Delivery of sustainable supply of non-food biomass to support a "resource-efficient" Bioeconomy in Europe

S2Biom Project Grant Agreement n°608622

D4.1

Draft structure of the S2BIOM database

Version: 0.2

6.04.2017

About S2Biom project

The S2Biom project - Delivery of sustainable supply of non-food biomass to support a "resource-efficient" Bioeconomy in Europe - supports the sustainable delivery of non-food biomass feedstock at local, regional and pan European level through developing strategies, and roadmaps that will be informed by a "computerized and easy to use" toolset (and respective databases) with updated harmonized datasets at local, regional, national and pan European level for EU28, Western Balkans, Moldova, Turkey and Ukraine. Further information about the project and the partners involved are available under www.s2biom.eu.

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IINAS International Institute for Sustainability Analysis and Strategy
CEI CENTRAL EUROPEAN INITIATIVE
btg biomass technology group
biomass research

About this document

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0.1	1/06/2015	DLO	First version as database is further developed through the project with input from other WPs	Draft
0.2	6/04/2017	DLO	Minor editorial corrections concerning statements referring to the 7th Frame Programme and responsibility.	Final

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Executive summary

This report explains the overall structure of the central database for as far developed in this stage of the project. The database so far is strongly based on the data generated in WP1, 2 and 3 as these data have already been collected in draft in this stage of the project and viewing and extraction functionalities have been programmed in WP4 for these data.

The final database will consist of sub-databases which will be fully integrated by the end of project in one relational database.

The sub-databases to be distinguished are:

1) Biomass cost-supply database
2) Biomass conversion technology database
3) Biomass pre-treatment and logistics database
4) Database on the policy and regulatory framework of biomass delivery chains
5) Biomass demand and use database
6) Library incorporating all final reports and documents generated by the project

The challenge of the development of the database is especially to incorporate and integrate all information and relations between the different entries of the different databases to facilitate all functionalities of the viewing and full chain assessment tools to be developed in S2BIOM. To reach this challenging product the implementation of the database is gradual and becomes more sophisticated towards the end of the project.

1 Table of contents

2 Introduction

The central database in WP4 is to be designed in this WP 4, but populated in WP1, 2, 3, 5, 6 and 7. The main aim of the database design made in WP4 is to ensure that the data bases can be easily populated in the different WPs and that the central database can be linked to the tools developed in subtasks 4.1-4.5. The design of the database needs to be aligned to all the requirements of the different versions of these tools. The database structure follows the workflow of tool development and data collection in the different WPs. So its technical design is to be up-dated twice to follow the needs of the development of the other tools 4.1 to 4.5 and to ensure that all new data and information produced in the other WPs is incorporated in the final version of the toolset. In this Deliverable an overview is given of the technical implementation of the database and of the structure of the database for the data collected in WP1, 2, 3 and WP6 communicating with the viewing tools developed so far in the project. At the end of the report an overview is also given of the further database development to come in the remaining part of the project.

2.1 Overview of total database and links to tools

In the following Table 1 an overview is given of the different data generated in the project and the tools to be developed to be fed by the data from the central database generated in WP4 of the project, but populated in other WPs of the project.

Table 1 Overview of data, database requirements and tools to be developed

Type of data	WP populating the data	Data input into tool:
Biomass cost supply	WP1	1) Biomass cost-supply data viewer 2) Biomass Matching tool 3) Full chain assessment tool at national level (BeWhere) 4) Full chain assessment tool at local level (LOCAgistics)
Biomass conversion technologies	WP2	1) Biomass conversion technology viewer 2) Biomass Matching tool 3) Full chain assessment tool at national level (BeWhere) 4) Full chain assessment tool at local level (LOCAgistics)
Biomass pre-treatment and logistical components	WP3	1) Biomass pretreament and logistical components viewer 2) Biomass Matching tool 3) Full chain assessment tool at national level (BeWhere) 4) Full chain assessment tool at

Type of data	WP populating the data	Data input into tool:
		local level (LOCAgistics)
Biomass relevant regulations and policies	WP6	1) Biomass regulations and policies viewing tool
Biomass demand and use levels	WP7	1) Viewable through the General User Interface entry biomass demand. 2) Full chain assessment tool at national level (BeWhere)
All developed strategies, reports and other documents in the project	WP 1-11	1) Viewable through the General User Interface entry biomass demand.

