



EFORWOOD
Sustainability Impact Assessment
of the Forestry - Wood Chain



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EFORWOOD

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Development of topology for M3 processes at EU-chain level

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Involved organisations: ALUFR, FCBA, Skogforsk, FVA

Introduction

This report is a manual for creating the “EU-FWC” in the framework of the project EFORWOOD at country specific level in M3. It summarises discussions about the topology of chains, the processes and products which shall be included in the EU-FWC and the indicators which shall be collected and calculated.

Chain structure

The following approach has been developed and applied to accomplish the work of creating country specific chains in the EU 25+2 and for compiling collected data for allocation, harvesting and transport processes, which are to be provided for ToSIA at European level.

For the EU-FWC for every EU 25+2 country chains were built at the Workshop of chain designing in Prague (September 2008). It was decided that first priority is to get individual data for every country.

If there are no data available for one country indicator values of another country with similar conditions may be used. Therefore, countries with the same harvesting/ hauling operations (chains) were put together in country groups.

A “key country” was defined for each country group to be sure that there will be any data for a group of countries if the responsible organisation won't find any data for one country. The following country groups and key-countries were determined, to assure that data with a high probability are available. Accordant contact persons were nominated.

The following country groups were defined (see figure 1):

M3 country groups in use are:

Central EU25+2: Germany, Austria, BeNeLux, Denmark, Switzerland, France, Italy

Northern EU25+2: Sweden, Norway, Finland, UK, Estonia

Southern EU25+2: Cyprus, Greece, Malta

Eastern EU25+2: Czech Republic, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia, Rumania

IBERIAN: Portugal, Spain

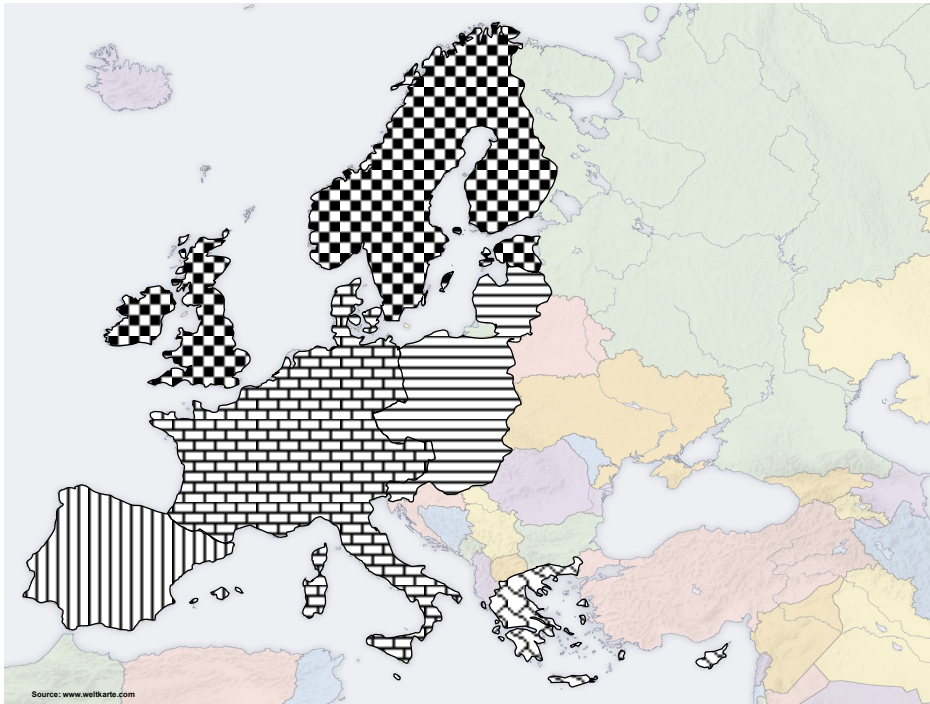


Figure 1: Country groups in M3

The following key-countries and contact persons were nominated in case of no data availability in a country:

| | | |
|--------------------|----------------|-----------------------------------|
| In Central EU25+2: | <u>Germany</u> | → ALUFR, contact Janine Fischbach |
| In Northern EU25+2 | <u>Sweden</u> | → Skogforsk, contact Staffan Berg |
| In Southern EU25+2 | <u>Greece</u> | → FCBA, contact Mikael Poissonnet |
| In Eastern EU25+2 | <u>Poland</u> | → ALUFR, contact Janine Fischbach |
| In IBERIAN: | <u>Spain</u> | → FCBA, contact Mikael Poissonnet |

One chain called "Process template M3" was put into the database client and copied for all EU25+2 templates (see figure 2 as an example).

It is the task of the responsible partners to specify/ adjust the processes of the template chain according to the structure of the specific country/ country group (e.g. cable crane in Austria) and to delete the processes which are not selected/ applicable.

