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Item 5 (a) of the provisional agenda
Methodological issues under the Convention
Harvested wood products

Data and information on changes in carbon stocks and emissions of greenhouse gases from harvested wood products and experiences with the use of relevant guidelines and guidance of the Intergovernmental Panel on Climate Change

Submissions from Parties

Addendum

1. In addition to the five submissions contained in document FCCC/SBSTA/2005/MISC.9 and Add.1, one further submission has been received (on 4 October 2005).

2. In accordance with the procedure for miscellaneous documents, this submission is reproduced[*] in the language in which it was received and without formal editing.

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SUBMISSION FROM SWITZERLAND

SBSTA 23
Data and Information on Harvested Wood Products
CO_2 Accounting
Submission by Switzerland

1 Introduction

In response to the invitation by SBSTA 21 to provide updated data and information on harvested wood products**,** Switzerland would like to provide the following information supplementary to its 2004 submission included in FCCC/SBSTA/2004/MISC.9.

Switzerland still supports the inclusion of the entire removals and use cycle in the CO_2 accounting process. It also believes that there should not be a one-sided emphasis on sink formation in the crediting of forest management; sink formation is temporally limited and hence unsustainable. It is only through forest management that the forest can retain its function in the long term as a supplier of the CO_2-neutral raw material wood while also maintaining the sink capacities. The inclusion of harvested wood products in the CO_2 accounting process should serve the objective of supporting the sustainable use of the renewable resource wood and, in particular, reward the long-term effects of a conservation approach to wood as a resource. In accordance with the application of the polluter-pays principle, emissions should be credited to the country that actually causes them: the polluter is the consumer of the products. In Switzerland's view, this is the only way that an incentive can be created to limit emissions from inefficient and unsustainable removals.

The information on the socio-economic effects of the inclusion of harvested wood products in the carbon accounting process presented below is based on two new studies.

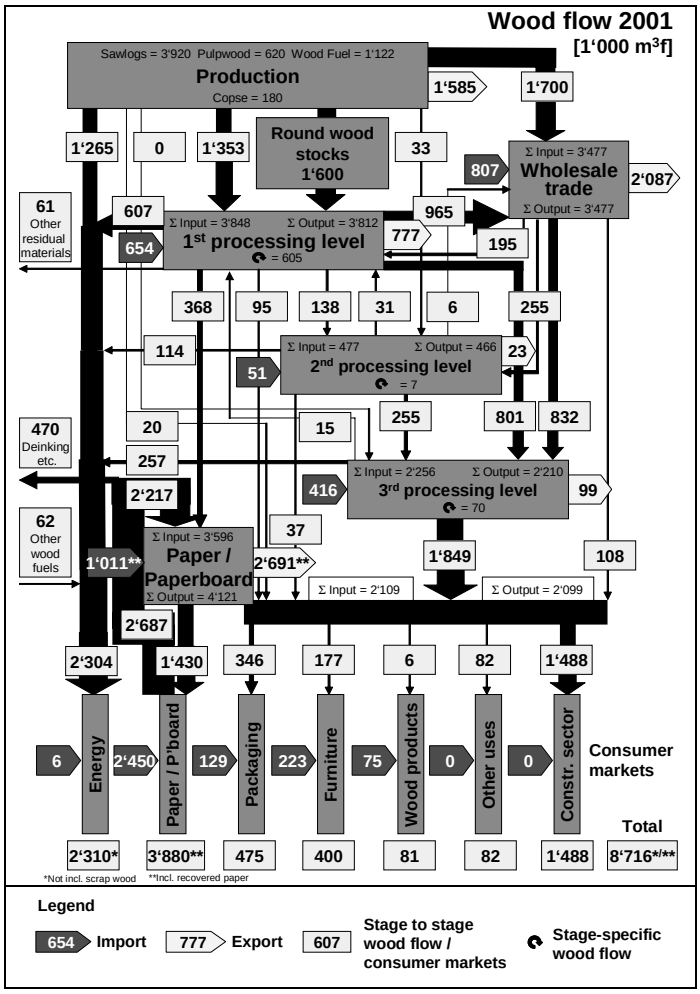
- An economic analysis of the Swiss forest industry sector entitled *Branchenprofil der Wald- und Holzwirtschaft 2001* ("Profile of the Forest Industry Sector 2001") was published in 2004. It presents the structure of the entire forestry and wood sector in Switzerland and provides a very detailed analysis of wood flows from the forest to the consumer in all areas of application.
- The study *Bewertung unterschiedlicher Politiken für Wald und Holz im Lichte einer wirkungsvollen Klimapolitik* ("Evaluation of Different Forest and Wood Policies in the Light of Effective Climate Policy") (working title, in preparation) explores the CO_2-sink and substitution effects of forest increment, removals, processing and use, taking international trade into account. The effects of different policies on the removal, processing and use of wood were estimated with the help of models calculated in the context of different scenarios.

2 Strategies to reduce the production of CO_2

2.1 The base data from the 2001 sector profile

Figure 1:
Wood flow in the Swiss Forest Industry Sector 2001

Source:
Branchenprofil der Wald- und Holzwirtschaft 2001, Bern 2004



The publication *Branchenprofil der Wald- und Holzwirtschaft 2001* ("Profile of the Forest Industry Sector 2001") provides the base data for the scenarios described below. The analysis of the structural development of the sector is based on the 2000/2001 census of companies. Furthermore, the material flows from the forest to final consumption are examined in detail. A total of three surveys have been carried out on the final consumption of wood in Switzerland.

The studies are rounded off with a value-added statement for the entire processing chain.

