Project no. 518128

EFORWOOD

Tools for Sustainability Impact Assessment

Instrument: IP

Thematic Priority: 6.3 Global Change and Ecosystems

D3.0.4
Annual report of Module 3 for Year 2

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Final version

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Dissemination Level		
PU	Public	
PP	Restricted to other programme participants (including the Commission Services)	x
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Section 1 – Project objectives and major achievements during the reporting period

Module 3

Module 3: Forest to Industry Interaction
Module leader: ALUFR. Module co-leader: FR
Overall objective

Module 3 as a part of the FWC links the primary production of the forest resource and its present and future management (M2) and the industrial production (M4). It covers all activities related to the conversion of living trees into pre-processed materials fed into industrial processes with regard to the impact on sustainability. This includes the allocation of appropriate raw materials to specific products and production processes, with impacts on material efficiency, process effectiveness, energy and chemical use, and economy. In this context, product lines relevant in the European context are analysed in the sectors of solid wood, fibre and bio-energy products. Furthermore, it includes harvesting activities with respect to their possible negative or positive impact on landscape, recreation, watershed, or soil. Additionally, their beneficial impacts on economy and employment for different types of organisation (industrial, small scale) and levels of mechanisation will be considered. It also includes current and future transport activities that will have a major impact on the sustainability level of FWCs.
These activities are analysed for different logistic systems, taking into account transport alternatives (road, rail, water), mixed systems and advanced logistic and distribution systems.

M3 collects, analyses and aggregates data about raw material allocation, harvesting and transport to be used in integrated ToSIA.

M3 also develops partial models for these aspects to assess SI of processes between forestry and industry in more depth and detail.

M3 furthermore identifies key indicators of status quo and future developments: in allocation, harvesting and transport as a contribution to baseline future and scenario development.
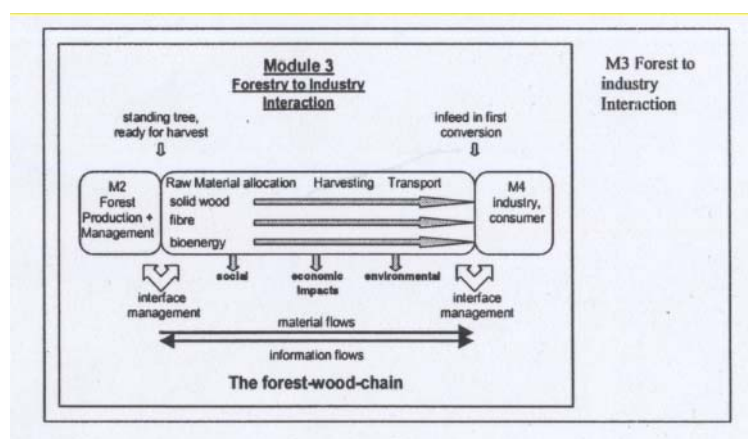
During the reporting period, M3 performed work and made achievements in the following areas:

Chain development:
- the following harvesting-transport chains were outlined for the three EFORWOOD test chains / single chains: the pine-chain in Northern Scandinavia, the spruce-chain in Central Europe (Baden-Württemberg) and the eucalypt-chain in the Iberian Peninsula.

This work included interface discussions with M2 (forest management) and agreement on commonly used management activities and their output (trees) and interface related activities with M4 (which wood assortments are delivered and converted into the related forest products). These interface agreements included aspects of the species, quantity, dimension, quality and timing of the wood volumes to be delivered.

Within the reference borders of M3, harvesting and transport processes were designed using the "event method". In a second step quantities (m^3, tones) of raw material were calculated and linked to the respective process steps. Subsequently, the relevant indicators were identified for every process step and the indicator values were derived from various sources and calculated (see also Contribution to Indicator Development).

The results for the 3 chains were transferred to M1, at first by excel-sheets, later on on the basis of the EFORWOOD data client. The results were checked for correctness and plausibility.

Module specific modelling:
Existing models in the area of harvesting and transport were identified and tested. Decisions how these models could be used to give a more specific and detailed inside in the processes of M3 were taken. As a first step for allocation models, a group of 25 products (paper, solid wood, bioenergy) was identified and the related raw material quality requirements were listed.

Indicator development:
Members of M3 acted as members of the task force indicator development. They took part in the iterative process to develop a commonly agreed list of economic, social and ecological indicators. The relevance and availability of the indicator values were elaborated and decided within the reference borders of M3 (allocation, harvesting and transport).

Transport issues:
Members of M3 act as members of the transport task force. The challenge to use the same terminology, parameters and indicators for all the various transport processes within EFORWOOD led to the formation of the transport task force, which is coordinated by M3. In various discussions a commonly agreed concept to include and evaluate transport issues for all module and transport modes (roads – on road, off road, water (fluvial, maritime) and railway) were discussed and decided. Several workshops and meetings (telephone and physical) were organized to achieve these objectives.

Scenario development:
M3 members contributed actively to the scenario task force by giving input to the general concept (baseline future, scenario development) and in formulating specific technological developments for the technology-driven scenarios.

Case study development:
On the level of the three European Case Studies, M3 is responsible for the Central European (Baden-Württemberg) regional case study. The borders of the case study were fixed. The case study was described with the different relevant flows of materials within the regional borders, and the respective process chains were outlined and designed. Interface problems were solved together with M2 and M4. Data and statistical sources were identified for M3 purposes and as service for other modules (M2, M4, M5).

European level:
M3 structured the future work in a way, that the different research institutes involved in M3 are each responsible for a specific group of countries within the EU-25 and will collect data for allocation, harvesting and transport in this context.

Periodic Activity Report, WP Leader
Annual report 12 months
Period: November 1, 2006 - October 31, 2007

| WP leader	Gero Becker, ALUFR	WP number	3.0
Date	15.10. 2007		

Work package objectives

Objectives

1. To ensure that M3 objectives are fulfilled and deliverables are provided according to the time schedule
2. To coordinate the interaction with IP management and with other modules
3. To develop an intra-module training concept
4. To carry out and guide the annual reporting, as well as other to be accomplished Deliverables and project work

Progress towards objectives

1. It had been taken care of work on deliverables, requests form task forces and other modules and WPs in a timely manner, especially also concerning the data collection for ToSIA and the Client. Changes in time scheduling from M1 occurred and work was performed accordingly, including one additional step in ToSIA development of "test chains", namely the "single chain", which is/will be followed by the "case study" as well as "European cases". Some deliverables which were designed for the test chains, thus were performed for the single chains due to the better data material.

   Within M3 a good quality cross-check model according to WP in one direction and cross-checking by case study leaders alias representatives exists (see graphic). This is completed by an internal review by the module leader Gero Becker, ALUFR, and co-module leader, Barry Gardiner, FR.
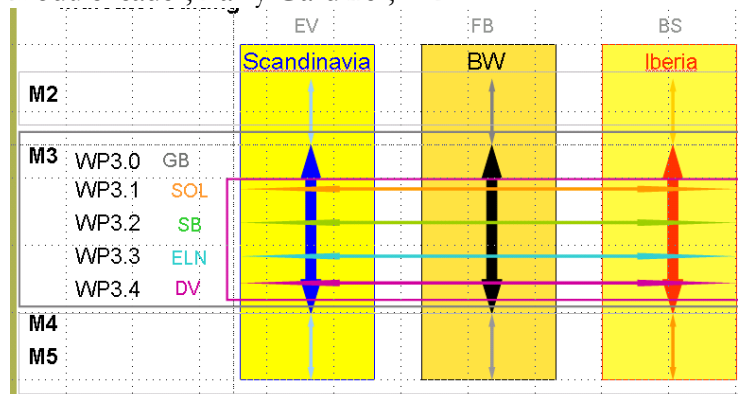
   In addition, for D deliverables M3 has an external reviewer, Andrzej Kundzewicz from Bastex, Poland

2. There was a good IP management interaction, as well as with other modules. M3 attended all IP board meetings.
   For M3-4-5-interaction a model mill concept has been developed, data acquire assistance happened and is under discussion. Especially for the Baden-Württemberg spruce regional case some problems occurred for M4/, therefore M5 posted a request for assistance to the German M3 partners.
   For M2-3 boundary were and are under discussion. Data transference has been clarified.