3 Technical implementation of the database

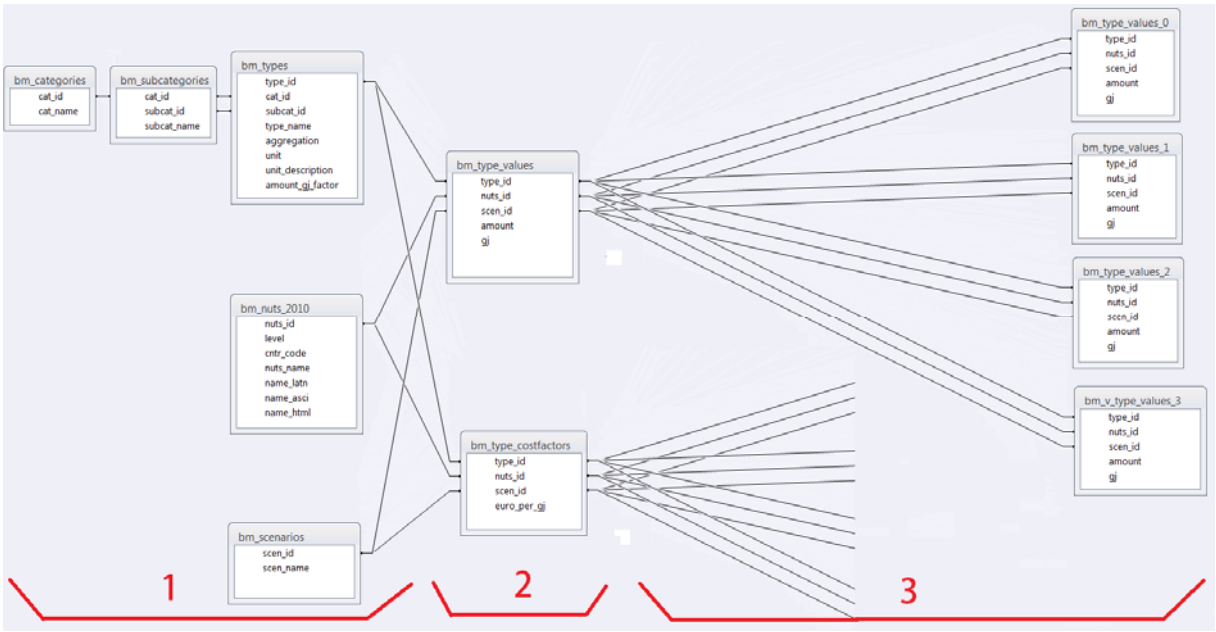
The database has been developed using the open source database software PostgreSQL 9.3, with the PostGIS2.0 geospatial extension. The database runs under Linux.

4 Description of the database

In the following different components of the dataase are described forming together the total S2BIOM dataase which is gradually growing. This description is not covering a full database yet as many components are still in a development stage and thir structure is not clear yet as the data has not been collected (completely) or the data has not yet been delivered to WP4 as it was not yet planned.

4.1 Database for biomass cost supply

The Entity-Relationship Diagram for the cost supply database looks like this:



On the left side we see the base tables (part 1). These define on which items cost and supply information have been collected. The information has been collected on 40 types of biomass, at various NUTS levels and for three types of potentials. The biomass types are divided into 9 categories with 15 subcategories. The overview of the biomass types is presented in Table 2.

Table 2 Overview of biomass cost-supply database

type_id	cat_id	subcat_is	category	subcategory	short_name	name
1111	11	111	Primary forestry production	Stemwood from thinnings & final fellings	Final fellings from broadleaf trees	Stemwood from final fellings originating from broadleaf trees
1112	11	111	Primary forestry production	Stemwood from thinnings & final fellings	Final fellings from conifer trees	Stemwood from final fellings originating from conifer trees
1113	11	111	Primary forestry production	Stemwood from thinnings & final fellings	Thinnings from broadleaf trees	Stemwood from thinnings originating from broadleaf trees
1114	11	111	Primary forestry production	Stemwood from thinnings & final fellings	Thinnings from conifer trees	Stemwood from thinnings originating from conifer trees
1121	11	112	Primary forestry production	Stem and crown biomass from early thinnings	From broadleaf trees	Stem and crown biomass from early thinnings originating from broadleaf trees
1122	11	112	Primary forestry production	Stem and crown biomass from early thinnings	From conifer trees	Stem and crown biomass from early thinnings originating from conifer trees
1211	12	121	Primary forestry residues	Logging residues from final fellings	From broadleaf trees	Logging residues from final fellings originating from broadleaf trees
1212	12	121	Primary forestry residues	Logging residues from final fellings	From conifer trees	Logging residues from final fellings originating from conifer trees
1221	12	122	Primary forestry residues	Stumps from final fellings	From broadleaf trees	Stumps from final fellings originating from broadleaf trees
1222	12	122	Primary forestry residues	Stumps from final fellings	From conifer trees	Stumps from final fellings originating from conifer trees
2111	21	211	Primary production of lignocellulosic biomass crops	Energy grasses, annual & perennial crops	Sweet and biomass sorghum	Sweet and biomass sorghum (Annual grasses)
2112	21	211	Primary production of lignocellulosic biomass crops	Energy grasses, annual & perennial crops	Miscanthus	Miscanthus (Perennial grass)
2113	21	211	Primary production of lignocellulosic biomass crops	Energy grasses, annual & perennial crops	Switchgrass	Switchgrass (Perennial grass)