2.2 Evaluation of CO2 effects based on scenarios

Scenarios were created for the Swiss context and their CO_2 effects examined. The scenarios are based on:

- the data from the Swiss National Forest Inventory 1 and 2 (*Landesforstinventars*);
- current data on the consumption of wood products and their potential for development;
- model calculations on material and carbon flows and on stocks in the civilizational cycle;
- calculations on the effect of material substitution in a very wide range of construction applications, other uses of wood and energy.

The scenarios reflect different forest management strategies and their effects on the CO_2 emissions balance. They differ in terms of the volumes of wood harvested in the forest, the uses made of wood and production volumes, both in the context of domestic and foreign trade. Given that the level of stock formation in the paper and paperboard sector is insignificant and no substitutes exist for these products, the production and consumption volumes and the situation with regard to foreign trade were merely slightly adapted on the basis of the situation in 2000. The following four scenarios were defined and compared with the status for 2000.

Baseline:	There is a slight increase in removals (+15%), in the use of wood by the construction sector (10%) and in forest fuelwood (20%). All processing levels profit more or less proportionally from the increase in consumption.
Minimal forest maintenance:	Removals in Switzerland decline by around 40%. Consumption by the construction sector remains stable at current levels and decreases by a good 20% in the area of forest fuelwood. The domestic wood processing industry is in decline and more wood products are imported
Destocking of large-diameter wood:	There is a 50% increase in harvesting (to an average of 7.5 million m^3) in order to reduce the large volumes of large-diameter wood. Consumption increases by 35% in the construction sector and by 80% in the area of forest fuelwood. The wood processing industry benefits considerably from the increased production (~+50%), exports increase and there is a decrease in imports.
Optimized increment:	The forest is managed in a way that gives rise to optimum high growth in the long term with continuous removals at an average of 9 million m^3 (removals +80%). Consumption in the construction sector increases by 35% and by 100% in the area of forest fuelwood. The domestic wood industry increases its production by an average of 70% for all processing levels. Significantly more wood products are exported than imported.

It was assumed that the relevant changes in volume with respect to harvesting, consumption and production take place between 2000 and 2030. The values remain constant from 2030. Due to the long duration of stock formation of long-lived wood products in the civilizational cycle and the long-term processes in the forest, the development of the different stocks in the civilizational cycle was observed over 130 years. At 100 years, the forest observation period corresponds to the possibilities offered by the model used here. 2094 was defined as the final year for the joint consideration of forest and wood following the extrapolation of the findings of the second Swiss National Forest Inventory of 1994 by 100 years.

National and international influences were considered in the evaluation of the CO_2 effects and were added to the total effect. Distinctions were made between:

- stock changes in the forest (including slash and natural losses; slash and natural losses remain C-stocks for longer in the forest soil);
- stock changes in the civilizational cycle (gains and losses of long-lived wood products);
- effects of material substitution through the use of wood instead of other materials;
- effects of energetic substitution through the use of wood instead of fossil fuels.

Two variants were considered for the exported wood products:

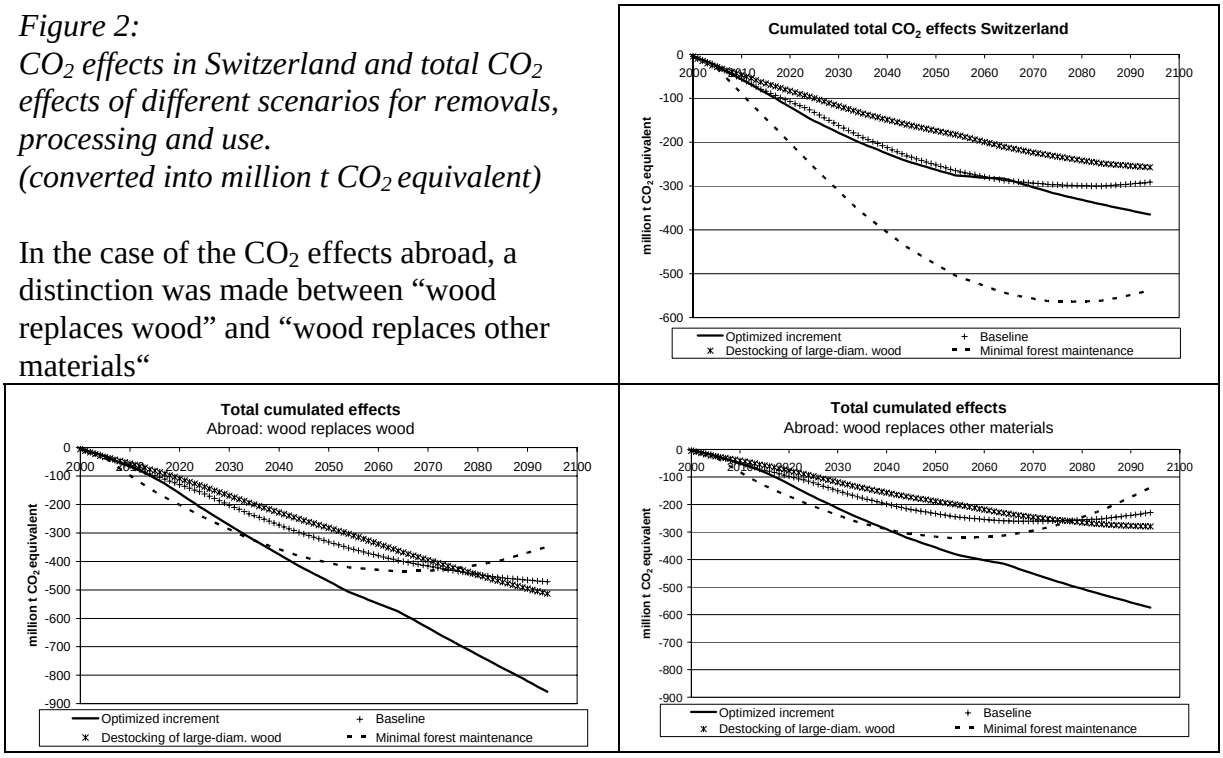
1. All Swiss wood products replace foreign wood products (wood replacing wood),
2. All Swiss wood products replace substitute products (wood replacing other materials)

It is assumed, that the reality will lie somewhere between these two poles.