3. There was an M3 scenario meeting needed, which took place in Freiburg 10-11 July 2007, but only internal training needs were detected so far. Instead it proved to be valuable to participate at "ToSIA training" in Finland, 23-24 April 2007, and at the upcoming "data collection training" in Portugal, 29-30 November 2007, and to pass the acquired knowledge on internally to the partners. This was done during module meeting (at EFORWOOD weeks in Zvolen, Slovakia and Brussels, Belgium and scenario meeting in Freiburg, as well as on individual basis via Adobe Connect telephone calls and personal meetings)

Deviations from work programme (if any)

Changes in time scheduling from M1 occurred and work was performed accordingly, including one additional step in ToSIA development of "test chains", namely the "single chain", which is/will be followed by the "case study" as well as "European cases". Some deliverables which were designed for the test chains, thus were performed for the single chains due to the better data material.

Periodic Activity Report, WP Leader
Annual report 12 months
Period: November 1, 2006 - October 31, 2007

WP leader	**Sven-Olof Lundqvist, STFI-Packforsk**	WP number	3.1
Date	**19.10.2007**		

Work package objectives

Objectives

1. To provide the basis for the mapping of properties of the forest resources, based on measurements and models, at different levels (test chain and case study)
2. To define proper alternatives for allocation of raw materials to relevant production lines
3. To describe the sustainability effects of existing and future scenarios for) material allocation and select a preliminary set of data for ToSIA at different levels (test chain and case study)
4. To identify methods for early assessment of allocation

Progress towards objectives

Partners involved: STFI-Packforsk, AFOCEL, ALUFR, FVA, FR, Skogforsk

1. A concept for mapping of properties of forest resources is under development. It is based on measurements and models. A draft concept is now in place at STFI-Packforsk, designed to be a general approach, reasonably easy to apply on resources of different wood species and countries. Volumes and properties of stands, trees, logs and chips are estimated based on inventory data from a limited number of selected stands representing the resource, models and simulation. It has been tested on the test chain in Västerbotten, based on data from the Swedish National Forest Inventory. The concept is described in DP3.1.3 and presented in "Modelling and simulation of properties of forest resources and along the paper value chain" (COST E44 Conference "Modelling of wood chain: Forestry-Wood industry-Wood product markets). (The concept is integrated with data from the case studies in WP3.4).

   This general approach has been complemented by Skogforsk with extensive analyses of properties of available wood and possibilities to buck sawlog dimensions of different properties for the Västerbotten test chain, based on simulated CTL-harvesting (Cut To Length) of stands provided by Swedish National Forest Inventory (selected by SLU/M2) and typical price-lists for bucking control. A specific preliminary report "Examples of bucking simulation including prediction of properties" and "Intelligent CTL harvesting based on cost-benefit analyses for value chain optimization" have been produced.

   The two approaches with different objectives provider a basis for a deeper dialog (e.g. with experts in M4) concerning the economic and environmentally possibilities to select, buck and haul different assortments and enriched properties to different production units. These analyses will make it possible to balance variation in forest resources, cost and environmental load from different logging and haulage in one hand with the potential gains in reduction of costs and environmental load in the following industrial processes in the other.

2. Demands on wood and fibres of selected products in major production lines (solid wood, fibre, bio energy) have been specified. First, a set of key products for the major production chains was identified. This was first done for the fibre chains by STFI-Packforsk, in cooperation with researches in module 4 and 5. Forest Research managed

the corresponding analyses and compilation for the solid wood and bio-energy chains. This definition of key products has become a basis for the definition of regional chains and model processes in other modules. In the next step, the demands on wood of the key products and process were expressed in terms of raw material properties, managed analogously between STFI-Packforsk and Forest Research, with contributions also from FVA and other partners. Appropriate alternatives have been defined for allocation of raw materials from existing forest resources, meeting the demands of relevant production lines, in specific or more general terms depending on what is possible. The results are described in D3.1.2 "Key products of the forest-based industries and their demands on wood raw material properties".

WP3.1 has been active in the development of the chains and model mills. Special contributions have been made by Skogforsk and STFI-Packforsk to the Västerbotten case, by ALUFR and FVA to the Badem-Württemberg case and by STFI-Packforsk and AFOCEL to the Ibarian case. (STFI-Packforsk has defined the Iberian fibre chains and also worked on models for eucalypts. AFOCEL has clarified the interaction between Iberia and Southern France and worked on models for Maritime pine.)

3. Proper allocation of wood raw materials is crucial for sustainable production, as unsuitable materials cause yield and quality losses, increased need for transportation, energy, chemicals, etc. It has been analysed how effects of allocation best is described with indicators. The conclusion from this work is that WP3.1 defines what is suitable (D3.1.2, etc.), which influences the material flows in the case to be run with ToSIA, but that the indicators are calculated in the processes affected by the allocation. Contributions from several partners.

4. Alternatives are analysed for measurement/assessment of quantity and quality of the forest resource at an early stage of the chain and in key positions between forest and industry, according to their effectiveness and costs. So far, the methods described above to estimate properties already in the resource or on harvesting have been emphasised. Main contributions by STFI-Packforsk and Skogforsk.

A workshop "Quality assessment and allocation" was arranged at STFI-Packforsk in Stockholm on March 8-9, 2007, with M3 and representatives from M4, M5, M2 and M1. Discussions and presentations on methods, status and results related to WP3.1 has been held at the Eforwood weeks in Lisbon (November 2006) and Zvolen (May 2007), at M3 meetings in Freiburg (July 2007) and at telephone meetings. A poster was presented at the Eforwood week in Brussels (October 2007). A presentation was held at the COST E44 Conference "Modelling the Wood Chain: Forestry – Wood Industry – Wood Products Market" in Helsinki September 17-19, 2007.

Deviations from work programme (if any)

Changes in time scheduling from M1 occurred and work was performed accordingly, including one additional step in ToSIA development of "test chains", namely the "single chain", which is/will be followed by the "case study" as well as "European cases". Some deliverables which were designed for the test chains, thus were performed for the single chains due to the better data material.

Periodic Activity Report, WP Leader
Annual report 12 months
Period: November 1, 2006 - October 31, 2007

WP leader	Staffan Berg, Skogforsk		WP number	WP3.2
Date	15.10.2007			

Work package objectives, starting point of work at beginning of reporting period.

Objectives

1. To select a preliminary set of data for ToSIA at different levels (test, single chain and case study)
2. To analyze existing and future harvesting systems (scenarios) on different technical levels and organizational framework and their sustainability impacts
3. To identify and evaluate adequate harvesting systems for different product lines (solid wood, fibre, bio- energy), terrain (flat, steep) and socio-economic framework (big scale-small scale enterprises)
4. To elaborate existing and new concepts for integrated planning and organization of harvesting operations and assess their influence on the sustainability impact of the operation
5. To analyze interactions between harvesting systems/techniques and silvicultural management concepts with special regard to sustainability impacts
6. To analyze interactions between harvesting systems/techniques and wood allocation (quality, defects, sorting) in different product lines
7. To define training needs for planning staff and operators

Partners involved: <u>SKOGFORSK</u>, AFOCEL, ALUFR, FR, FVA, STFI-Packforsk
Progress towards objectives,

1. 2. 3. The working party finalized the work on Deliverable D3.2.3. Data over harvesting operations have been delivered in data client for the **Single Forest Wood Chains** "Pine" (Scandinavia), "Spruce" (Baden-Württemberg), and "Eucalypt" (Iberia). These data are collected according to PD0.0.12 Draft and contain results for the three test chains concerning costs, resource use and emissions, such as, contribution to GWP. Concerning the Eucalypt Chain, the process was described for plantation system and sprouting system (coppice in 2nd generation).

Effort has been made in order to define the harvesting operations in **Case studies** and a manual is developed. Data for case studies are not yet reported.

Meetings addressing the issues for the WP3.2 were held at

- Uppsala 5-6 March 2007;
- Zvolen EFORWOOD week 7- 12 May 2007;
- and Freiburg 10-11 July 2007.

4. Participating (AFOCEL) to the Task Force Waste Management in order to define the type of waste to be considered in ToSIA . Assessment due to operation caused emissions not yet done.

5. Harvesting schemes were designed to fit the harvest method in the 5 Forest Management Alternatives (FMA) from M2. The scheme will implement in the Iberian case study, at least in a partial way.
6. in preparation

7. Training has also been performed at each participating institute. A Short Time Scientific

Assignment was held for PhD student and WP3.2 participant Diana Vötter (ALUFR) who spent one month (August 2007) at Skogforsk in order to participate in the use of Sima Pro routine for calculating Environmental impacts. Training has been received in Joensuu, 25 -26 April 2007.

Supporting documents;

D3.2.3 SI-data for harvesting operations in test chains.

PD0.0.12 Report on Indicator Working Groups on data collection protocols for Single FWC. Draft.

Minutes from the M2-M3 "Scandinavian case study" meeting in Uppsala March 5-6, 200.7

Module 3.2 Harvesting telephone conference minutes, 4th April 2007.