Figure 2: Example for a possible process chain in the EU



This is an example for a system of a general process chain in the EU.
Country specific processes have to be added (e.g. transport with 60t in Sweden).

Responsibilities for data collection in EU-FWC

The following table shows M3 partners and their responsibilities for collecting data and calculating indicators in the EU-FWC.

Table 1: Responsibilities for data collection in M3, as finally decided in EFORWOOD Week in Bordeaux (Oct.2008):

| | Data from: | Responsible partner | Contact person |
|----|-------------------|----------------------------|-------------------------------------|
| 1 | Sweden | Skogforsk | Staffan Berg |
| 2 | Finland | Skogforsk | Staffan Berg |
| 3 | GB | Forest Research | Barry Gardiner, Stefania Pizzirani |
| 4 | Ireland | Forest Research | Barry Gardiner, Stefania Pizzirani |
| 5 | Denmark | Skogforsk | Staffan Berg |
| 6 | Estonia | Skogforsk | Staffan Berg |
| 7 | Latvia | Skogforsk | Staffan Berg |
| 8 | Lithuania | ALUFR | Janine Fischbach |
| 9 | Germany | ALUFR | Janine Fischbach |
| 10 | Netherlands | FVA | Franka Brüchert, Torsten Bensemann |
| 11 | Belgium | FCBA | Elisabeth Le Net, Mikaël Poissonnet |
| 12 | Luxemburg | FCBA | Elisabeth Le Net, Mikaël Poissonnet |
| 13 | Austria | FVA | Franka Brüchert, Torsten Bensemann |
| 14 | Spain | FCBA | Elisabeth Le Net, Mikaël Poissonnet |
| 15 | Portugal | FCBA | Elisabeth Le Net, Mikaël Poissonnet |
| 16 | France | FCBA | Elisabeth Le Net, Mikaël Poissonnet |
| 17 | Italy | FCBA | Elisabeth Le Net, Mikaël Poissonnet |
| 18 | Greece | FCBA | Elisabeth Le Net, Mikaël Poissonnet |
| 19 | Poland | ALUFR | Janine Fischbach |
| 20 | Slovakia | FVA | Franka Brüchert, Torsten Bensemann |
| 21 | Slovenia | Skogforsk | Staffan Berg |
| 22 | Czech Rep. | ALUFR | Janine Fischbach |
| 23 | Cyprus-> Greece | Forest Research | Barry Gardiner, Stefania Pizzirani |
| 24 | Hungary | ALUFR | Janine Fischbach |
| 25 | Malta-> Italy | Forest Research | Barry Gardiner, Stefania Pizzirani |
| 26 | Norway | Skogforsk | Staffan Berg |
| 27 | Switzerland | FVA | Franka Brüchert, Torsten Bensemann |

So far M2 had not created processes for countries for which they do not have data. Those countries were Malta and Cyprus. It was decided at the EU-FWC Task Force Meeting in January 2009 that Malta should be added to Italy and Cyprus should be added to Greece (please contact Marcus Lindner for questions).

M2 / M3 boundary

In M2, the country-specific processes have been defined as species/country combinations based on the EFISCEN database.¹

Species groups:

Pine (Scots pine + Maritime pine)

Spruce (Norway + Sitka)

Beech

Birch

Eucalypt

Other broadleaves (mainly oak, all oaks merged).

Species with increment less than 1% of national total were excluded. Development stages were not included in the M2 processes in EU-FWC; the processes included the full rotation cycle of the forest.

¹ These information was provided by Veronique Gucchi, M2 (date: November 2008)

Output products of M2 for M3 were defined as followed:

EU_Pine_TreesReadyForThinning
EU_Spruce_TreesReadyForThinning
EU_Beech_TreesReadyForThinning
EU_Birch_TreesReadyForThinning
EU_Eucalypt_TreesReadyForThinning
EU_Oak_TreesReadyForThinning
EU_Pine_TreesReadyForHarvest
EU_Spruce_TreesReadyForHarvest
EU_Beech_TreesReadyForHarvest
EU_Birch_TreesReadyForHarvest
EU_Eucalypt_TreesReadyForHarvest
EU_Oak_TreesReadyForHarvest

These M2 output products were connected to M3.

Output of M2 for M3:

The output from M2 to M3 is the 'volume of fellings', further divided to size classes of stems per each tree species (Furthermore, the M2 output products "TreesReadyForThinning" and "TreesReadyForHarvest" will produce different set of felling volumes to estimate the shares).

For setting up the M3 chains in the EU-FWC and to deliver the M3-"Materials to M4", M3 needed the size classes of the trees. Tree species and volumes has been simulated with EFISCEN and delivered at the EFORWOOD Week in Bordeaux. In November 2008 M1 has made an attempt to disaggregate the EFISCEN output for A1 into size classes, for the combinations of countries and species as it was decided earlier. There are the Classes 0 (<9,99cm dbh), Class1 (10-19,99cm dbh), Class2 (20-29,99 cm dbh), etc. up to Class5 (>50cm dbh).

