore Oil Corp., the nation's third-largest oil company, together with PT Sinar Mas Agro Resources & Technology will invest $5.5 billion in an eight-year program for biofuel projects in Indonesia. The two companies and Hong Kong Energy Ltd. will invest in the planting of crops to make biofuels in Papua and Borneo.
It has been pointed out that the government rule that forbids cutting of primary forests for plantations isn't followed by many district and regional governments. Oil palm production in Indonesia has been a major reason for deforestation and the peat fires that terrorise the region.

Source: http://www.bloomberg.com/

---

## News from Belgium
## Botanic Gardens peat free!

At the 3th Global Botanic Gardens Congress, 16-20 April 2007, Wuhan China, with the motto "Building a sustainable future: the role of Botanic Gardens" the National Botanic Garden of Belgium has encouraged the 954 participants from 67 countries to go peat free.
The National Botanic Garden in Meise was one of the first gardens in the world that systematically applied alternatives to peat. Glasshouse Manager Viviane Leyman: "The continued use of peat by horticulture is dreadful, especially as excellent alternatives exist. We grow over 10,000 different types of plants in peat-free coco-fibre compost. We believe that it is counter-intuitive to grow plants in peat compost because it directly endangers peat bogs and the plants and animals that live there".
"Gardeners all over Belgium should demand peat-free alternatives and if they are not available in their local store they should request it. Many retailers will only start stocking peat alternatives as routine if there is demand, and that is up to every responsible gardener to create."
As could be foreseen, the Belgian substrate federation BPF reacted immediately and accused the Botanic Garden of "not fully correct information". Next to the meanwhile classic fallacies that are at length discussed in this Newsletter, the press release of the Belgian "Potgrondfederatie" contained an argument of hitherto unknown stupidity:
"Peat is almost 10,000 years old and its conversion to CO2 is very slow because it is a stable product. In contrast cocos (coir) decays more rapidly and produces more CO2."
Maybe the International Peat Society should start a campaign to inform her industrial supporters about the different climatic effect of releasing carbon from a long-term store (where without exploitation the carbon would have been conserved for eternity) and releasing carbon from a rapidly cycling supply (from where it soon would be released anyhow)...

---

## News from Germany
## Presidential attention for paludiculture

From 420 innovative environmental projects, of which 187 were invited to exhibit in the garden of the presidential palace in Berlin, the president of German Federal Republic Horst Köhler selected 20 for a more in depth personal orientation. Here he discusses the perspectives of "paludiculture": the cultivation of energy crops and raw materials on rewetted degraded peatlands.

*German President Horst Köhler with in his hand information material on alder and peatmoss cultivation. Photo: Greta Gaudig, 6 June 2007*

---

## IMCG Main Board

*Chair:*
Jennie Whinam (Australia)
Nature Conservation Branch
Dept of Primary Industries, Water & Environment
GPO Box 44; Hobart TAS 7001
Tel.: +61 3 62 336160 / Fax: +61 3 62 333477
http://www.parks.tas.gov.au/index.html
jennie.whinam@dpiwe.tas.gov.au

*Secretary General*
Hans Joosten (Germany, Netherlands)
Botanical Institute,
Grimmerstr. 88,
D-17487 Greifswald, Germany;
Tel.: + 49 (0)3834 864177/ Fax: 864114
joosten@uni-greifswald.de
http://www.uni-greifswald.de/~palaeo/

*Treasurer*
Philippe Julve (France)
HERMINE Recherches sur les Milieux Naturels
159 rue Sadi Carnot,
59280 Armentières, France.
Tel. + fax : + 33 (0)3 20 35 86 97
philippe.julve@wanadoo.fr
http://perso.wanadoo.fr/philippe.julve/

*additional Executive Committee members*
Tatiana Minaeva (Russia)
Wetlands International Russia Programme,
Nikoloyamskaya Ulitsa, 19, strn.3,
Moscow 109240 Russia;
Tel.: + 7 095 7270939 / Fax: + 7 095 7270938
tminaeva@wwf.ru
http://www.peatlands.ru/

Piet-Louis Grundling (South Africa, Canada)
Department of Geography, Univ of Waterloo, Canada
Tel.: + 1 519 885 1211 X35397
Cell: + 1 519 591 0340
peatland@mweb.co.za / pgrundli@fes.uwaterloo.ca

*other Main Board members:*
Olivia Bragg (Scotland, UK)
Geography Department, The University,
Dundee DD1 4HN, UK;
Tel: +44 (0)1382 345116 / Fax: +44 (0)1382 344434
o.m.bragg@dundee.ac.uk

Rodolfo Iturraspe (Tierra del Fuego, Argentina)
Alem 634, (9410) Ushuaia, Tierra del Fuego, Argentina;
rodolfoiturraspe@yahoo.com
iturraspe@tdfuego.com
http://www.geocities.com/riturraspe

Tapio Lindholm (Finland)
Dr, Doc, Senior Scientist
Nature Division
Finnish Environment Institute
P.O.Box 140
Fin-00251 Helsinki Finland
tel +358 9 4030 0729
fax +358 9 4030 0791
tapio.lindholm@ymparisto.fi
tapio.lindholm@environment.fi