Summary and Decisions of the M3-Scenario-Meeting in Freiburg. 10 -11.7 2007.

Manual for description of harvest operations in case studies, draft.

Data Client Single FWC.

Deviations from work programme (if any),

Changes in time scheduling from M1 occurred and work was performed accordingly, including one additional step in ToSIA development of "test chains", namely the "single chain", which is/will be followed by the "case study" as well as "European cases". Some deliverables which were designed for the test chains, thus were performed for the single chains due to the better data material.

Deliverable D3.2.3 was delivered 31.10 2006 and approved 3/1 2007. No delays so far but changes in time table for case studies might affect PD.3.2.4.

Periodic Activity Report, WP Leader
Annual report 12 months
Period: November 1, 2006 - October 31, 2007

WP leader	Elisabeth Le Net, AFOCEL		WP number	3.3
Date	15. 10. 2007			
Work package objectives				

Objectives
1. To analyze scenarios of existing and future road, rail and water transport systems for wood products,
2. To harmonise transport aspects between different modules (M3-M4-M5),
3. To analyze the transport techniques, logistic concepts, loading and storage alternatives with special emphasis on environment, economy of the whole process and the social dimensions,
4. To analyze the complete transport system with special emphasis on the sustainability impacts for the test chain,
5. To detect training needs for planning staff and operators

Partners involved: <u>AFOCEL</u>, ALUFR, FR, Skogforsk, STFI-Packforsk

Progress towards objectives

1. Some propositions have been done to define transport hypotheses for scenarios

2. WP33 partners have been involved a lot in the different versions of Transport Protocol for application throughout all modules. The feedbacks from data collection (test chains) helped in this work.

3. Through PD332, 4 country profiles on wood transport have been done. This deliverable give information on:

   - Eurostat database and its limits (this experience can be useful for other modules)

   - The wood transport systems by mode: volume, distance, specific equipments,…

   - Some solutions for wood transport

   - The limits of transport protocol solutions for evaluating employment and energy for wood transport (due to its specificities, cf. above).

4. Transport impacts have also been identified and solutions have been proposed in other (than Transport) Protocols.

5. Training needs have not explicitly been detected

Deviations from workprogramme (if any)

Changes in time scheduling from M1 occurred and work was performed accordingly, including one additional step in ToSIA development of "test chains", namely the "single chain", which is/will be followed by the "case study" as well as "European cases". Some deliverables which were designed for the test chains, thus were performed for the single chains due to the better data material.

   - The delivery of PD332 has been postponed several times in order to adjust and make comparable (as far as possible) available information on different countries (France, Germany, UK and Sweden). The methodological choice made was to base the analysis on those countries in order to illustrate the diversity of European situations. Instead of picking some disseminating information, this option allows to get dominant systems that

allow generalisation.

- Two themes have not been considered till now: training and storage.

Periodic Activity Report, WP Leader
Annual report 12 months
Period: November 1, 2006 - October 31, 2007

WP leader	Diana Vötter, ALUFR		WP number	3.4
Date	15.10. 2007			

Work package objectives

Objectives

1. To define common criteria /indicators and ways to measure these (units, key figures)
2. To define the module specific parts of test chains
3. To integrate partial results of SIA analysis from WP 3.1 to WP 3.3 into a chain model, taking the test chain as an example
4. To integrate and link this partial model with the results of M2 and M4
5. To identify inter-module and external training needs

Partners involved: ALUFR, AFOCEL, FR, FVA, Skogforsk, STFI-Packforsk

Progress towards objectives

1. Active participation of all M3 partners in indicator task forces for transport, environmental, socio-economic, energy and waste indicator group, as well as chairing "indicator compilation group" (ALUFR, Skogforsk). Those results were reviewed several times, participation at Vienna meeting, 23-24 August 2007 and numerous telephone conferences was necessary

2. M3- parts of test chain and single chains were defined, as well as boundaries and work sharing with M2 at this boundary. M3 agreed to calculate all machine work, also within M2, even if processes other indicators are calculated my M2.
   Module specific parts of the single chain by defining common processes for material allocation, harvesting, transport and handling has been done and is on the way fro the case study description. Further some brainstorming on scenarios had been carried out during a M3 Scenario meeting in Freiburg, 10-11 July 2007

3. Partial results of the SIA were collected for the test chains and the single chains. Those results were put into the client, as well as described in PD3.4.2. Work on the case studies is ongoing.

4. A classification system has been set up, also for module specific modelling and is described in deliverable D3.4.3 (will be submitted this October) and data has been collected (see 3.) More time is needed for module-specific calculations, so far the data collection work is just working at client level today.

5. So far only at M1 level for ToSIA functioning and data collection (see WP3.0 and 5.). There have however, been internal training from those trainings, as well as information meetings and discussions during partner and module meetings, and during dedicated session parts during the EFORWOOD weeks.
   In addition, partners ALUFR and Skogforsk had a training in terms of a one month stay (August 2007) of Diana Vötter at Skogforsk in order to be trained on SimaPro for environmental impact calculations.

Deviations from work programme (if any)

Changes in time scheduling from M1 occurred and work was performed accordingly, including one additional step in ToSIA development of "test chains", namely the "single chain", which is/will be followed by the "case study" as well as "European cases". Some deliverables which

were designed for the test chains, thus were performed for the single chains due to the better data material.

Section 2 – Work package progress of the period

Module 3

Summary of Module work

Module 3 – Forest to Industry Interactions lead by ALUFR consists out of WP3.0 to 3.4 with partners from ALUFR, AFOCEL, FR, FVA, Skogforsk and STFI-Packforsk. It has worked according to its promised goals and objectives on the following issues: WP3.0 ensured that the Module objectives have been achieved as well as coordinated and controlled the proceedings of deliverables and other IP management issues. Additional input was given to the case study coordination of Case Study Baden Wurttemberg. WP3.1 tested some concepts of mapping properties of forest resources and specified wood and fibre demand of selected production lines. WP3.2 has identified and analysed harvesting systems for different product lines and for the case studies. WP3.3 concentrated on the analysis of transport techniques and logistic concepts for different country profiles with special emphasis on sustainability effects. WP3.2 and WP3.3 have, as well, already collected, calculated data for test and single chains for ToSIA calculations and put them into the client, and prepared processes and data for the Case Study Baden Wurttemberg. WP3.4 emphasized its work in providing calculation routines and data collection protocols for all indicators used within ToSIA, as well as data for M3 processes in test and single chain has been collected, calculated, put into the client and regularly checked. Work on scenarios has also started.

WP3.0

WP3.0 "Coordination" took care of full-filling objectives promised in the DOW as well as of requests from the coordinator or other modules. It ensured the quality control of deliverables by implementing a cross-checking system for PDs and Ds within M3. Also interaction with IP management and other modules ran smoothly and close to timetable; the same applies for the annual reporting of year 2. Additional activities were carried out to organise the Case Study Baden Wurttemberg.

WP3.1

The promised concept of mapping properties of forest resources based on models and measurements is well under way, and has already been tested in subsets at various points. Wood and fibre demands of selected production lines for solid wood, bio-energy and fibre have been specified, and their possible allocation effects have also been brainstormed. This, as well as early assessment methods for quality and quantity allocation still requires more work, especially with reference to the case studies.

WP3.2

Harvesting systems for different product lines have been identified, existing and possible future systems have been and are analysed. At single chain level data for those was provided and still is collected for the case studies. Existing and new concepts for integrated planning and organization of harvesting systems and silvicultural management schemes as well as wood allocation are assessed also in terms of their impacts on sustainability. Data for test chains and single chains have been collected, calculated and put into the client for ToSIA calculation.

WP3.3

WP3.3 "Transport" took over the task to analyse transport techniques and logistic concepts for different country profiles, and did so with special emphasis on sustainability effects. Data for test chains and single chains have been collected, calculated and put into the client for ToSIA calculation. As an additional task, transport issues and approaches for calculation of the same throughout all EFORWOOD modules were discussed and are formulated into data collection protocols. Scenarios for transport underwent a thorough brainstorm and are being assessed.

WP3.4

In WP3.4 "Partial modelling" a lot of work has been and is put into providing calculation routines and data collection protocols for all indicators used within ToSIA. M3's module specific chain parts have been gathered for test and single chains, and are being formed for the case studies. Data for M3's processes in the test and single chain were collected, calculated, written into the Client and regularly checked and corrected. Work on scenarios on a general, as well as on a M3 level has started. A system for M3-specific modelling has been developed. Boundaries and interfaces of M3 with M2 on the one side and M4 on the other are in constant dialogue.