type_id	cat_id	subcat_is	category	subcategory	short_name	name
2114	21	211	Primary production of lignocellulosic biomass crops	Energy grasses, annual & perennial crops	Giant reed	Giant reed (Perennial grass)
2115	21	211	Primary production of lignocellulosic biomass crops	Energy grasses, annual & perennial crops	Cardoon	Cardoon (Perennial crop)
2116	21	211	Primary production of lignocellulosic biomass crops	Energy grasses, annual & perennial crops	Reed Canary Grass	Reed Canary Grass (Perennial grass)
2121	21	212	Primary production of lignocellulosic biomass crops	Short rotation coppice	SRC Willow	SRC Willow
2122	21	212	Primary production of lignocellulosic biomass crops	Short rotation coppice	SRC Poplar	SRC Poplar
2123	21	212	Primary production of lignocellulosic biomass crops	Short rotation coppice	Other SRC	SRC Other (incl. Eucalyptus)
2211	22	221	Agricultural residues	Straw/stubbles	Rice straw	Rice straw
2212	22	221	Agricultural residues	Straw/stubbles	Cereals straw	Cereals straw
2213	22	221	Agricultural residues	Straw/stubbles	Oil seed rape straw	Oil seed rape straw
2214	22	221	Agricultural residues	Straw/stubbles	Maize stover	Maize stover
2215	22	221	Agricultural residues	Straw/stubbles	Sugarbeet leaves	Sugarbeet leaves
2216	22	221	Agricultural residues	Straw/stubbles	Sunflower straw	Sunflower straw
2221	22	222	Agricultural residues	Woody prunning & orchards residues	Residues from vineyards	Residues from vineyards
2222	22	222	Agricultural residues	Woody prunning & orchards residues	Residues from fruit tree plantations	Residues from fruit tree plantations (apples, pears and soft fruit)
2223	22	222	Agricultural residues	Woody prunning & orchards residues	Residues from olives tree plantations	Residues from olives tree plantations
2224	22	222	Agricultural residues	Woody prunning & orchards residues	Residues from citrus tree plantations	Residues from citrus tree plantations

type_id	cat_id	subcat_is	category	subcategory	short_name	name
2225	22	222	Agricultural residues	Woody prunning & orchards residues	Residues from nuts plantations	Residues from nuts plantations
2311	23	231	Grassland	Currently unused grass land (grassland not used for feed)	Unused grassland cuttings	Unused grassland cuttings (abandoned grassland, managed grasslands not used for feed)
3111	3	311	Other land use	Biomass from other areas under landscape maintenance	Landscape care (grassy)	Grassy biomass from landscape maintenance (recreational and nature protection areas, dykes)
3112	3	311	Other land use	Biomass from other areas under landscape maintenance	Landscape care (woody)	Woody biomass from landscape maintenance (landscape elements)
3121	3	312	Other land use	Biomass from road side verges	Road side verges (grassy)	Grassy biomass from road side verges
3122	3	312	Other land use	Biomass from road side verges	Road side verges (woody)	Woody biomass from road side verges
4111	41	411	Secondary residues from wood industries	Saw mill residues	Sawdust	Sawdust from sawmills from conifers
4112	41	411	Secondary residues from wood industries	Saw mill residues	Other residues (conifers)	Sawmill residues: excluding sawdust, conifers
4113	41	411	Secondary residues from wood industries	Saw mill residues	Other residues (broadleafs)	Sawmill residues: excluding sawdust, broadleafs
4121	41	412	Secondary residues from wood industries	Other wood processing industry residues	Residues from industries producing semi finished wood based panels	Residues industries producing semi finished wood based panels
4122	41	412	Secondary residues from wood industries	Other wood processing industry residues	Residues from further woodprocessing	Residues from further woodprocessing
4211	42	421	Secondary residues of industry utilising agricultural products	By-products and residues from food and fruit processing industry	Olive-stones	Olive-stones
4212	42	421	Secondary residues of industry utilising agricultural products	By-products and residues from food and fruit processing industry	Other food processing residues	Other by-products and residues from food and fruit processing industry
4221	42	422	Secondary residues of industry utilising agricultural products	Other industry by-products utilising agricultural products	Cotton_acorn	Cotton_acorn