Asbjørn Moen (Norway)
Norwegian University of Science and Technology (NTNU)
Museum of Natural History and Archaeology
Section of Natural History
7491 Trondheim
Norway
tel: +47-73 59 22 55
fax: +47-73 59 22 49
asbjorn.moen@vm.ntnu.no

Faizal Parish (Malaysia)
Global Environment Centre,
2nd Floor, Wisma Hing, 78, Jalan SS2/72,
47300 Petaling Jaya, Selangor, MALAYSIA
Tel + 60 3 7957 2007 / Fax + 60 3 7957 7003
fparish@genet.po.my / faizal.parish@gmail.com
www.gecnet.info / www.peat-portal.net

Line Rochefort (Canada)
Bureau de direction Centre d'Études Nordiques
Département de phytologie
Pavillon Paul-ComtoisUniversité Laval,
Québec, Qc, CanadaG1K 7P4
tel (418) 656-2131
fax (418) 656-7856
Line.Rochefort@plg.ulaval.ca

Jan Sliva (Germany, Czech Republic)
Technische Universitaet Muenchen, Department of Ecology, Chair of Vegetation Ecology;
Am Hochanger 6,
D-85350 Freising-Weihenstephan, Germany;
Tel.: + 49(0)8161 713715 / Fax: 714143
sliva@wzw.tum.de
http://www.weihenstephan.de/vegoek/index.html

Leslaw Wolejko (Poland)
Botany Dept., Akad. Rolnicza,
ul. Slowackiego 17, 71-434 Szczecin, Poland;
Tel.: +48 91 4250252
botanika@agro.ar.szczecin.pl or ales@asternet.pl

Meng Xianmin (China)
Mire research institute,
College of City and Environmental Sciences
Northeast Normal University
No. 138, Renmind Street, Changchun 130021
The People's Republic of China
Tel/Fax: 0086 431 5268072
mengxm371@nenu.edu.cn / mxm7949172@mail.jl.cn

## UPCOMING EVENTS

See for additional and up-to-date information: http://www.imcg.net/imcgdia.htm

**International Conference on Multi Functions of Wetland Systems**
*26-29 June 2007, Legnaro (Padova), Italy*
for more information visit multiwet-conf.it

**4th Workshop And Short Intensive Course On Wetland Water Management 2007**
*02-08 July 2007, Biebrza, Poland*
For more information: levis.sggw.waw.pl/wethydro/

**Buttongrass Moorland Management Workshop**
*04-05 July 2007, Hobart, Tasmania*
For details, see IMCG Newsletter 2007/1 or visit: http://dpiw.tas.gov.au/buttongrass

**IALE World Congress: 25 years Landscape Ecology: Scientific Principles in Practice**
*08-12 July 2007, Wageningen, The Netherlands*
for more information visit http://www.iale2007.com

**Biannual Confernce of the German Peat Society**
*20-23 July 2007, Bad Muskau, Germany*
for more information visit www.dgmtev.de

**2nd International Field Symposium West Siberian Peatlands and carbon Cycle: Past and Present**
*26-30 August 2007, Khanty-Mansiysk, Russia*
For more information see IMCG Newsletter 2006/4 or visit http://www.edu.ugrasu.ru/conferences/?cid=2

**International Symposium and Workshop on Tropical Peatland**
*27-31 August 2007,Yogyakarta, Indonesia*
See previous Newsletter or visit:
http://www.soil.faperta.ugm.ac.id/CT/

**Monitoring the Effectiveness of Nature Conservation Programmes**
*03-06 September 2007, Birmensdorf, Switzerland*
for more information visit:
http://www.wsl.ch/event_07/monitoring/

**WETPOL 2007 – 2nd International Symposium on Wetland Pollutant Dynamics and Control**
*16-20 September 2007, Tartu, Estonia*
for more information visit:
http://www.geo.ut.ee/wetpol2007

**Climate protection through mire conservation?**
*5 - 6 October 2007, Freising, Germany*
For more information download documentation:
http://www.imcg.net/docum/dgmt_climate_07.pdf or visit: http://www.dgmtev.de

**Peat and Peatlands 2007 - Peat in horticulture and the rehabilitation of mires after peat extraction**
*8. - 11. October 2007, Jura, France*
For more information see IMCG Newsletter 2007/1 or visit: http://www.pole-tourbieres.org

**History of mires and peat**
*18 - 20 October 2007, Laon, France*
For more information:
http://ghzh.free.fr/Colloque_tourbe_oct_2007.pdf

**13th International Peat Congress After Wise Use - The Future of Peatlands**
*9. - 15. June 2008, Tullamore, Ireland*
for more information, visit ipcireland2008.com

**IMCG Field Symposium and Congress**
*27 August – 11 September 2008, Georgia/Armenia*
For more information see IMCG Newsletter 2006/4

**VISIT THE IMCG HOMEPAGE AT**

**http://www.imcg.net**