Periodic Activity Report, WP Leader
Annual report 12 months – YEAR 2
Period: November 1, 2006 - October 31, 2007

Table 1. List of Deliverables

List all deliverables, giving date of submission and any proposed revision to plans.

Del No.	Deliverable name	WP No.	Due date	Actual/ Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contractor
PD3.0.3	Draft Description of Baden-Württemberg Caste Study (Month 20)	3.0	20	23		10,15	FVA
D3.0.4	Annual reporting for 2nd year	3.0	23	23		4,42	ALUFR

*) if available

Table 2. List of Milestones

List all milestones, giving date of achievement and any proposed revision to plans.

Milestone No.	Milestone name	Work package No.	Date due	Actual/Forecast delivery date	Lead contractor
M3.0.3	Draft Description of Baden-Württemberg Caste Study	3.0	20	23	FVA
M3.0.4	Annual reporting for 2nd year	3.0	23	23	ALUFR

Periodic Activity Report, WP Leader
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Table 1. List of Deliverables

List all deliverables, giving date of submission and any proposed revision to plans.

Del No.	Deliverable name	WP No.	Due date	Actual/ Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contractor
D3.1.2	Demands on wood and fibres for selected products in major production lines (solid wood, fibre, bio energy) expressed in terms of raw material properties. (Month 17)	3.1	17	17		7,95	STFI-Packforsk
PD3.1.3	Draft concept for the mapping of properties of the forest resources by which the forest resources are grouped/classified according to potential forest and wood utilisations (species, composition, growth conditions, localisation, etc.) (Month 21)	3.1	21	25		3,85	STFI-Packforsk
PD3.1.4	Data collection of allocation processes to be provided for ToSIA at case study level (Month 25)	3.1	25	33		2,95	STFI-Packforsk
PD3.1.5	Draft concept for the mapping of properties of the forest resources by general applicable methods at case study level (Month 30)	3.1	30	31		3,25	STFI-Packforsk
PD3.1.6	Prototype development of stratified partial models for allocation on case study level (Month 30)	3.1	30	33		1,15	STFI-Packforsk
PD3.1.7	Delivery of a preliminary set of data for allocation processes to be provided for ToSIA at European case level (Month 30)	3.1	30	36		0,85	

*) if available

Table 2. List of Milestones

List all milestones, giving date of achievement and any proposed revision to plans.

Milestone No.	Milestone name	WP No.	Date due	Actual/Forecast delivery date	Lead contractor
M3.1.2	Demands on wood and fibres for selected products in major production lines (solid wood, fibre, bio energy) expressed in terms of raw material properties. (Month 17)	3.1	17	17	STFI-Packforsk
M3.1.3	Draft concept for the for the mapping of properties of the forest resources by which the forest resources are grouped/classified according to potential forest and wood utilisations (species composition, growth conditions, localisation, etc.) (Month 21)	3.1	21	25	STFI-Packforsk
M3.1.4	Data collection of allocation processes to be provided for ToSIA at case study level (Month 25)	3.1	25	33	STFI-Packforsk
M3.1.5	Draft concept for the mapping of properties of the forest resources by general applicable methods at case study level (Month 30)	3.1	30	31	STFI-Packforsk
M3.1.6	Prototype development of stratified partial models for allocation on case study level (Month30)	3.1	30	33	STFI-Packforsk
M3.1.7	Delivery of a preliminary set of data for allocation processes to be provided for ToSIA at European case level (Month 30)	3.1	30	36	STFI-Packforsk

Periodic Activity Report, WP Leader
Annual report 12 months – YEAR 2
Period: November 1, 2006 - October 31, 2007

Table 1. List of Deliverables

List all deliverables, giving date of submission and any proposed revision to plans.

Del No.	Deliverable name	WP No.	Due date	Actual/ Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contra ctor
PD3.2.4	Data collection of harvesting processes to be provided for ToSIA at case study level	WP3.2	25 -> shifted to 33	33	7,1	8,06	Skog-forsk
(PD3.2.5) PD3.2.6	Delivery of a preliminary set of data for harvesting processes to be provided for ToSIA at European case level	WP3.2	30 -> shifted to 36	36	7,8	2,18	Skog-forsk
(PD3.2.6) PD3.2.5	Prototype development of stratified partial models for harvesting on case study level	WP3.2	30 -> shifted to 32	32	8,4	2,1	Skog-forsk

*) if available

Table 2. List of Milestones

List all milestones, giving date of achievement and any proposed revision to plans.

Mileston e No.	Milestone name	Workpackage No.	Date due	Actual/Forecas t delivery date	Lead contractor
M3.2.4	Data collection of harvesting processes to be provided for ToSIA at case study level	WP3.2	25	33	Skogforsk
M3.2.5	Delivery of a preliminary set of data for harvesting processes to be provided for ToSIA at European case level	WP3.2	36	36	Skogforsk

M3.2.6	Prototype development of stratified partial models for harvesting on case study level	WP3.2	32	32	Skogforsk

Periodic Activity Report, WP Leader
Annual report 12 months – YEAR 2
Period: November 1, 2006 - October 31, 2007

Table 1. List of Deliverables

List all deliverables, giving date of submission and any proposed revision to plans.

Del No.	Deliverable name	WP No.	Due date	Actual/ Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contractor
PD332	Identification of existing transport methods and alternative methods or new approaches with relevant SI-data	3.3	15	21	9.1	7,95	AFOCEL-FCBA
D333	Assessment of logistic concepts to sustainability: Development of a common approach to transport issues at case study level within a M3-M4-M5-cross-module-transport group	3.3	25 (previously 20)	25	3.9 for year 2	2,17	AFOCEL-FCBA

*) if available

Table 2. List of Milestones

List all milestones, giving date of achievement and any proposed revision to plans.

Milestone No.	Milestone name	Workpackage No.	Date due	Actual/Forecast delivery date	Lead contractor
M3.3.2	Identification of existing transport methods and alternative methods or new approaches with relevant SI-data	3.3	15	Done (21)	AFOCEL-FCBA
M3.3.3	Assessment of logistic concepts to sustainability: Development of a common approach to transport issues at case study level within a M3-M4-M5-cross-module-transport group	3.3	20	25 (link with D333 which have been revised to 25)	AFOCEL-FCBA

Periodic Activity Report, WP Leader
Annual report 12 months – YEAR 2
Period: November 1, 2006 - October 31, 2007

Table 1. List of Deliverables

List all deliverables, giving date of submission and any proposed revision to plans.

Del No.	Deliverable name	WP No.	Due date	Actual/ Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contractor
PD3.4.2	To collect and aggregate test chain data from WP 3.1-WP 3.4, derive ToSIA inputs in commonly agreed units and formats and deliver those to M1	3.4	18	18*		10,97	ALUFR
D3.4.3	A method of integrating SIA-results of different partial models in the context of module 3 is developed	3.4	22	23		4,15	ALUFR
PD3.4.4	Compilation of collected data of allocation, harvesting and transport processes to be provided for ToSIA at case study level	3.4	27	34		0,15	ALUFR
PD3.4.5	Development and selection of M3 key scenarios for ToSIA	3.4	28	32		0,15	ALUFR

*) if available

* due to change from Test Chain to Single Chain in ToSIA structure and (re) definition of indicators- Shift of focus of PD from TC-SC due to better and more comprehensive data.

Table 2. List of Milestones

List all milestones, giving date of achievement and any proposed revision to plans.