The disaggregation was based upon diameter development (dbh) over age as provided by yield tables. Therefore, a range from the worst to the best growth classes was taken. The unit is 1000 m3 ob per 5 years (=time step of EFISCEN).

A general conversion factor of 12% for bark (overbark=112%*underbark) was used.

The provided table „Output_By_Size_Classes_A1_xls” is not the final output. By collecting data, calculating indicator values and working with the size classes and tree species which were provided by EFISCEN some problems in M3 were figured out: in some countries the provided data were good, in some countries the tree species were not chosen correctly and in other countries the volumes were not correct or not provided.

At a M3 Meeting in Paris at 2nd and 3rd of march 2009 it was decided that the responsible partners check if missing and/ or wrong volumes were presented by other species (e.g. Sitka spruce and spruce) and that there will be a revised calculation by EFISCEN with that corrected data until the end of march 2009.

As residues were not included in the removals, a second table with harvest residues will be provided. The basic of EFISCEN therefore is stemwood volume. Furthermore Alterra uses expansion factors for each country and species to convert that into whole tree biomass. Has information about the ratios between fellings and removals, to define how much has to be felled in the forest in order to get a certain removal amount. The difference is harvest residue (topwood). This information will be provided together with the volumes of fellings.

In M2, responsible partner and contact for providing volumes per country and main species is Mart-Jan Schelhaas (MartJan.Schelhaas@wur.nl).

M3 Processes and Products

Processes

As decided in the EU-FWC Task Force Meeting in February 2008, the M3 processes are divided into the following systems (see table 2).

Stage 1. Harvesting systems

Those harvesting systems were chosen which reflect the systems and consider all conditions (restrictions-environmental, resources, assortments...)

Processes:

1. motormanual
2. partly mechanised
3. fully mechanised

Stage 2. Forwarding and processing systems in forest

Those forwarding and processing systems were chosen which reflect the systems and consider all conditions (restrictions-slope, environmental, resources...)

Processes:

1. skidder (with or without winch)
2. forwarder
3. cable systems
4. bundler and chipper
5. *(Other - tractor, animals, etc.- if necessary to cover the targeted coverage)*

Stage 3. Transport systems

Those transport systems were chosen which reflect the systems and consider all conditions (short / long distance transport, short or long logs...)

Processes:

1. truck
2. train
3. ship

Stage 4. Mill gate operations

Those millgate operations were chosen which reflect the systems and consider all conditions

Processes:

1. No sorting at millgate
2. Automatic sorting at plant gate
3. Manual sorting at plant gate

Table 2: Overview of general M3 processes

| Management: | | Processes: | Process ID: |
|--------------------|-----------|---|-------------|
| Harvesting: | Thinning: | Thinning with medium harvester | 1002722 |
| | | Thinning with motorsaw | 1002724 |
| | | Clearcut with medium harvester | 1002725 |
| | | Selective logging with medium harvester | 1002726 |
| | | Selective logging with motorsaw | 1002728 |
| Hauling: | | Hauling with forwarder | 1002730 |
| | | Hauling with skidder | 1002731 |

| | | | |
|--|----------------|--------------------------------------|---------|
| | | Hauling with cable crane | 1002733 |
| Processes between hauling and transport | Bundling | Bundling with bundler | 1002732 |
| | Chipping | Chipping with chipper | 1003040 |
| Transport: | Road vehicles: | Transport coniferous with 40t truck | 1002734 |
| | | Transport coniferous with 60t truck | 1002735 |
| | | Transport broadleaves with 40t truck | 1002761 |
| | | Transport broadleaves with 60t truck | 1002762 |
| | | Transport in container with truck | 1002764 |
| | Rail: | Transport with train | 1002766 |
| | Ship: | Transport with ship | 1002763 |
| Millgate: | | Sorting_None at plant gate | 1002768 |
| | | Sorting_Automatic at plant gate | 1002767 |
| | | Sorting_Manual at plant gate | 1002769 |

Now partners have the possibility to delete or add specific processes in the chain templates in order to reflect the realistic work systems in their countries (see chain structure). Those chains should then be filled with data.

Furthermore all products can be connected.

The chain topology should be finished at soon as possible (acc. to roadmap).

How to deal with millgate operations

It was recognized that millgate operations only absorb minimal resources and that partners have problems to find data.

It was decided (after discussing with ToSIA-Team) to just let the material “run through” the M3 millgate processes and to set the indicators to standard minimal value and all other information to a setting that ToSIA can survive and continue in calculation on the subsequent processes. FVA can provide calculation schemes/ data for a millgate process with automated log measurements system, intake more than 100.000 m³ standard length softwood per year²; a millgate process for long logs (20m log length which needs cross cutting) and a millgate process for panel mill. Those data were taken over from the Baden-Württemberg case study and used for all millgate operations throughout Europe.