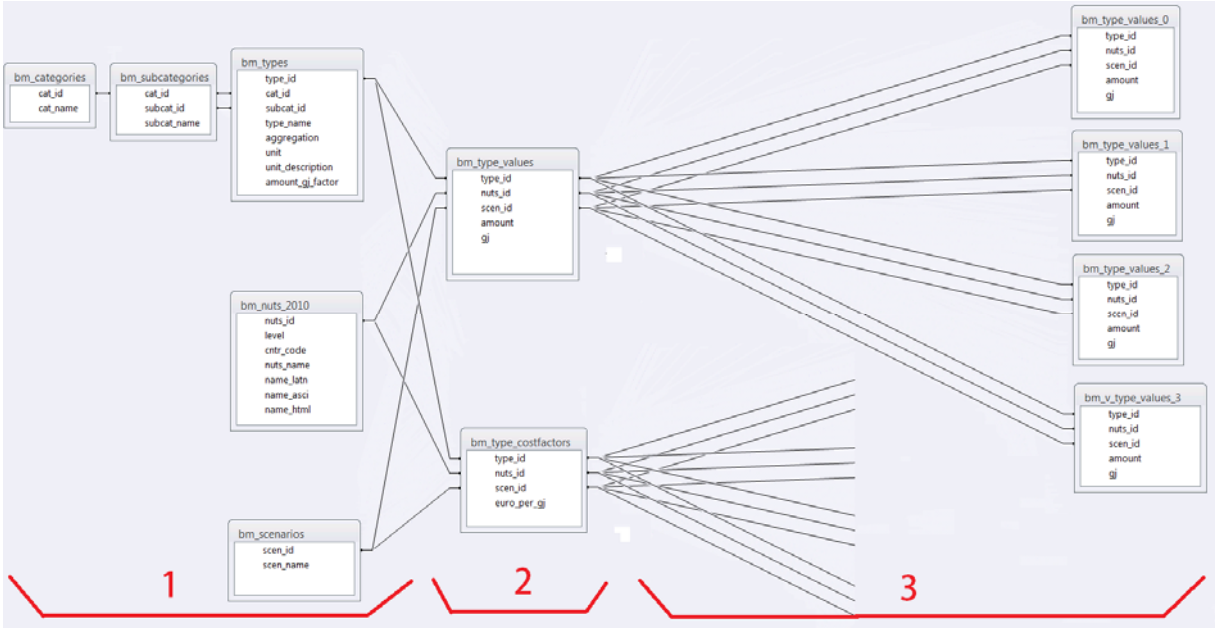
type_id	cat_id	subcat_is	category	subcategory	short_name	name
4222	42	422	Secondary residues of industry utilising agricultural products	Other industry by-products utilising agricultural products	Other industrial residues	Other industry by-products utilising agricultural products
5111	51	511	Biodegradable municipal waste	Biodegradable waste	Biowaste unseparately collected	Biowaste as part of integrally collected municipal waste: Biodegradable waste of not separately collected municipal waste (excluding textile and paper)
5112	51	511	Biodegradable municipal waste	Biodegradable waste	Biowaste separately collected	Separately collected biowaste: Biodegradable waste of separately collected municipal waste (excluding textile and paper)
5211	52	521	Post consumer wood	Post consumer wood	Hazardous post consumer wood	Hazardous post consumer wood
5212	52	521	Post consumer wood	Post consumer wood	Non hazardous post consumer wood	Non hazardous post consumer wood

The geographical information is organised by the 2013 NUTS regions. At the moment NUTS levels 0 to 3 are loaded into the database. This can be expanded if needed. Most information has been delivered at NUTS level 3.