2.3 Results of the scenario calculation re CO_2

Figure 2:
CO_2 effects in Switzerland and total CO_2 effects of different scenarios for removals, processing and use.
(converted into million t CO_2 equivalent)

In the case of the CO_2 effects abroad, a distinction was made between "wood replaces wood" and "wood replaces other materials"



Source: *Bewertung unterschiedlicher Politiken für Wald und Holz im Lichte einer wirkungsvollen Klimapolitik*

Figure 2 shows the CO_2 savings from the different scenarios converted into million tonnes of CO_2 equivalent. The more negative the values, the greater the reduction in CO_2. The presentation of the total effects show that, in the long term, the optimized increment and minimal forest maintenance scenarios represent the extreme positions among the selected policies. In the case of the baseline scenario, wood use is on a good trajectory in relation to CO_2, although harvesting is insufficient. The forced destocking of large-diameter wood does not appear to be a worthwhile option. Comparison of the optimized increment and minimal forest maintenance scenarios prompts the following insights in relation to CO_2:

- In general terms, the optimized increment scenario produces the best effect after 30 or 40 years. The replacement of wood products by foreign wood products emerges as the better option in relation to CO_2 effects. From a purely domestic perspective (ignoring foreign effects), due to the additional forest growth stocks, even after 100 years, the minimal forest maintenance scenario shows the highest CO_2 savings. However, this effect begins a clear decline from 2070.
- In the long term, the main effect is achieved through the substitution effects, i.e. through the replacement of conventional materials with wood and the replacement of fossil fuels by forest fuelwood, wood residues from production and used wood when it has been removed from the life cycle.
- In the early years, the minimal forest maintenance scenario shows a considerable increase in growing stocks in the Swiss forest which prompts the positive outcome from the national perspective. However, a global view beyond the borders of Switzerland shows a reduced effect because additional imports of wood into Switzerland result in increased removals in foreign forests.

- In the case of the optimized increment scenario, the situation with respect to the forest is reversed. The ongoing absorption of increment prevents further development of the forest stock in Switzerland. The substitution of imported wood products with products from Switzerland causes a reduction of harvesting in foreign forests. The same also applies conversely for the exports of Swiss wood products to other countries insofar as they replace wood products from other countries.

3 Calculation of CO2 flows for the scenarios based on the different approaches

3.1 General comments

The differences between the currently debated accounting approaches for forest and wood are identified in the following sections. The initial situation in the year 2000 and the figures for the optimum increment and minimal forest maintenance scenarios in the sample years 2030 and 2094 are calculated using the four approaches and the results compared. Harvesting and consumption levels remain constant in all scenarios from 2030. The forest model calculation ends in the year 2094. As opposed to this, the stock changes in the structural elements in buildings are not quite completed, the wood processing is not yet in a state of equilibrium. The evaluation of the suitability of the approaches on the basis of reference values and overall CO_2 effects in accordance with the scenario calculations must remain rudimentary for the present. Various issues with respect to methods remain open.

Three points should be kept in mind to facilitate a better understanding of the following descriptions.

- National borders play a role in all accounting approaches. Thus it is not possible to demonstrate the global effect of a climate policy.
- Unlike the perspective in section 2, the four wood accounting approaches do not take substitution effects into account. These are, however, visible in the national emissions balances. However, it is not possible to identify here, the extent to which the reduced or increased consumption of fossil fuels is dictated by the production and use of wood and the corresponding substitution effects.
- A negative value on the charts reflects a CO_2 sink and a positive value reflects a CO_2 source.

3.2 The initial situation in the year 2000

The situation in 2000 is strongly influenced by the increase in wood consumption in the preceding years. Because the consumption of wood by the construction sector increased significantly between 1980 and 2000, the wood system in the civilizational cycle has not yet reached a state of equilibrium. At the current consumption volumes, stores are still being developed in the building stock, in particular in long-lived structural elements.