FVA can't provide data for the third millgate process in the EU cases "sorting - non at the mill gate", but a marginal value (between 0 and 0,0000001³) could be taken.

Products

All possible input and output products were linked to the processes (see table 4 below). Because of practical reasons only one general product called Output Harvesting M3 (or „output hauling M3“...) is connected as a placeholder to another product.

Partners will have to delete these placeholder later. The idea behind is that for example in Hungary there is only oak and now the responsible partner can just delete all products with the other tree species which he doesn't need in Hungary and continue with all “oak products”. In that way the definition of products is very comprehensible and products are easy to identify and find, also for other Modules.

² Franka Brüchert, 12.03.2009

³ will be decided by ToSIA team soon and reported via e-mail

Table 3: All products within M3 in EU-FWC

| stage | Products within M3 | |
|--------------------------------|---|---|
| | tree species | product |
| Thinning Harvesting | Pine | Short roundwood in forest stand Harvest residues in forest stand Long roundwood in forest stand |
| | Spruce | Short roundwood in forest stand Harvest residues in forest stand Long roundwood in forest stand |
| | Beech | Short roundwood in forest stand Harvest residues in forest stand Long roundwood in forest stand |
| | Birch | Short roundwood in forest stand Harvest residues in forest stand Long roundwood in forest stand |
| | Eucalypt | Short roundwood in forest stand Harvest residues in forest stand Long roundwood in forest stand |
| | Oak | Short roundwood in forest stand Harvest residues in forest stand Long roundwood in forest stand |
| Hauling | Pine | Short roundwood at roadside Harvest residues at roadside Long roundwood at roadside |
| | Spruce | Short roundwood at roadside Harvest residues at roadside Long roundwood at roadside |
| | Beech | Short roundwood at roadside Harvest residues at roadside Long roundwood at roadside |
| | Birch | Short roundwood at roadside Harvest residues at roadside Long roundwood at roadside |
| | Eucalypt | Short roundwood at roadside Harvest residues at roadside Long roundwood at roadside |
| | Oak | Short roundwood at roadside Harvest residues at roadside Long roundwood at roadside |
| Bundling | Bundles of coniferous harvest residues at roadside Bundles of broadleaf harvest residues at roadside | |
| Chipping | Coniferous | chips in container at roadside |
| | Broadleaf | chips in container at roadside |
| Transport | Bundle of coniferous harvest residues at railway terminal Bundle of coniferous harvest residues at plantgate Bundle of coniferous harvest residues at harbour | |
| | Bundle of broadleaf harvest residues at railway terminal Bundle of broadleaf harvest residues at plantgate Bundle of broadleaf harvest residues at harbour | |
| | Coniferous | chips at plant gate chips at harbour chips at railway terminal |
| | Broadleaf | chips at plant gate chips at harbour |

| | | |
|-----------------|-----------------------|---|
| | | chips at railway terminal |
| | Spruce | Short roundwood at railway terminal Short roundwood at harbour Short roundwood at plant gate Long roundwood at railway terminal Long roundwood at harbour Long roundwood at plant gate |
| | Pine | Short roundwood at railway terminal Short roundwood at harbour Short roundwood at plant gate Long roundwood at railway terminal Long roundwood at harbour Long roundwood at plant gate |
| | Beech | Short roundwood at railway terminal Short roundwood at harbour Short roundwood at plant gate Long roundwood at railway terminal Long roundwood at harbour Long roundwood at plant gate |
| | Birch | Short roundwood at railway terminal Short roundwood at harbour Short roundwood at plant gate Long roundwood at railway terminal Long roundwood at harbour Long roundwood at plant gate |
| | Eucalypt | Short roundwood at railway terminal Short roundwood at harbour Short roundwood at plant gate Long roundwood at railway terminal Long roundwood at harbour Long roundwood at plant gate |
| | Oak | Short roundwood at railway terminal Short roundwood at harbour Short roundwood at plant gate Long roundwood at railway terminal Long roundwood at harbour Long roundwood at plant gate |
| millgate | Coniferous | chips at plant gate |
| | Broadleaf | chips at plant gate |
| | Bundles of coniferous | harvest residues at plant |
| | Bundles of broadleaf | harvest residues at plant |
| | Pine | Short roundwood after sorting Long roundwood after sorting |
| | Spruce | Short roundwood after sorting Long roundwood after sorting |
| | Eucalypt | Short roundwood after sorting Long roundwood after sorting |
| | Beech | Short roundwood after sorting Long roundwood after sorting |
| | Oak | Short roundwood after sorting Long roundwood after sorting |
| | Birch | Short roundwood after sorting Long roundwood after sorting |

Output of M3 for M4: The volume of assortments (short/long logs per tree species), measured and sorted, at the millgate.