Milestone No.	Milestone name	Workpackage No.	Date due	Actual/Forecast delivery date	Lead contractor
M3.0.3	Draft Description of Baden-Württemberg Caste Study	3.0	20	22	ALUFR
M3.0.4	Annual reporting for 2nd year	3.0	23	24	ALUFR

Plan for using and disseminating the knowledge
Annual report 12 months
Period: November 1, 2006 - October 31, 2007

Table 1

Exploitable Knowledge (description)	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable for commercial use	Patents or other IPR protection	Owner & Other Partner(s) involved

Table 2

Planned /actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible /involved
8.-10.05.07	Conference (BMBF Research for Sustainability, Berlin From Lisbon to Leipzig, Leipzig)[1]	Research	Europe	150	ALUFR-M3
20.08.07	Conference (Uppsala)[2]	Research	Sweden	10	ALUFR-M3
1.-4.10.07	Conference (FERIC, Canada)[3]	Research, Industry (sector forest technology)Research	Canada, worldwide	300	ALUFR-M3
17.09.07	Project web-site (link to www.eforwood.com)	Research, Industry (sector forest technology)	Germany, Europe, worldwide		ALUFR-M3
4.-5.09.07	Flyers[4]	Research, Industry (sector forest technology, bioenergy)	Scandinavia,Europe, worldwide	500	ALUFR-M3
14.09.07	Workshop (MCA Workshop, Freiburg)[5]	Industry, stakeholder	Germany	13	ALUFR-M3
12.07.07	Direct e-mailing (Conference list)[6]	Industry, stakeholder	Germany	10	ALUFR-M3
04.09.07	Direct e-mailing (Conference invitation)[7]	Industry, stakeholder	Germany	560	ALUFR-M3
25.09.07	Press release (Eforwood newsletter)[8]	Research, Industry, stakeholder	Germany	13	ALUFR-M3
1-31.08.07	Guest stay, Short Term Scientific Mission (STSM)[9]	Research	Sweden	100	ALUFR-M3

Comments to table 2

[1] by Prof. Dr. Gero Becker

[2] by Diana Vötter: internal presentation of work within M3, WP3.4 in particular

[3] by Diana Vötter: poster

[4] distributed at Bioenergy Conference 2007 in Jyväskylä, Finland

[5] by Prof. Dr. Gero Becker; with external experts and stakeholders at national/local level (Baden Württemberg)

[6] by Prof. Dr. Gero Becker for EFORWOOD Conference 2007 in Brussels, Belgium

[7] by Prof. Dr. Gero Becker for EFORWOOD Conference 2007 in Brussels, Belgium

[8] by Prof. Dr. Gero Becker: on Scenario meeting on M3 level in Freiburg

[9] by Diana Vötter at Skogforsk, Uppsala, Sweden

Template 3
Contract No.: 518128 (GOCE) - EFORWOOD
Project acronym: EFORWOOD

Project title: Tools for Sustainability Impact Assessment of the Forestry-Wood Chain

Instrument: Integrated Project

Thematic Priority: Integrating and strengthening the European Research Area

Periodic Management Report
Annual report 12 months

Period covered: from November 1, 2006 to October 31, 2007   **Date of preparation**: 15 Oct 2007

Start date of project: November 1, 2005   **Duration**: 48 months

Project coordinator name: Kaj Rosén
Project coordinator organisation name: Skogforsk   **Revision**: [1]

Section 1 - Justification of major cost items and resources

Description of work performed by partner 19/ AFOCEL within Module 3:

WP3.0
Due to AFOCEL's participation in three modules and two Task Forces, the management and harmonisation of AFOCEL researchers involved in the different WP is necessary and time consuming.

AFOCEL participated in many meetings linked to M3 and did the working report for the second year.

WP3.1
AFOCEL worked at the interface between the modules 2 and 3 to help partners in determining the parameters requested from the forest production in Aquitaine.

AFOCEL gave information from different data base (National Customs, professional organizations…) about the consumption in the Iberian Peninsula, and the distribution of industrial products consumed in Spain and Portugal coming from Aquitaine.

AFOCEL (G Chantre) contributed to the D 3.1.2., and especially was in charge of the analysis of the report with Arto Usenius.

AFOCEL is presently updating the existing fibre models and round log quality models for Maritime Pine in Aquitaine, with special focus on the connection with growth models (increment, height…), knowing growth traits are deeply affected by genetics nowadays. Operational chain of models will be validated from the plantation to the final cut by Month 30. This chain of models will provide information for grading logs according to the common specifications of the D 3.1.2 depending on the forest growth and the FMP.

WP 3.2
AFOCEL filled Excel sheets for eucalyptus single chain and AFOCEL had the responsibility to look after indicators for the dataclient from IFER.

AFOCEL contributed to the definition of common machines specifications and added specific harvester machine from cultivated forest (e.g. small harvester).

AFOCEL designed harvesting schemes to fit the harvest method in the 5 Forest Management Alternatives (FMA) from M2. The scheme will implement in the Iberian case study, at least in a partial way. The scheme with energy use objective should be more discuss to get an accurate assessment of the harvesting costs

WP3.3
Being coordinator of this WP and a cross-module group, AFOCEL is involved in the integration of transport in EFORWOOD. That means many proposals and trials to balance the requests of partners (from specific information to generalized ones). The elaboration of PD332 (collection of data and compilation, test of Eurostat statistics, highlights of wood transport particularities, France country profile) and the work done on D333 (still in progress) have been the main contribution of AFOCEL on wood transport and logistics.

WP3.4
AFOCEL contributed to Scenario definition and description.
AFOCEL is part of two Task Force:

- the Indicator Task Force as a coordinator of the Transport Protocol
- the Waste Management Task Force in order to define the type of waste to be considered in ToSIA.
-

<u>AFOCEL Participation to meetings linked with M3</u>

- 15-17 nov 2006: EFORWOOD Week in Lisbon (Carcavelo)

- January 2007: organisation of a meeting with Forest Research in Paris

- 8-9 March 2007 (Stockholm, STFI-Packforsk):

    o Presentation of the forest resources in Aquitaine and the growth models for Maritime Pine. Possible connection with other models (wood quality, fiber quality...) and Forest Inventory data.

- 7-9 may 2007: Zvolen meeting with all Module and WP partners.

- July 2007: meeting in Freiburg on scenarios

- August 2007: meeting of the task force indicators in Vienna

- October 2007: Participation to the Eforwood conference and Eforwood Week in Brussels

Description of work performed by partner 5/ALUFR within Module 3:

General

ALUFR is the Module leader of M3, as well as the Work package leader of WP3.0 and WP3.4. Thus, it participates not only in the work packages WP0.0, WP3.0 and WP3.4, but also WP3.1, WP3.2 and WP3.3. In addition to its position as module leader of M3, ALUFR-M3, namely the Institute of Forest Utilization and Work Science, University of Freiburg, Germany, also took over the organisation of the partner ALUFR, who consists of the Institute of Forest Utilization and Work Science (M3) with director Prof. Dr. Dr. h. c. Gero Becker as well as of the Institute of Forest Yield (M2) with director Prof. Dr. Heinrich Spiecker as head.

WP0.0: Scientific Co-ordination:

ALUFR is the Module leader of M3, and thus involved in several activities of the scientific coordination, working closely together with the project Co-ordinator Skogsforsk, as well as with the other module leaders. These activities, which ensure the continuing progress and scientific quality of the project EFORWOOD, envolved:

- to co-ordinate and harmonise the efforts among the module activities;
- to design and regularly update the implementation plan (Implementation Plan Month 13 to 30, as well as Implementation Plan Month 25 to 42) of the IP, including design of the reporting methods and templates for the modules;
- watch over the distribution of manmonths of the partners for the individual Implementation Plan and the remaining time of the project
- to follow up the overall progress of the project and to give direction to the project;
- to design the content of joint IP meetings and to participate at those
- to prepare the scientific progress and the second annual report to EU
- to ensure an efficient transfer of project results into dissemination (co-ordinated by Module 6)

WP 3.0: Coordination/Management:

ALUFR is the work package leader of WP3.0 Coordination und thus its work includes the coordination and management of

- the work within the Module M3, including its five work packages (WP3.0 Coordination, WP3.1 Quality assessment and allocation, WP3.2 Harvesting systems, WP3.3 Transport systems, WP3.4 Integrated Partial Chain Modelling) and its five partner organisations (AFOCEL, FVA, FR, STFI, Skogforsk) as well as the interface management between those organisations, work packages and test chains/single chains /case studies (Spruce, Pine and Eucalypt test and embedded single chain). It included intra-module communication with all partners via telephone and email, as well as the organisation of the following intra-module meetings:
  - EFORWOOD week in Carcavelos, date Nov 2006
  - EFORWOOD week in Zvolen, Slovakia, date 7-13/05/2007
  - EFORWOOD week in Brussels, date 3-4/10/2007
  - Case Study BW in Freiburg, 27/02/2007
  - MCA meeting in Freiburg, 19/04/2007

- MCA workshop in Freiburg, date 13-14/09/2007
- Scenario meeting in Freiburg, date 10-11/07/2007
- Seminar for project management in Freiburg, date 31.01.2007
- BMBF Research for Sustainability, Berlin From Lisbon to Leipzig, Leipzig, Germany; date: 8.-10.05.07
- Internal presentation of work within M3, WP3.4 in particular at Skogforsk, Uppsala, Sweden, date: 20.08.07
- FERIC 2007, Mont Tremblant, Canada; date: 1.-4.10.07
- MCA Workshop, Freiburg, Germany; date: 14.09.07
- Guest stay of D. Vötter, ALUFR, at Skogforsk, Uppsala Sweden for model calculations of SimaPro, date: 1-31.08.07

and the participation at the following meetings:

- IP Board 18, Warsaw, Poland, 3 September 2007
- x IP-Boards so far
- Allocation meeting in Stockholm, date 8-9/03/2007
- Bioenergy conference in Jyväskylä; date 4-5/09/2007
- FERIC 2007 in Mont Trembrant Canada, date 1-4/10/2007
- EFORWOOD week in Carcavelos, date Nov 2006
- EFORWOOD week in Zvolen, Slovakia, date 7-13/05/2007
- EFORWOOD week in Brussels, date 3-4/10/2007
- EFORWOOD conference in Brussels, date 1-2/10/2007
- Indicator Task Force in Vienna, date 22-24/08/2007
- From Lisbon to Leipzig in Leipzig, date 8-10/05/2007
- Roadshow in Frankfurt, Germany, date 30.10.2007
- ARIS Architect in Saarbrücken, date 14-15/05/2007
- ARIS Business Optimum in Saarbrücken, date 20-21/11/2006
- Skogforst report scenario meeting in Uppsala, date 7/08/2007
- Transport logistic 2007 in Munich, date 12-14/06/2007
- ToSIA training in Joensuu, 21-28/04/2007
- Uppsala case study in Stockholm, 3-9/03/2007

Module coordination:

- harmonisation of data collection, data handling, data storage, quality insurance;
- ALUFR coordinated the information flow between coordinator, other modules and task forces (on indicators and scenarios) with M3 module partners, by forwarding e.g. IP board and other protocols, as well as by distributing, reminding and gathering of requests from other modules like questionnaires (on …), documents (e.g. …), newsletter (…), and other) or simple questions via email.
- organisation and harmonisation of work on the three test chains and single (embedded) chains as well as of the three case studies
- set-up of a detailed working plan for the project months 13-30, 13 to 24 and 25 to 43.
- carrying out the annual reporting for WP0.0, WP3.0, WP3.4 and M3, including preparing the forms for the partners (work packages 3.0 to 3.4), proof-reading, checking and editing.
- Clarifying questions concerning project administration with the partners
- Reminding and initiating financial auditing for M3 partners, if necessary

- Participation at seminary for project leaders in EU projects, in Freiburg, Germany, 31 January 2007

The module coordination tasks were substantial. Additional coordination activities were necessary for inputs to the task forces "Compilation of data collection protocols" (leader) and Transport indicators, socio-economic indicators, energy indicators, as well as scenario task force (participant). Therefore 2 man months from WP3.1 were allocated to WP3.0, as well as 0,02 man months from the period 31 – 48 were already used in the 2nd year.

WP 3.1: Quality Assessment and Allocation:
WP3.1 deals with the issues of wood quality and allocation and is leaded by STFI-Packforsk. ALUFR's participation in this work package included:

- organisation and contribution to the discussion on layout and workplan of the workpackage

- identification of Allocation possibilities and linkage to processes; as well as determination of boundaries towards M2 and M4, in close work with STFI

- work on product tables for construction wood, pulp and paper, and bio-energy, for the case studies. Aimed for defining products of the case study, as well as agreeing throughout the modules on certain production chains, close cooperation with STFI-Packforsk, Sweden and Forest Research, GB

- presentation, discussion and further development of these results with other modules at M3 meeting in Stockholm, Sweden, dated: 8-9/03/2007

- identification of sources for relevant data and models for all case study regions, and scrawling of EUROSTAT data base, including data collection for the three test and single chains and case studies.

- work on concepts of "model mills" where data on industry structure of a country or region is either not available or too sensitive to be used.

- contribution to the identification of a module specific and further refinement of common set of indicators

- contribution to work on scenarios

During months 13-14 WP3.1 did not require as much input from ALUFR as it was planned. due to some shifts in case study timetables. The respective time will be needed during the next planning period. Therefore 2 man months from WP3.1 could be allocated to WP3.0 for the 2nd year.

WP 3.2: Harvesting:
WP3.2 deals with the issue of harvesting methods and technology, and is leaded by Skogsforsk. ALUFR's participation in this work package included:

- working on drafts of the spruce, pine and eucalypt test and single chains, as well as on the case studies

- modelling and calculation of relevant harvesting systems for the spruce test and single chain and starting to identify resources for relevant data for their characterisation in close work with partner FVA, and M2

- started identification of relevant harvesting systems for Västerbotten case study

- started identification of relevant harvesting systems for the Baden-Wuerttemberg case study and started to identify and check resources for relevant data for their characterisation

- input, check and maintenance of harvesting indicators within the client

- contribution to the identification of a module specific and a common set of indicators
- participation at WP3.2 Harvesting meeting and preparation of Production-driven Case Study Västerbotten in Uppsala, Sweden, dated: 05-06/03/2007
- participation at preparation of Product-driven Iberian peninsula in Stockholm, Sweden, dated: 07/03/2007 with M4 and M5 representatives
- participation at trade fair "ELMIA Wood 2007", Jönköping, Sweden, 31-2 June 2007, in order to get contacts, data and further insight into harvesting processes
- participation at trade fair "Bioenergy 2007", Jyväskylä, Finland, 4-5 September 2007, in order to get contacts, data and further insight into harvesting processes, esp. in area of bio-energy
- contribution to the identification of a module specific and further refinement of common set of indicators
- contribution to work on scenarios

The work load within WP3.2 was considerable because additional efforts were necessary to design the single chain and case study processes and the related data collections. Therefore more than 2/3 of the budgeted 18-months budget was already spent, in figures those are 5,01 out of 5,90 planned for 13-30. In this perspective we will need more man months in this workpackage in order to keep up the standard of work performed here and meet the requirements of others partners and M1.

WP 3.3: Transport:

WP3.3 deals with the issues of transport and logistics and is leaded by AFOCEL. ALUFR's participation in this work package included:

- identifying relevant processes and indicators within the work package "Transport" of the test and single chains, as well as for the case studies
- work on indicator and process calculation by means of contributing to project deliverable PD3.3.2, as well as developing an excel based calculation scheme for machine calculations ("Transport_costs_GERMANY_Dianas.xls") and for indicator collection of indicators priority class 1 (Indicator calculation sheet for Transport_Diana.xls)
- gathering those indicators for the spruce test and single chain, calculating them according to processes and filling them into the Client
- input, check and maintenance of transport indicators within the client for all three single chains
- contribution to the identification of a module specific and further refinement of common set of indicators
- participation at trade faire "Logistics 2007", Munich, 12-14 June 2007, in order to get contacts, data and further insight into transport processes, esp. in modal split
- participation at WP3.2 Transport meeting in Freiburg 11 July 2007
- supervision and tutoring of diploma thesis on transport issues
- contribution to work on scenarios

The work load within WP3.3 was considerable higher than planned when starting the project. The reason were the extended duties to develop and coordinate transport processes and routines for indicator collection not only for M3 but also for other modules. Therefore more than 2/3 of the budgeted 18-months budget was already spent, in figures those are 2,65 out of 2,50 planned for 13-30, drawing 0,15 man months already off the periode 31 - 48. Consequently, in the long view, we will need more man months in this workpackage in order to keep up the standard of work performed here.

WP 3.4: Process modelling:

ALUFR is the work package leader of WP3.4 Partial Integrated Process Modelling und thus organises and coordinates the work on process modelling within M3 and in connection to M1, as well as to M2 and M3.

- background studies on process modelling and ARIS Business Architect (Modelling software based on object-oriented programming, business process modelling and UML-unified-modelling language), as well as starting of modelling processes from the test and single chain, case studies and scenarios in order to test its applicability for EFORWOOD M3's processes

- participation at training course on ARIS Business Optimizer in Saarbrücken, Germany, 14-16 May 2007

- development of a classification system with which information such as stand, tree and machine classifications as well as indicators can be linked to the above mentioned models

- participation at telephone meetings with M1 on ToSIA and M3 processes within, as well as participation at a ToSIA training in Joensuu, 23-24 April 2007

- drafting and modelling of M3 processes within the single chain and case studies; work on this continues

- working on Scandinavian part of case study as well as gathering of background knowledge and refining of calculation schemes for processes and indicators, testing of new models, during a one month stay at Skogforsk, Uppsala, Sweden, 1 - 31 August 2007; work on this continues

- contribution to modelling of spruce single chain, eucalypt single chain and pine single chain

- Preparation and organisation of MCA meeting with M1 and FVA in Freiburg, 19 April 2007

- Preparation and organisation of MCA Workshop with external stakeholders, together with M1 and FVA in Freiburg, 19 April 2007

- participation at M2-M3 ALUFR-FVA meetings in Freiburg, 25 July 2007

- contribution to the identification of a module specific

- further refinement of common set of indicators by participation in 3 out of 5 task forces for data collection:
    o Energy indicators
    o Economic and ecologic indicators
    o Transport indicators

- Heading the task force of data collection protocol compilation, which ensures the consistency of indicator treatment in terms of data collection for ToSIA, and giving back of to be discussed question s to the following task forces:
    o Environmental indicators
    o Energy indicators
    o Economic and ecologic indicators
    o Transport indicators
    o Waste indicators

- participation at Indicator Task Force meeting in Vienna, Austria, 23-24 August 2007, for review, definition and clarification of indicator description and sub-grouping; development of priority listing for application in ToSIA modelling and data collection.