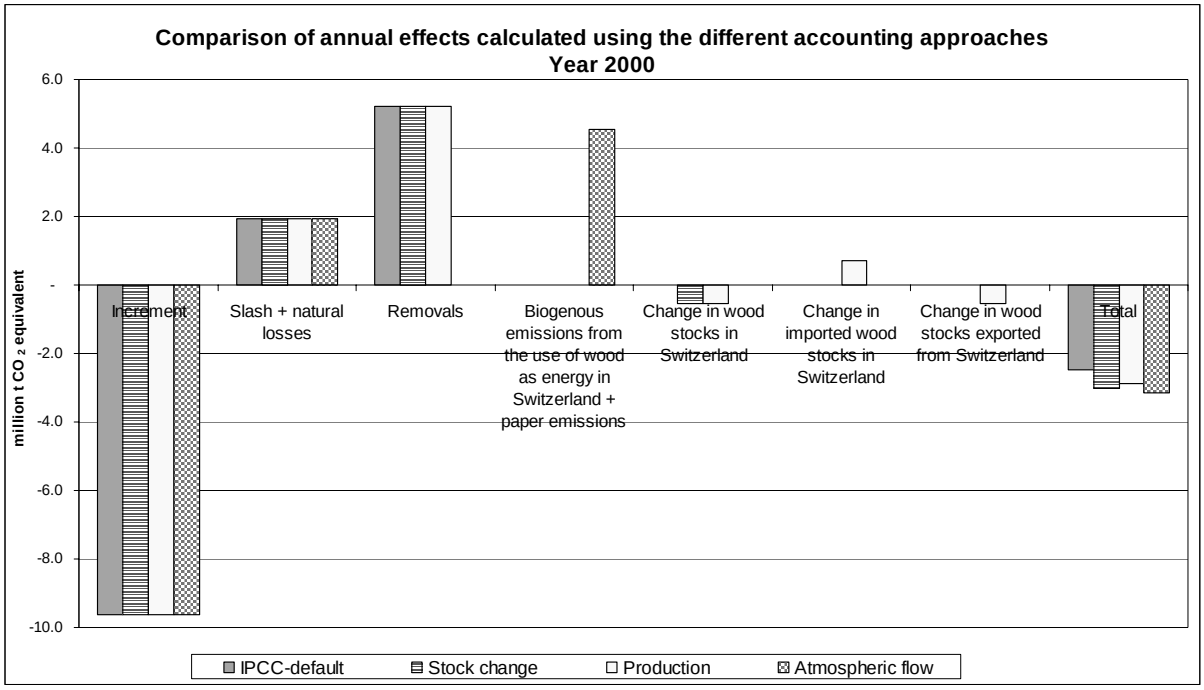
Comparison of the accounting approaches:

- Given that the IPCC default approach evaluates harvesting as immediate CO_2 emission, it does not reflect stock development in the civilizational cycle. Thus, it probably deviates most strongly in terms of the actual value.
- The stock change approach takes the entire stock development into account and thus produces higher CO_2 savings than the production approach.
- Due to the surplus of imported wood products, more wood stocks based on foreign wood are being created in Switzerland than wood stocks abroad based on Swiss wood. In the

production approach this part of the stock development is credited to the different producing countries and not to Switzerland.

- The CO_2 sink resulting from the atmospheric flow approach is similar to that produced by the stock change approach.

Figure 3: Calculations for the initial situation in 2000 based on the different accounting approaches



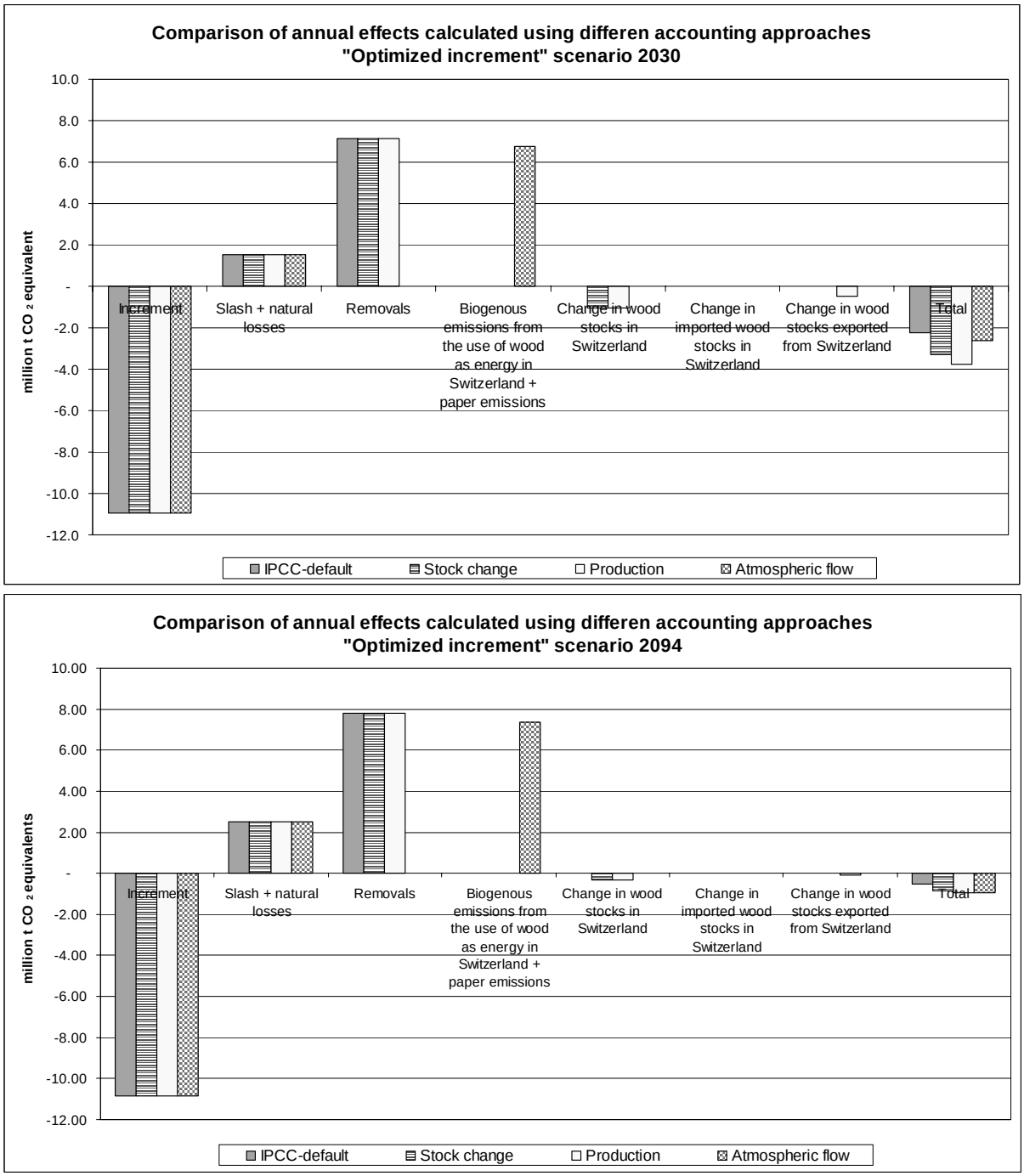
Source: Calculations based on the scenarios examined