To define the output products from M3 to M4 it was looked carefully into the database client and those products were taken over, which were already in the M4-chains or those products where information was available (communication with M4).

The following table shows the output products from M3 to M4. There are products for the processes “sorting automatically at millgate”, “sorting none at millgate” and “sorting manual at millgate” for different tree species.

Table 4: Output products from M3 to M4

| Process at Mill gate | Product |
|-------------------------------|---|
| Sorting_Automatic at millgate | EU_Oak_Short roundwood after sorting |
| Sorting_None at millgate | EU_Birch_Short roundwood after sorting |
| Sorting_Manual at millgate | EU_Eucalypt_Short roundwood after sorting |
| | EU_Beech_Short roundwood after sorting |
| | EU_Pine_Short roundwood after sorting |
| | EU_Spruce_Short roundwood after sorting |
| | EU_Coniferous chips at millgate |
| | EU_Broadleaf chips at millgate |
| | EU_Bundles of coniferous harvest residues at millgate |
| | EU_Bundles of broadleaf harvest residues at millgate |
| | EU_Oak_Long roundwood after sorting |
| | EU_Eucalypt_Long roundwood after sorting |
| | EU_Birch_Long roundwood after sorting |
| | EU_Beech_Long roundwood after sorting |
| | EU_Pine_Long roundwood after sorting |
| | EU_Spruce_Long roundwood after sorting |

Short roundwood is roundwood <6m (e.g. pulpwood) and long roundwood is roundwood longer >6m.

M3-M4 boundary

To have a non detailed picture of the volume shares at the M3/ M4 boundary, M3 provided some additional information for M4 about pulpwood shares in the different processes.

The following table shows the percentages from pulpwood compared to the total volume (100%) from M3’s output products given to M4

Table 1: Vol.of long +short log operations which will be given to M4

| PULPWOOD (%) | | | | |
|----------------|-----------|--|------------|---------------|
| | Long logs | | short logs | |
| | thinning | final harvest (also stands which are ready for harvest) | thinning | final harvest |
| Nordic | | | | |
| coniferous | n.a. | n.a. | 70 | 40 |
| broadleaves | n.a. | n.a. | 100 | 90 |
| Central | | | | |
| coniferous | 40 | 15 | 60 | 25 |

| | | | | |
|-----------------|-----|----|-----|----|
| broadleaves | 90 | 40 | 90 | 40 |
| Eastern | | | | |
| coniferous | | | 60 | 20 |
| broadleaves | | | 80 | 60 |
| Southern | | | | |
| coniferous | 90 | 60 | 70 | 50 |
| broadleaves | 100 | 60 | 100 | 60 |
| Iberian | | | | |
| coniferous | 100 | 75 | 100 | 30 |
| broadleaves | 100 | 85 | 100 | 80 |

This information is at roadside and comes from M3's experience⁴. It shows how the flowshare of pulpwood (long logs and short logs) could be.

To facilitate the M3/M4 border issues, the responsibilities for data collection in M4 are laid down in the following table (5):

M4 is collecting data per region. The table (table 7) shows the responsible partners for the different value chains, indicators and regions:

Table 5: Responsibilities for data collection in M4

| data collection for fibre chain in M4 | | | | |
|--|--|--|--|--|
| Europe region | integrated newsprint | wood containing & woodfree paper | container & carton board | bleached chem pulp |
| central | Env.: KCPK Soc.: KCPK Econ.: JPC | Env.: KCL Soc.: KCPK Econ.: JPC | Env.: STFI-P Soc.: KCPK Econ.: JPC | Env.: KCL Soc.: KCPK Econ.: JPC |
| south | Env.: KCPK Soc.: KCPK Econ.: JPC | Env.: KCL Soc.: KCPK Econ.: JPC | Env.: STFI-P Soc.: KCPK Econ.: JPC | Env.: KCL Soc.: KCPK Econ.: JPC |
| east | Env.: KCPK Soc.: KCPK Econ.: JPC | Env.: KCL Soc.: KCPK Econ.: JPC | Env.: STFI-P Soc.: KCPK Econ.: JPC | Env.: KCL Soc.: KCPK Econ.: JPC |
| north | Env.: KCPK Soc.: KCPK Econ.: JPC | Env.: KCL Soc.: KCPK Econ.: JPC | Env.: STFI-P Soc.: KCPK Econ.: JPC | Env.: KCL Soc.: KCPK Econ.: JPC |
| data collection for solid wood in M4 | | | | |
| Europe region | sawn timber | panel products | building components | furniture |
| central+ south Europe | Env.: BRE Soc.: BRE Econ.: JPC | Env.: BRE Soc.: BRE Econ.: JPC | Env.: BRE Soc.: BRE Econ.: JPC | Env.: BRE Soc.: BRE Econ.: JPC |
| east | Env.: BRE Soc.: TUZVO Econ.: JPC | Env.: BRE Soc.: TUZVO Econ.: JPC | Env.: BRE Soc.: TUZVO Econ.: TUZVO/(JPC) | Env.: BRE Soc.: TUZVO Econ.: TUZVO/(JPC) |
| north | Env.: VTT/(BRE) Soc.: BRE Econ.: JPC/VTT | Env.: VTT/(BRE) Soc.: BRE Econ.: JPC/VTT | Env.: VTT/(BRE) Soc.: BRE Econ.: JPC/VTT | Env.: VTT/(BRE) Soc.: BRE Econ.: JPC/VTT |
| data collection for bioenergy in M4 | | | | |
| Europe region | pellets | power | heat | |
| all regions | Env.: VTT Soc.: VTT Econ.: VTT | Env.: VTT Soc.: VTT Econ.: VTT | Env.: VTT Soc.: VTT Econ.: VTT | |