- M3 representation in task force for scenarios, including participation in several telephone conferences, and organisation of M3 Indicator meeting in Freiburg, 10-11 July, 2007

Modelling work within WP3.4 turned out to be more complex than estimated when starting the project. Therefore more than 2/3 of the budgeted 18-months budget was already spent, in figures those are 8,25 out of 8,50 planned for 13-30. In the long view, we will need more man months in this workpackage also in order to keep up the standard of work performed here.

Description of work performed by partner 14/FR within Module 3:

WP 3.0
Forest Research attended each of the EFORWOOD 6 monthly meetings during the reporting period. In addition a number of Module 3 internal meetings were held by Forest Research in order to coordinate work. A list of meetings attended by and organised by Forest Research as part of Module 3 work is listed below.

- EFORWOOD Meeting, Lisbon, Portugal   12/11/06-15/11/06
- EFORWOOD Module 3 Meeting, NRS, Scotland   06/12/06
- EFORWOOD Modelling Meeting, Stockholm   08/03/07-10/03/07
- EFORWOOD Module 3 Meeting, Ae Forest   14/03/07
- EFORWOOD Seminar, NRS, Scotland   16/03/07
- EFORWOOD Meeting, Zvolen, Slovakia   07/05/07-10/05/07
- EFORWOOD Module 3 Meeting, Ae Forest   22/05/07
- EFORWOOD Module 3 Meeting, NRS, Scotland   22/08/07
- EFORWOOD Meeting, Brussels   02/10/07-05/10/07

WP 3.1
- Forest Research in partnership with STFI and Baden-Württemberg Forest Research Institute has prepared Deliverable D3.1.2 (Quality Assessment and Allocation). This will form the basis for an agreed range of products within EFORWOOD. As part of the work a presentation was made by Forest Research at the Allocation Meeting at STFI in Stockholm, Sweden (08/03/07-10/03/07) illustrating the definition of solid wood and biofuel products and the desired wood and log characteristics associated with these products.
- A series of log and wood property models have been and are continuing to be developed for Sitka spruce and Scots pine growing in Britain. These models predict wood density, wood stiffness, microfibril angle, grain angle and knot size and position. The wood property models for Sitka spruce have been linked to existing growth models and currently they are being linked with sawn timber models predicting strength, stiffness and distortion. This allows a link between tree growth (M2) and solid wood performance (M4).

WP 3.2
- Testing of Web based models for calculation of harvesting costs on different terrain types and with different sizes of machines. Model calculations have been compared to actual costs incurred by the Forest District. In general the models perform well and when there are differences the models tend to underestimate the costs because they are unable to account for unexpected difficulties.
- Calculation of average costs and fuel usage for typical harvesting systems in South Scotland has been carried out. These values are being used in the construction of the GIS and ToSIA models in WP3.4.

WP 3.3
- Forest Research was involved with AFOCEL in the preparation of Deliverable PD3.3.2 (Identification of Existing Transport Methods and Alternative Methods or New Approaches with Data about Energy Consumption, Labour Input and Costs).
- Calculation of the costs of transporting different products using different transport modes in Scotland was made. This provides the input to the calculations carried out in WP3.4.
- Development of data collection protocols for different forms of transport.

- Ina Gerdes at Napier University has been investigating different transport strategies in Craik Forest as part of her MSc project. This includes costs of transporting material to a range of mill types and the costs and benefits of dedicated within forest transport.

WP 3.4
- At the Vilanova meeting in February 2007 a presentation was made on a landscape simulation within the Scottish test forest (Craik Forest). This is a GIS based analysis of the habitat, recreational and financial value of different parts of the forest. The analysis of the financial value is based on calculations of the current volume return from the forest using models developed in WP 3.1, harvesting costs calculated in WP 3.2 and transport costs calculated in WP 3.3.
- An outline ToSIA chain for South Scotland has been constructed which will be used to test the impact of different management strategies on key sustainability indicators within the region. The chain covers M2/M3 (establishment to mill gate) and will mainly deal with issues regarding forest establishment, thinning, age at harvesting, method of harvesting and transport modes.

Description of work performed by partner 27/ FVA (Dep. Forest Utilisation/WN) within Module 3:

WP 3.0: Coordination/Management: (6.25 personmonths)

FVA contributed to the M3 annual report [D 3.0.2] and to the on-going issues on coordination and management within Module 3 concerning data collection, data handling, data storage, quality insurance;

FVA acted as contact for matters arising from data collection concerning the test chain and single FWC chain "Spruce" for modules M2, M3, M4 and M5; and supported data collection for the chains mentioned above for M4 and M5;

FVA took on responsibility for coordinating the case study "Baden-Wuerttemberg"; FVA coordinated the set-up of the case study Baden-Wuerttemberg; a task force group was formed, and information exchange and communication ensured by physical meetings, telephone and email contact; terms of reference, the role of the task force and a time table for further work were set up and agreed as reported in state report of the work complied by FVA (deliverable 3.0.3 1. version) (handed to the coordinator by February 2007). Regular physical meetings were organised between M2 and M3 to discuss matters arising from M2 and M3 contributions to the case study and to define the interface between both modules (held in January, February, March and July 2007). Telephone meetings were held to liase between the different modules M3, M4 and M5. Day-to-day contact was held by email and telephone when necessary. A state of work progress report (description of the case study) was delivered in February 2007, and updated in October 2007 (deliverable 3.0.3);

FVA contributed to the discussions on indicators and data collection protocols;

FVA drafted a protocol for data exchange between M2 and M3 for the case study level and the European level in conjunction with partner ALU-FR, which was circulated between partners and discussed between the two modules' partners at the Eforwood week in Brussels November 2007;

FVA participated in the following meetings: Eforwood weeks in Lisbon (November 2006), Zvolen (May 2007), and Brussels (October 2007); internal module meeting WP 3.1 in Stockholm (March 2007); ToSIA training in Joensuu (April 2007); telephone meetings; and contributed to the discussions on data exchange within and between modules.

WP 3.1: Quality Assessment and Allocation: (7.5 personmonths)

FVA contributed to the discussion on the identification of the role of material allocation and quality assessment within ToSIA, and the decisions on the implementation into the single chain "Spruce" and case study Baden-Wuerttemberg;

FVA liased with partners STFI and FR to set up the layout of a "resource database"; the necessary input from the national inventory database for Baden-Württemberg were identied and actions taken to prapare input into database; FVA identied the most important models to predict wood characteristics such as stem taper, crown length, wood density, knottiness.

The wood density model by Wilhelmson et al. (2004) was adopted and parameterised for the Baden-Württemberg resource.

FVA contributed to the deliverable D 3.1.2 "Key products of the forest-based industries and their demands on wood raw material properties" in conjunction with partners STFI and FR; work ongoing.

WP 3.2: Harvesting: (2.0 personmonths)

FVA updated data collection for the chain "Spruce";

FVA set up and revised the test chain to the single chain "Spruce"; collected and delivered data for this chain; and undertook several revisions of the chain in accordance to new formats for the data set up by module M1; liaising with partner ALU-FR (M2 and M3);

FVA identified relevant harvesting systems for the Baden-Wuerttemberg-case study and started to identify resources for relevant data for their characterisation;

FVA contributed to the deliverables PD3.2.2: "Descriptions of the harvesting systems and methods applied in the test chains with the necessary machines, labour and other resources", and to deliverable D 3.2.3 "SI-data for harvesting operations based on 3.2.1 and 3.2.2"

FVA contributed to the internal deliverable on forest machine specifications for harvesters, forwarders, skidders, and cable cranes together with partners 1 (Skogforsk) and partner 19 (Afocel).

Within WP 3.2 FVA participated in the following meetings: telephone conference in April 2007 on harvesting issues; session M3 "Harvesting" (Eforwood week, May 2007)

WP 3.3: Transport: (0 personmonths)

FVA contributed to the discussions on identying the relevant processes and indicators within the "Transport" stage of the case study "Baden-Wuerttemberg".