3.3 Accounting for the optimized increment scenario

Comparison of the accounting results:

- The smallest CO_2 sink is produced by the accounting values for the IPCC approach, both in 2030 and 2094. The reason for this is that the formation of wood stocks in the civilizational cycle, strong in 2030 and slightly weaker in 2094, takes place but is not represented.
- The values for the stock change approach are significantly lower than those for the production approach in 2030, but only slightly lower in 2094. Only wood products used domestically, or their stock development, count here. The increased export volume is not taken into account.
- Due to the replacement of imports with domestic products and the expansion of exports accompanied by stock development abroad, the production approach shows a very high CO_2 sink. Stock formation is significantly more pronounced in 2030 than in 2094. Thanks to this "reach beyond the border", more CO_2 sinks are calculated for this approach in this constellation.
- The atmospheric flow approach produces a lower CO_2 sink for 2030 because it records higher emissions from the incineration of wood residues due to the increase in domestic wood processing. The 2094 values for this approach are almost identical to those for the production and stock change approaches.

Figure 4: Accounting for the optimized increment scenario in 2030 and 2094



Source: Calculations based on the scenarios examined

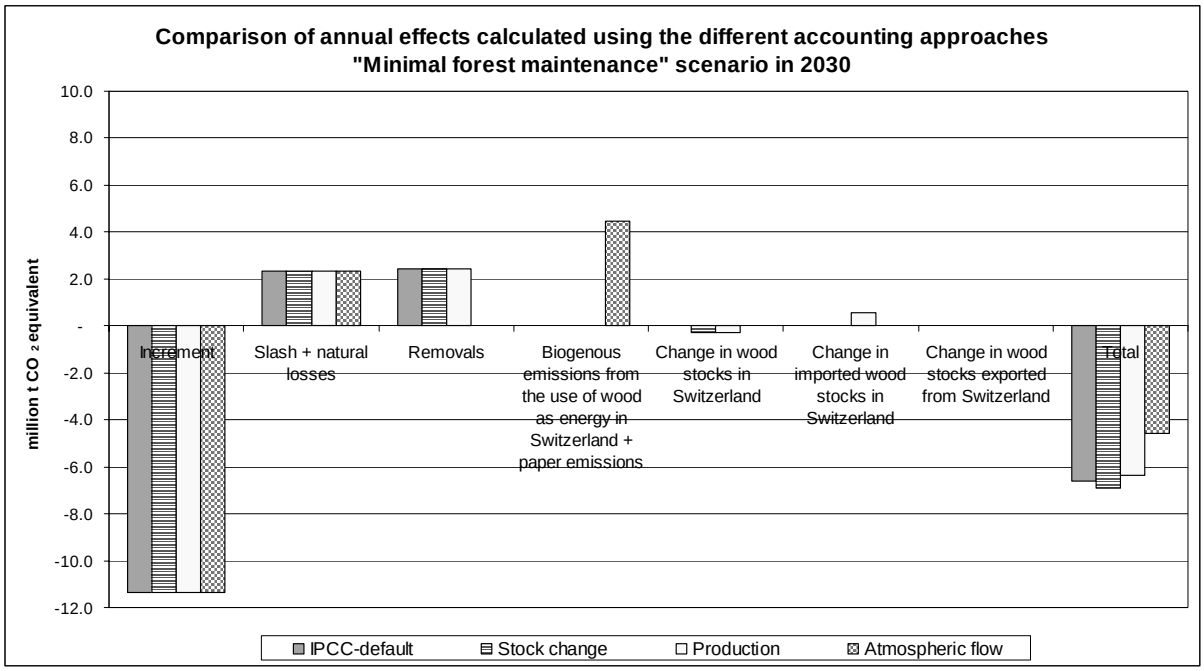
3.4 Accounting for the minimal forest maintenance scenario