⁴ discussed and decided at M3 Meeting 2nd/3rd of march 2009 in Paris

Indicators

The data collection of indicator values for 2005 has started.

The following table (table 6) shows, for which indicators data should be collected⁵. All green marked indicators should be calculated in 2005 and in the reference futures 2015 and 2025. If there will be time left, the grey marked indicators should also be calculated.

Table 6: Selected Indicators for EU-FWC

| Indicator | EU-FWC |
|--|--------|
| 1.1 - Gross value added (at factor cost) * | Green |
| 2.1 - Production cost | Green |
| 2.1.1 - Average cost - raw materials from FWC | Green |
| 2.1.2 - Average cost - raw materials from outside FWC | Green |
| 2.1.3 - Average cost - labour costs | Green |
| 2.1.4 - Average cost - energy costs | Green |
| 2.1.5 - Other productive costs | Green |
| 2.1.6 - Non-productive costs | Green |
| 2.2 - Share of cost of wood-based materials | Grey |
| 3.1.1 - Imports of wood and products derived from wood - Volume | Green |
| 3.1.2 - Imports of wood and products derived from wood - Value | Green |
| 3.1.3 - Imports of wood and products derived from wood - Share of imports in total volume consumed | Green |
| 3.2.1 - Exports of wood and products derived from wood - Volume | Green |
| 3.2.2 - Exports of wood and products derived from wood - Value | Green |
| 3.2.3 - Exports of wood and products derived from wood - Share of exports in total volume consumed | Green |
| 3.3.1 - Net trade in wood and products derived from wood - Volume | Green |
| 3.3.2 - Net trade in wood and products derived from wood - Value | Green |
| 4.1.1 Wood-based material in total (from ToSIA) | Grey |
| 4.1.2 - Other renewable materials in total | Grey |
| 4.1.2.1 - Other renewable materials - virgin origin | Grey |
| 4.1.2.2 - Other renewable materials - recycled origin | Grey |
| 4.2 - Volume of non-renewable materials in total | Grey |
| 4.2.1 - Volume of non-renewable materials - virgin origin | Grey |
| 4.2.2 - Volume of non-renewable materials - recycled origin | Grey |
| 5.1 - Number of forest holdings and forest-based enterprises in total | Grey |
| 5.1.1 - Number of forest holdings and forest-based enterprises - public | Grey |
| 5.1.2 - Number of forest holdings and forest-based enterprises - private | Grey |
| 5.2 - Average forest holding size | Grey |
| 5.2.1 - Average forest holding size - public | Grey |
| 5.2.2 - Average forest holding size - private | Grey |
| 5.3.1 - Micro and small forest based enterprise (0-49 employees), | Grey |
| 5.3.2 - Medium sized forest based enterprise (50-249 employees), | Grey |
| 5.3.3 - Large forest based enterprise (>250 employees) | Grey |
| 6.1 - Investment (gross fixed capital formation) in total | Grey |

⁵ IPB (32); This table is also on the Portal under Partners only → data collection