The future expectations are divided into 3 or more types of potentials (or scenarios as named in the scheme underneath) and for 3 time periods:

scenario	year	year	year
Technical potential	2012	2020	2030
Base Potential	2012	2020	2030
User defined potential A	2012	2020	2030
User defined potential B	2012	2020	2030
User defined potential C	2012	2020	2030

For the user defined potentials; these are to bedefined specifically per biomass type and some times there are only 2 for biomass A, while there could be 4 for biomass type B.



In the middle we see the bm_type_values and bm_type_costfactors tables (part 2). Inside these the tables the actual values for supply and cost are stored, by NUTS region and by scenario (= type of biomass potential). The NUTS region can be at any level, as long as the region is defined inside the table bm_nuts_2013. At the moment the table bm_type_values holds 27359 entries. Table bm_type_costfactors holds 32868 values, but currently an up-date of the database is in process which will lead to at least 3 times the amount of current entries.

On the right we see some derived tables, to make the informaton available on all NUTS levels (part 3). If supply values on a lower NUTS level are provided, the values at a higher level can be calculated by taking the sum of the amounts at the lower level. We only do so if the value on the higher NUTS level has not been provided

separately. So if no value has been provided for a NUTS region, we look if values are available at lower lowels and sum them up. These values are stored in the derived tables: we have a derived table at any availabe NUTS level.

A similar approach is taken for the costfactors, with the difference that this works in the opposite direction. If a cost factor is provided for a country, this cost factor gets assigned to lower NUTS levels within the country in case there is no cost factor provided for these NUTS regions. Again there is are derived tables for any available NUTS level (these are not in the picture for convenience).

A further extension of the cost supply database is currently in process adding additional values per type of biomass in relation to the physical and chemical composition of the biomass and meta information on the way the potential for this type of biomass is assessed and what main input data were used to calculate the potential X for that specific type of biomass. The compositional data on the biomass are crucial for the biomass matchin tool to be developed in WP4. The meta information is crucial for the end-user of the data and information produced in the project and should be made accessible throuh the biomass cost-supply data viewer.

4.2 Database for biomass conversion technologies

An overview of available conversion technologies and their properties is stored in he conversions table and related tables. The related tables are one-to-many subtables for output capacity and for additional input that might be needed for the conversion process. Finally there are domain tables to store possible values for selected attributes.

At the moment there are 42 conversion technologies stored inside the database, but this number is growing.

The properties collected for conversion technologies belong to several categories:

1. General properties.

View details of Dry Batch Digestion (MSW)

GENERAL PROPERTIES

Name	Dry Batch Digestion (MSW)	Level of commercial application	Commercial large scale
Main category	Anaerobic digestion	Important pilots and EU projects	Only to develop innovations
Subcategory	Plug flow digester	Expected Developments	Mainly in biogas upgarding and in efficiency improvement
Image url		Current Technology Readiness Level in 2014	Level 9, System ready for full scale deployment
Year of first implementation	1900	Expected Technology Readiness Level in 2030	Level 9, System ready for full scale deployment
Estimated number of systems in operation	100	Justify expected Level in 2030	System is commercial - Innovations implemented

Main operating principle:

Mainly used for Municipal Solid Waste (MSW). MSW or comparable substaret is digested over a 2 to 4 week period in a closed area. It is a batch process. Temperature can be between 30 and 60C.

2. Technical properties.

View details of Dry Batch Digestion (MSW)

TECHNICAL PROPERTIES

	Capacity of outputs (typical values)				
Power	(MWe) 1				
Conversion efficiencies: net returns electricity(GJ/GJ biomass input)	typical: 0.2	min: 0.1	max: 0.4	typical in 2020:	typical in 2030:
Biogas	(m3/hour) 700	LHV (GJ / m^3) 19.7			
Conversion efficiencies: net returns fuel(GJ/GJ biomass input)	typical: 0.5	min: 0.2	max: 0.90	typical in 2020:	typical in 2030:
Methane	(m3/hour) 420	LHV (GJ / m^3) 32.8			
Conversion efficiencies: net returns fuel(GJ/GJ biomass input)	typical: 0.5	min: 0.2	max: 0.9	typical in 2020:	typical in 2030:

Data sources used to define conversion efficiencies in 2014:

Depends on biomass input type!