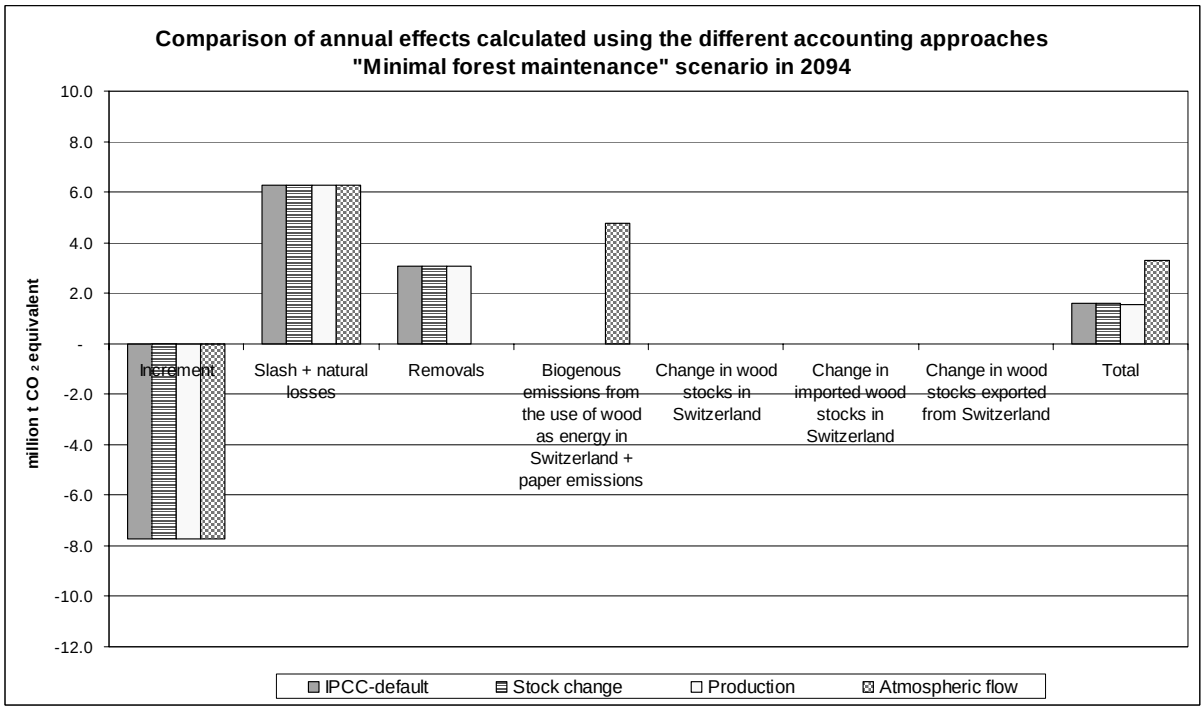
Comparison of the accounting results:

- The IPCC default approach produces a relatively high CO_2 sink for the minimal forest maintenance scenario in 2030. With little change in wood consumption as compared with 2000, harvesting has been reduced by 40%. Increment in the forest is still relatively high and natural losses are minimal. As opposed to this, increment is exceeded by natural losses, slash and harvesting in 2094. The result is a CO_2 source.

- Because the stocks in the forest and in the civilizational cycle in Switzerland are still increasing in 2030, the stock change approach produces high CO_2 savings. However, a significant proportion of the stock increase is caused by foreign wood products. The stock change approach also shows decreasing forest stocks for 2094. The wood stocks in the civilizational cycle remain almost unchanged. The outcome here is similar to that produced by the IPCC default approach and results in a CO_2 source.

Figure 5: Accounting for the minimal forest maintenance scenario in 2030 and 2094





Source: Calculations based on the scenarios examined

- For 2030, the production approach takes into account that the domestic stock is being increased by imported wood. Thus, the CO_2 sink calculated on this basis is smaller than that produced by the stock change approach. Given that almost no further stock changes occur with foreign wood in the civilizational cycle in 2094, CO_2 production is conveyed through stock depletion in the forest as is the case in the aforementioned approaches.
- In the case of the atmospheric flow approach, it emerges for both 2030 and 2094 that, in addition to reduced increment and a high level of natural losses in the forest, a relatively high volume of wood products are being disposed of and incinerated. The products involved are mainly imported. Due to the relatively high rate of increment in the forest, this approach shows a CO_2 sink for 2030, albeit smaller than that produced by the other approaches. This approach shows the highest CO_2 source for 2094 as forest increment has reduced significantly in the meantime and natural losses have increased significantly.

4 The socio-economic effects of the selected strategy and accounting method

The sustainability of forest management and effects on employment are adopted here as parameters for socio-economic effects. This also applies to the information in section 4.2.

4.1 Evaluation of the socio-economic effects of the selected policy

4.1.1 Assessment of the sustainability of forest harvesting

All scenarios are based on a volume of removals that does not exceed the increment potential of the forest in the long term. The harvesting management practices, on which the model calculations for the forest were based, remain unchanged as compared with the current status.

It may be expected that in the case of the minimal forest maintenance scenario, in particular, the well-stocked forests and possibly over-mature stands could become actual sources of CO_2 in the event of storms and other disasters. The study is unable to reflect this risk. It must, however, be taken into account. Similar observations also apply for the baseline scenario, in which there is a clear increase in growing stocks.

The optimized increment scenario prompts enduring stability in the forests with considerable wood stocks and a high level of increment in the long term. A considerable proportion of the slash is used in energy production. However, a certain proportion of dead wood remains in the forest, thus biodiversity requirements are also fulfilled.

4.1.2 Assessment of effect on employment

The following table incorporates the estimation of employment effects arising from changes in the volumes of wood processed in Switzerland into the four scenarios.

Based on the calculations presented below, as compared with the situation in 2000, the optimized increment scenario results in the creation of around 30,000 stable new jobs. As opposed to this, the minimal forest maintenance scenario would give rise to a loss of 10,000 jobs by 2030. The corresponding values for the baseline and destocking of large-diameter wood scenarios are +5,000 and +20,000 jobs respectively.

Table 1: Estimation of effects on employment of changes in the volumes of wood harvested, processed and used in Switzerland in accordance with the scenarios.