| | |
|---|--------------|
| 6.1.1 - machinery and equipment | |
| 6.1.2 - vehicles | |
| 6.1.3 - the value of land improvements | |
| 6.1.4 - buildings | |
| 6.2 - Research & Development expenditure in total | |
| 6.2.1 - Research & Development - private expenditure | |
| 6.2.2 - Research & Development - public expenditure | |
| 7. Total production | Tosia |
| 8. Productivity | Tosia |
| 9.1 - Share of forest-based enterprises with new or significantly improved goods or services (merged categories) | |
| 9.2 - Share of forest-based enterprises with new or significantly improved production process, distribution method, or support activity for goods or services (merged categories) | |
| 9.3 - Share of turnover from new or significantly improved products as a share of total turnover | |
| 10.1 - Employment - absolute number | |
| 10.2.1 - Employment male - % of total | |
| 10.2.2 - Employment female - % of total | |
| 10.3.1 - Employment on enterprise sites located in rural areas | |
| 10.3.2 - Employment on enterprise sites located in urban areas | |
| 11.1 - Wages and salaries - total | |
| 11.1.1 - Wages and salaries male | |
| 11.1.2 - Wages and salaries female | |
| 11.2.1 - Average wages & salaries per employee relative to country average | Tosia |
| 11.2.2 - Average wages & salaries per employee weighted by purchasing power parity | Tosia |
| 12.1 - Occupational accidents - total | |
| 12.1.1 - Occupational accidents (non-fatal) - absolute numbers | |
| 12.1.2 - Occupational accidents (fatal) - absolute numbers | |
| 12.2 - Occupational diseases - frequency of cases in % per 1000 employees | |
| 13.1.1 - Highest level of education of employees up to lower secondary education | |
| 13.1.2 - Highest level of education of employees - post secondary and tertiary education | |
| 13.2 - Training time per employee | |
| 14.1. - Forest holdings and forest-based enterprises with third party certified management | |
| 14.1.1 - Forest holdings and forest-based enterprises with third party certified management - Forest certification schemes | |
| 14.1.2 - Forest holdings and forest-based enterprises with third party certified management - Environmental management system | |
| 14.2. - Share of wood sourced from third party certified sustainable production | |
| 15.1 - Persons employed part-time and employees with a contract of limited duration (annual average) in total | |
| 15.1.1 - Persons employed part-time and employees with a contract of limited duration (annual average) - male | |
| 15.1.2 - Persons employed part-time and employees with a contract of limited duration (annual average) - female | |
| 15.2 - Self-employed persons | |
| 16.1.1 Forest area designated for recreational use | |
| 16.1.2 Forest area designated for protective services | |
| 16.2. Number of visits to forests | |
| 17.1. - Apparent consumption of wood per capita | |

| | |
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| 17.2.1 - Share of population perceiving forest area | |
| 17.2.2 - Share of population perceiving forest biodiversity | |
| 17.2.3 - Share of population perceiving forest health as stable or increasing | |
| 17.3.1 - Share of population perceiving forest industry to be environmentally friendly | |
| 17.3.2 - Share of population perceiving forest industry to be an attractive employer | |
| 18.1 - On-site energy generation from renewables | |
| 18.1.1.1 - On-site heat generation from renewables - residues from process - inputs | |
| 18.1.1.2 - On-site heat generation from renewables - other wood biomass | |
| 18.1.1.3 - On-site heat generation from renewables - non-wood based renewable heat | |
| 18.1.2.1 - On-site electricity generation from renewables - residues from process | |
| 18.1.2.2 - On-site electricity generation from renewables - other wood biomass | |
| 18.1.2.3 - On-site electricity generation from renewables - non-wood based renewable electricity | |
| 18.1.3.1 - On-site fuel generation from renewables excluding fuel used for mill site heat and electricity generation and excluding fuel that is used as a product further in the FW3 - residues from process | |
| 18.1.3.2 - On-site fuel generation from renewables excluding fuel used for mill site heat and electricity generation and excluding fuel that is used as a product further in the FW3 - other wood biomass | |
| 18.1.3.3 - On-site fuel generation from renewables excluding fuel used for mill site heat and electricity generation and excluding fuel that is used as a product further in the FW3 - Non-wood based renewable fuel production | |
| 18.2 - Energy use | |
| 18.2.1.1 - Energy use - Heat from renewable sources | |
| 18.2.1.2 - Energy use - Heat from fossil sources | |
| 18.2.2.1 - Energy use - Direct fuel use - renewable fuel | |
| 18.2.2.2 - Energy use - Direct fuel use - fossil fuel | |
| 18.2.3.1 - Electricity use - from 100% renewable sources | |
| 18.2.3.2 - Electricity use - from 100% fossil sources | |
| 18.2.3.3 - Electricity use - from the grid | |
| 18.3 Energy self sufficiency | |
| 19.1 - Greenhouse gas emissions | |
| 19.1.1. Greenhouse gas emissions from machinery | |
| 19.1.2. Greenhouse gas emissions from wood combustion | |
| 19.2 - Carbon stock | |
| 19.2.1 - Carbon stock in woody living biomass (above ground) | |
| 19.2.2 - Carbon stock in woody living biomass (below ground) | |
| 19.2.3 - Carbon stock in woody dead wood | |
| 19.2.4 - Carbon stock in soils of forest | |
| 19.2.5 - Carbon stock in wood products | Tosia |
| 20.1.1.1 - Distance by mode - road transport - loaded | |
| 20.1.1.2 - Distance by mode - rail transport - loaded | |
| 20.1.1.3 - Distance by mode - water transport (inland waterways) - loaded | |
| 20.1.1.4 - Distance by mode - water transport (maritime - sea-going ships) - loaded | |