WP 3.4: Process modelling: (0.75 personmonths)

FVA identified a partial FW chain model for the processes "harvesting – forwarding – roundwood allocation" using inputs from M2 (agreed forest management alternatives) into "Holzernte$^®$" software package, the central tool for calculation and modelling harvesting alternatives and wood allocation with respect to wood quality.

FVA contributed to PD 3.4.2 "Collection and aggregation of test chain data from WP 3.1-WP 3.4, in order to derive ToSIA inputs in commonly agreed units and formats and deliver those to M1"

FVA liased with Module 4 and Module 5 to define the processes involved concerning processing and manufacturing, and the use of the final products.

Description of work performed by partner 1/ Skogsforsk within Module 3:

WP3.0

- Contributing to the set up of the module and forming interfaces for data procurement and quality with Modules 2 and 4.
- Contributing to the identification of Module relevant environmental impacts.
- Participation at all M3 module and work package meetings, as well as EFORwood weeks in Lisbon (November 2006), Zvolen (May 2007) and Brussels October 2007). Organising a meeting on the Scandinavian case study preparation in Uppsala, Sweden (March 2007), as well as several internal meetings at Skogforsk.

WP3.1

- Contributing concerning of measurements and predictions of properties in the harvester for allocation.
- A harvesting simulation (by TimAn/Pri-analyses) has been applied on sample trees from sample plots in northern Sweden (National forest inventory /SLU). In the simulation log properties were characterised.

WP3.2

- Coordinating efforts to identify relevant harvesting systems and to create a set of Sustainability indicators for the harvesting operations in three test, alias single chains, Spruce chain, Scandinavian pine chain and Eucalyptus chain.
- Coordinating models for describing the harvesting chains and developing protocols for purchasing data.
- Developing for Sustainability indicators for those test and single chains.
- Delivered data to data client for Single FWC.
- Constructing manual for description of harvesting system for case studies.
- Delivered data on saw log properties for the Nordic pine test chain.
- Received and performed (internal) training.

WP3.3

- Contributed to the development of the Transport Data collection protocol for Single FWC
- Developing country profiles on wood transport (PD3.3.2).
- Identifying relevant transport scenarios (road vehicles, railways and ships) for assortment in the test chains above,
- a set of indicators and methods for data procurement to test and single chains and
- identification and development of models for calculation of Sustainability Indicators for transport

WP3.4

- Contributing to the Module 3 set of indicators defining interfaces to module 2 and 4 concerning the flow of raw material, equipment and employment.
- Contributing to Scenario definition and description.
- Calculating and filling in data into client for ToSIA.

Description of work performed by partner 7/ STFI-Packforsk within Module 3:

General comment on work distribution among year 1, 2 and 3

STFI-Packforsk is leading WP 3.1 and has a heavy role in WP3.4. WP 3.1 includes two demanding deliverables in year 2: PD3.1.2 and PD3.1.3. As expressed in the previous annual report, a large part of the person-months of WP3.1 during year 1 were devoted to these deliverables. However, this work could not be fully started until the work plans and the test chains, alias single chains, had been fully defined. When the foundations of the PD3.1.2 and 3 were in place, the work was intensified during the last months of year 1 and during year 2. The funding budgeted for these deliverables has now been used, but distributed somewhat differently in time than was expressed in the initial plans. There is a similar situation, but involving less person-months, at the interface between year 2 and 3, due to delayed definitions of the case studies. The situation is similar within WP3.4. About half a person-month in WP3.1 and about the same in WP3.4, initially allocated for year 2, will instead be performed in year 3.

Workpackage 3.0 Coordination, Interface Management (1,0 person-months)

STFI-Packforsk has as leader of WP3.1 participated in the management team of Module 3, to discuss, formulate and decide on common frameworks, methodological approaches and plans for the module. It contributed to the M3 annual report [D 3.0.4] and to the on-going issues on coordination and management within Module 3 concerning data collection, data handling, data storage and quality insurance. Issues regarding the test and single chains and case studies have been thoroughly dealt with. STFI-Packforsk has had a special responsibility for the specification of key products and model processes, for product demands on wood and allocation alternatives for the different chains. All chains have been dealt with, but chains related to pulp and paper have been emphasised. This has involved extensive communication with modules M4 and M5.

STFI-Packforsk has participated in the Eforwood weeks in Lisbon (November 2006), Zvolen (May 2007) and Brussels (October 2007), at M3 meetings in Freiburg (July 2007) and at telephone meetings. It has contributed to the reports required by the EC. A workshop "Quality assessment and allocation" was arranged at STFI-Packforsk in Stockholm on March 8-9, 2007, with M3 and representatives from M4, M5, M2 and M1. A poster was presented at the Eforwood week in Brussels (October 2007). A presentation was held at the COST E44 Conference "Modelling the Wood Chain: Forestry – Wood Industry – Wood Products Market" in Helsinki September 17-19, 2007.

Workpackage 3.1: Quality Assessment and Allocation (6,0 person-months)

STFI-Packforsk is leading the WP 3.1.

A concept for mapping of properties of forest resources is under development. It is based on measurements and models. A draft concept is now in place at STFI-Packforsk, designed to be a general approach, reasonably easy to apply on resources of different wood species and countries. Volumes and properties of stands, trees, logs and chips are estimated based on inventory data from a limited number of selected stands representing the resource, models and simulation. It has been tested on the single chain in Västerbotten, based on data from the Swedish National Forest Inventory. The concept is described in PD3.1.3 and presented in "Modelling and simulation of properties of forest resources and along the paper value chain" (COST E44 Conference "Modelling of wood chain: Forestry-Wood industry-Wood product markets). (The concept is integrated with data from the case studies in WP3.4).

Demands on wood and fibres of selected products in major production lines (solid wood, fibre, bio energy) have been specified. First, a set of key products for the major production chains was identified. This was first done for the fibre chains by STFI-Packforsk, in cooperation with researches in module 4 and 5. Forest Research managed the corresponding analyses and compilation for the solid wood and bio-energy chains. This definition of key products has become a basis for the definition of regional chains and model processes in other modules. In the next step, the demands on wood of the key products and process were expressed in terms of raw

material properties, managed analogously between STFI-Packforsk and Forest Research, with contributions also from FVA and other partners. Appropriate alternatives have been defined for allocation of raw materials from existing forest resources, meeting the demands of relevant production lines, in specific or more general terms depending on what is possible. The results are described in D3.1.2 "Key products of the forest-based industries and their demands on wood raw material properties".

STFI-Packforsk has been active in the development of the chains and model mills. Contributions have been made to all the regional cases. STFI-Packforsk has defined the Iberian fibre chains and also worked on models for eucalypts.

Proper allocation of wood raw materials is crucial for sustainable production, as unsuitable materials cause yield and quality losses, increased need for transportation, energy, chemicals, etc. It has been analysed how effects of allocation best is described with indicators. The conclusion from this work is that WP3.1 defines what is suitable (D3.1.2, etc.), which influences the material flows in the case to be run with ToSIA, but that the indicators are calculated in the processes affected by the allocation. Contributions from several partners.

Alternatives are analysed for measurement/assessment of quantity and quality of the forest resource at an early stage of the chain and in key positions between forest and industry, according to their effectiveness and costs. So far, STFI-Packforsk has emphasised methods to estimate properties already in the resource

Workpackage 3.2: Harvesting Systems (0,6 person-months)

STFI-Packfors has participated in the discussions on layouts of single chains and case study chains in WP3.2, with special emphasis on allocation opportunities at harvesting and transport of wood material to the forest road.

Workpackage 3.3: Transport Systems (0,6 person-months)

STFI-Packfors has participated in the discussions on layouts of single chains and case study chains in WP3.3, with special emphasis on allocation opportunities in the phase of transportation from the forest road to the mill.

Workpackage 3.4: Integrated Partial Chain Modelling (2,15 Person-months)

STFI-Packforsk has contributed to the definition of the module specific parts of the test and single chains and for the case studies, with special emphasis on issues related to material allocation for important products and processes, which involves on the one hand prediction of properties in forest resources and on the other hand demands of products on the raw material used. For this purpose, interfaces with M2 and M4-M5 have been discussed and specified. Efforts have been done for the preparation of all case studies: A common structure of integrated models have been applied on data from the Västerbotten case, models previously developed by STFI-Packforsk and Skogforsk has been transferred for use in the Baden-Württemberg case, data and models for eucalypts have been compiled for the Iberian case. Scenarios are being layouted. A small delay occurs, due to a shift in M1 set-up for work on test chains, single chains, case studies and European cases (see WP3.0 description).