	Status 2000		Optimized Increment		Minimal Maintenance		Baseline		Destocking of Large-Diameter Wood	
	Production	Number	Increased production	Extra employees	Increased production	Extra employees	Increased production	Extra employees	Increased production	Extra employees
Sector [1]	in 1,000m³	employed	in 1,000m³	[2] Number	in 1,000m³	[2] Number	in 1,000m³	[2] Number	in 1,000m³	[2] Number
Forestry sector	5,000	7,250	4,000	2,900	-1,900	-2,755	700	508	2,500	1,813
1st processing lev	3,070	5,030	2,129	1,744	-610	-999	304	249	1,459	1,195
2nd processing le	400	8,770	551	6,036	-110	-2,412	104	1,136	311	3,405
3rd processing Le	2,160	65,700	1,160	17,642	-90	-2,738	250	3,802	910	13,840
Total		**86,750**		**28,322**		**-8,904**		**5,695**		**20,252**

1) Each exclusive of mechanical pulp, cellulose, paper and paperboard manufacture, except in the forest sector.
2) It is assumed that the productivity levels of the new jobs in the scenarios involving increased domestic processing are twice as high as previous levels.
3) The loss of jobs in the minimal forest maintenance scenario is proportional to the volumes produced.

Source: Calculations based on the SAEFL publication *Branchenprofil der schweizerischen Wald- und Holzwirtschaft 2001* ("Profile of the Forest Industry Sector 2001"), Bern, 2004.

It is possible to estimate value added on the basis of the data provided in the publication *Branchenprofil der Wald- und Holzwirtschaft 2001* (2004). There, the value added per employee in the forest is given as CHF 79,800[1] and CHF 81,400 per employee in the forest industry sector. The following rounded values are produced based on the scenarios:

Optimized increment:	CHF 2,300 million
Minimal forest maintenance:	CHF -720 million
Baseline:	CHF 460 million
Destocking of large-diameter wood:	CHF 1,600 million

In terms of both employment and value added, the perspective here is restricted to the Swiss forest industry sector. It is not possible to complement the sectoral view with figures on the entire economy, furthermore it is not possible to quantify the effect on other countries of a Swiss harvesting, production and use policy based on one of the scenarios Thus, a few qualitative reflections will have to suffice here.

- A gain in jobs in the Swiss forestry and timber sector will be accompanied by losses in the corresponding sector abroad if imported products are replaced by domestically produced wood products in Switzerland. The same also applies if Swiss wood exports replace foreign wood products.
- If Swiss wood products replace products manufactured from other materials in Switzerland or abroad, the employment effect in the corresponding manufacturing sectors is negative and the value added decreases proportionally.
- The growth in the Swiss forestry and forest industry sector has no negative effects on foreign wood producers or on the manufacturers of substitute products if market expansion is covered by the increase in Swiss wood products.

It is clear that when the overall CO_2 effects, both at home and abroad, are taken into account, a strategy based on the optimized increment scenario can contribute to the limitation of the greenhouse gas effect in the most sustainable way. From a purely national point of view, the

[1] 1 US $ = 1.30 CHF (Oct. 2005)

minimal forest maintenance scenario provides considerable potential sink for sink development over the next century. However, in view of the increased risk of the creation of additional CO_2 sources due to storm events etc. and the negative effects on employment associated with this scenario, such a policy does not constitute a beneficial option in the long term, even from a purely domestic perspective.

4.1.3 The economic evaluation of sink and substitution services as a precondition for the implementation of policy that is effective from a climate perspective

A precondition of the CO_2-optimized management of forests is its association with economic benefits. It must provide incentives for the production of increased sinks and/or substitution services. If these incentives are not created, policy that is desirable from a climate perspective will not succeed. If individual countries associate such services with market mechanisms and others do not, unintentional effects may arise. Thus, attention should be drawn to the differences between Annex-I countries and non-Annex-I countries. The influence of steering measures on the competition situation in the Annex-I countries as compared with countries that have not adopted such measures should be studied in detail from the perspective of the different carbon accounting approaches.

4.2 The socio-economic effects of the different accounting approaches

Effects arising from the different accounting approaches:

- The application of a particular accounting approach can also give rise to effects of a socio-economic nature. The IPCC default approach only takes the effect of stock formation in the forest into account. By treating removals as a source of emissions, it ignores the stocks in the civilizational cycle. As all removals are treated as an immediate source of CO_2, this approach does not take account of long-lived wood products in terms of CO_2. Thus, a sink effect achieved through stock building cannot be identified and rewarded under this approach. In the optimized increment scenario, which our studies indicate as the optimal scenario in terms of CO_2, accounting based on the IPCC default approach produces a smaller CO_2 sink than the other approaches as long as the forest industry sector reports positive stock changes.
- In general, the results produced by the stock change approach are relatively close to those of the atmospheric flow approach. The concentration on the formation of stocks as opposed to forest increment proves unfavourable. With the stock change approach, the incentive exists to develop a well-stocked forest. This can be achieved by meeting the demand for wood with imports and “protecting” the domestic forest. However, is accompanied by the risk of forest instability due to excessive stocks.
- Given that carbon accounting is largely carried out on the basis of national perspectives, the sink and substitution effects abroad cannot be calculated for the accounting country. The effects of stock changes in the production approach are an exception to this. With high exports, this affects the stock development in the civilizational cycle of other countries. Thus, this approach produces a higher CO_2 sink or lower CO_2 source than the stock change approach.
- The atmospheric flow approach provides an incentive for both forest management that gives rise to high wood increment in the forest and for the manufacture of long-lived wood products which extends carbon sequestration. Thus, in the scenarios with high levels of increment, the accounting based on this approach shows the highest CO_2 savings as long as the harvested wood is not used immediately for energy production. At best, with this

approach, the emissions are assigned to the polluter, i.e. the "consuming" country. The export of wood products always involves the export of potential CO_2 emissions. In the case of high imports of long-lived products, the assignation does not become effective until the products are incinerated when they have been eliminated from the lifecycle.