| | |
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| 20.1.1.5 - Distance by mode - air transport - loaded | |
| 20.1.2.1 - Distance by mode - road transport - unloaded | |
| 20.2.1.1 - Freight volume - road transport - loaded capacity | |
| 20.2.1.2 - Freight volume - rail transport - loaded capacity | |
| 20.2.1.3 - Freight volume - water transport (inland waterways) - loaded capacity | |
| 20.2.1.4 - Freight volume - water transport (maritime - sea-going ships) - loaded capacity | |
| 20.2.1.5 - Freight volume - air transport - loaded capacity | Tosia |
| Ton km | |
| 21.1 - Water use (freshwater intake by industry) [relevant for industry] | |
| 21.2 - Water use (of the forest ecosystem) | |
| 21.2.1 - Water use (of the forest ecosystem) - Evapotranspiration from the system | |
| 21.2.2 - Water use (of the forest ecosystem) - Groundwater recharge | |
| 22.1 - Forest and Other Wooded Land Area | |
| 22.2.1 Growing stock classified by forest types | |
| 22.2.2 Growing stock on forests available for wood supply | Tosia |
| 22.4.1 - Balance of increments and fellings: Net annual increment | |
| 22.4. Balance of increments and fellings | |
| 22.5.1.1 - Age distribution: number of classes | |
| 22.5.1.2 - Age distribution: coefficient of variation | |
| 22.5.2.1 - Diameter distribution: number of classes | |
| 22.5.2.2 - Diameter distribution: coefficient of variation | |
| 23.1 - Chemical soil properties related to soil acidity and eutrophication (pH, CEC, C/N, organic C, base saturation), classified by main soil types | |
| 23.1.1 - pH | |
| 23.1.2 - CEC | |
| 23.1.3 - C/N ratio | |
| 23.1.4 - organic C | |
| 23.1.5 - base saturation | |
| 23.1.6 - site nutrient budget averaged over total rotation period (N, P, K, Ca, Mg) | |
| 23.2 - Soil compaction from machine operations | |
| 24.1.1 - Water pollution - organic substances (biochemical oxygen demand) | |
| 24.1.2 - Water pollution - nutrients (nitrogen, phosphorus) as Nitrogen or TKN (Total Kjeldahl Nitrogen) | |
| 24.2.1 - Non-greenhouse gas emissions into air - CO | |
| 24.2.2 - Non-greenhouse gas emissions into air - NOx | |
| 24.2.3 - Non-greenhouse gas emissions into air - SO2 | |
| 24.2.4 - Non-greenhouse gas emissions into air - NMVOC | |
| 25 Biodiversity | |
| 25.1.1 Area of forest & OWL by number of trees occurring | |
| 25.1.1 Area of forest & OWL by forest type | |
| 25.2.1 Volume of standing deadwood | |
| 25.2.1 Volume of lying deadwood | |
| 25.3. Protection status of area of forest and other wooded land | |
| 26.1.1 - Area with damage classified by damaging agent - biotic | |
| 26.1.1.1 - Area with damage classified by damaging agent - biotic - insects and diseases | |
| 26.1.1.2 - Area with damage classified by damaging agent - biotic - wildlife and grazing | |
| 26.1.2 - Area with damage classified by damaging agent - abiotic | |

26.1.2.1 - Area with damage classified by damaging agent - abiotic - fire
26.1.2.2 - Area with damage classified by damaging agent - abiotic - storm, wind

26.1.2.3 - Area with damage classified by damaging agent - abiotic - snow, drought, mudflow, avalanche and other identifiable abiotic factors

26.1.3 - Area with damage classified by damaging agent - human induced

26.2 - Damage-induced wood supply

27.1 - Generation of waste in total

27.1.1 - Not classified as hazardous waste

27.1.2 - Hazardous waste

27.2.1 - Waste to material recycling

27.2.2 - Waste to incineration

27.2.3 - Waste to landfill

(green: these indicators are selected for the ToSIA demonstration).

The data collection for the EU-FWC (2005, reference futures and scenarios) relates to demonstration indicators only.

Next steps

Next steps are finalising the data collection and calculation of reference futures in 2015 and 2025, as well as scenario calculation for 2015 and 2025.

Calculation of reference futures

For the calculation of indicator values for the reference futures in M3 a calculation scheme was created and sent out to all partners (January 2009). It is an updated version of the sheet „Calculation schema_RefFut_longlist_23102008_DV_M3.xls” which was sent out by Diana in October 2008. It includes the last version of M1's drivers for A1 and B2, M3's driver and assumptions, the selected indicators for demonstration and integrates the calculation formulas for the ref.fut. in the case studies and EU-FWC.

Others

It was decided at the EU-FWC Task Force meeting in January 2009 that a new page is created under the portal to collect all the information related to the EU-FWC application.

The page is now created and it is in address:

<http://87.192.2.62/eforwood/Partnersonly/EUFWCapplication/tabid/322/Default.aspx> (under Partners only tab, EU-FWC application). All relevant documents of this application will be collected there.