5 Assessment of the Swiss base data

The following table provides information on the existing surveys which can be used as base data and on the accuracy of the estimation of the CO_2 flows:

Accounting element	*Survey data base*	*Frequency*	*Accuracy*[1)]
Woods stocks in the forest	National Forest Inventory (LFI)	10-year cycle Permanent in future	Very high
Gross increment	National Forest Inventory		Very high
Slash and natural losses	Difference between the forest statistics and National Forest Inventory	Annually/every 10 years	High
Removals	Forest statistics, LFI	Annually/every 10 years	High
Stocks in Swiss civilizational cycle	No regular surveys	Unascertained	Medium to high
Stocks of important wood products in Switzerland	Model calculations based on foreign trade statistics	Unascertained	Inadequate
Stocks of Swiss wood products abroad	Model calculations based on foreign trade statistics	Unascertained	Inadequate
Biogenous emissions from incineration	Energy statistics HES, waste statistics, sector profile	Periodic (2-yearly)	High
Foreign trade flows	Foreign trade statistics	Monthly	Very high

[1)] Estimated accuracy: very high +/- 2 %; high +/- 10; average +/- 25 %.
[2)] Universities of Applied Science

The following base data are available for the estimation of the effect of wood use on the CO_2 emissions balance: (These are not part of the report, but of significance for a comprehensive evaluation of forest management):

Effect of the substitution of other materials	Calculations on the basis of LCA databases	to be defined	inadequate to average
Effect of the substitution of fossil fuels	Calculations on the basis of LCA databases	to be defined	average to high

The following base data is available for the evaluation of socio-economic effects:

Employment effect	Company surveys, sector profile	every 5 years	inadequate without additional studies

Sufficient base data are not available for all accounting approaches to adequately fulfil the requirements. Based on the analysis of the realism of the accounting approaches, it is recommended that the currently popular IPCC default approach be replaced by a new approach.

In our view, the atmospheric flow approach is the approach that best reflects the real processes occurring in the atmosphere. Moreover, it is the most manageable for Switzerland. It could avail of the data sources with the highest levels of reliability and accuracy. It only requires the data from the National Forest Inventory and the energy statistics, if necessary complemented by a few special surveys.

The stock change approach requires regular analysis of the stock changes in the building stock and for the other wood products. This requires special surveys which, given the complexity of wood use in buildings, should not be underestimated. It should, however, be possible to achieve an adequate level of accuracy at an acceptable cost.

The production approach is impracticable with regard to calculation. It is virtually impossible to trace the history of wood that has left the country. Moreover it is difficult to separate the imported wood volumes from domestically produced wood. In the case of both imported and exported wood, the flows take place across borders with products subject to varying degrees of processing. Products are nearly always subject to further processing in the recipient country and woods of different origin are mixed in this process. This further complicates the tracking of products. The socio-economic effects are almost impossible to calculate. Moreover, Switzerland does not consider an approach that uses a fixed lifespan for product groups as suitable as it does not reward efforts to conserve wood in the product cycle for as long as possible.

The substitution effects of wood use should also be considered to achieve a comprehensive assessment of effects. This would require additional LCA studies for all four approaches. In the context of the Swiss study, assumptions must be made as to which products manufactured using other materials are replaced by wood products. With time, changes could be achieved in the eco-balance using better technologies.

6 Conclusion

The forest industry sector can make a significant contribution to the reduction of CO_2 emissions and the formation and conservation of carbon stocks in the forest and in the civilizational cycle. The scenario calculations show the form that forest management, wood processing and wood use that is optimal in terms of climate policy should take:

1. Harvesting concepts must be based on a maximum forest increment in the long term and absorb the increment on an ongoing basis.
2. The competitiveness of wood processing should be improved so that most of the wood in local cycles can be processed.
3. The use of long-lived wood products should be promoted specifically in the construction sector. The wood types that cannot be used for more valuable purposes should be used for energy production at all processing levels, starting in the forest. Wood products that have been eliminated from the civilizational cycle should also be used consistently for energy production.

In the long term, the emissions-reducing effects of substitution are of greater significance than the sink effects. Both forest stocks and the wood stocks in the civilizational cycle become full

sooner or later and their sink effect is thus no longer valid. Also, sinks can become a direct source of CO_2 as a result of storm events in destabilized forests. At best, the calculation of forest sinks results in the promotion by forest policy of the creation of well-stocked and low-increment forests which are constantly harvested. A policy that is solely oriented towards the formation of increasing stocks in the forest and prevents removals will fail sooner or later in terms of climate policy.

For Switzerland, a climate-policy strategy that is suitable in the terms described above is one that aims to create stable forests and manage them sustainably. As a result, around 30,000 new jobs could be created in the forest industry sector in association with an annual value added of around CHF 2.3 billion.

The studies have shown again that carbon accounting based on the atmospheric flow approach is not only the easiest to implement at an acceptable level of accuracy, it is the only approach that rewards high increment in the forest and does not include removals in the calculation. Furthermore, the CO_2 emissions from the incineration and deposition of wood products are actually charged to the country that causes the emissions. Thus, Switzerland supports the polluter-pays principle. On the other hand, it could imagine a mechanism whereby trading partners on the import/export market agree on who should assume the CO_2 sink from harvested wood products and when the emissions arising from them should be calculated.

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