Data sources used to define conversion efficiencies in 2020:

Data sources used to define conversion efficiencies in 2030:

General data sources for technical properties:

External inputs (not generated by the biomass in the conversion process)

Power	(kW): 1000
Heat (useful, not process steam)	(kW): 1000

Indication: experience based data	Yes
Number of possible full load hours per year (hours)	5000
Number of typical full load hours per year (hours)	3500
Typical Lifetime of Equipment (years)	15

3. Biomass input specifications

View details of Dry Batch Digestion (MSW)

BIOMASS INPUT SPECIFICATIONS

Biomass input, common for the technology used:	HH MSW, Household waste; NACE MSW, Waste not from households; NACE Vegetal, Waste not from households; Grass, Abandoned grassland; Grass, Biomass (roadside Verges);
Biomass input, technically possible but not common:	Cardoon, Energy Grasses, Annual Crops, Perennial Crops; Sorghum, Energy Grasses, Annual Crops, Perennial Crops; Reed Canary Grass, Energy Grasses, Annual Crops, Perennial Crops; Maize, Straw/stubbles;

Traded form	Other (Black liquor, BMW, PO etc.)
Dimensions	Not applicable

Moisture content	(% wet basis) typical 50	max 70
Minimal bulk density	(kg/m^3, wet basis) 500	
Maximum ash content	(% dry basis) 40	
Minimal ash melting point (= initial deformation temperature)	(°C)	
Volatile matter (only for thermally trated material, torrefied or steam explosed)	(VM%)	

Maximum allowable contents

Nitrogen, N (wt%, dry)	Sulphur, S (wt%, dry)	Chlorine, Cl (wt%, dry)

Optional attributes

Net caloric value	(MJ/kg) min	max
Gross caloric value	(MJ/kg) min	max
Biogas yield	(m^3 gas/ton dry biomass) 50	% methane 50
Cellulose content	(g/kg dry matter) min 0	max 100
Hemicellulose content	(g/kg dry matter) min	max 100
Lignin content	(g/kg dry matter) min 0	max 100
Crude fibre content	(g/kg dry matter) min 0	max 100
Starch content	(g/kg dry matter) min 0	max 100
Sugar content	(g/kg dry matter) min 0	max 100
Fat content	(g/kg dry matter) min 0	max 100
Protein content	(g/kg dry matter) min 0	max 100
Acetyl group content	(g/kg dry matter) min 0	max 100

4. Financial and economic properties.

View details of Dry Batch Digestion (MSW)

FINANCIAL AND ECONOMIC PROPERTIES

Investments costs	in 2014 (€): 5000000	expected in 2020 (€):	expected in 2030 (€):	Labour needed	Operators (FTE): 1	Staff and engineering (FTE): 1

4.3 Database for logistical concepts

Logistical components as storage, pre-treatment and transportation technologies that are available to handle biomass are accumulated in the logistics table and related tables. The related tables are domain tables to store possible values for selected attributes. At the moment there are 220 logistic components stored inside the database, but their number is still growing. The properties collected for logistic components belong to several categories:

1. General properties.

View details of Doppstadt DZ 750 Kombi

GENERAL PROPERTIES

Commercial name	Doppstadt DZ 750 Kombi	Level of commercial application	Sold in Germany.
Main category	Communition (size reduction)	Year of first implementation in practice	
Subcategory	Shredding	Estimated number of systems in operation since introduction	
Image url	http://bfw.ac.at/fmdb/maschinen.web?kat=1929	Current Technology Readiness Level in 2014	Level 9, System ready for full scale deployment
Most common/suitable applications	Pre-treatment of wood.	Expected Technology Readiness Level in 2030	Level 9, System ready for full scale deployment
Main operating principle:		References:	
Trailer platform with own diesel engine. The power requirement is 450 kW. The available data for the input processing capacity are in unit nm3/h therefore we took the converter: 1nm3 = 0.4 m3 (Source: Kakovostna lesna goriva za vsakogar, Slovenian Forestry Institute - in Slovenian).		http://www.woodybiomass.org/PagesRS/www.woodybiomass.org/userfiles/files/Microsoft%20Word%20-%20TOR-Annex%203_WE%20Technology_report_Krajnc.pdf and http://bfw.ac.at/fmdb/maschinen.web?kat=1929.	

2. Technical properties.

View details of Doppstadt DZ 750 Kombi

TECHNICAL PROPERTIES

Energy demand	(MJ/t)		Number of full load hours per year	(h)	1800
Type of energy needed		Diesel	Maximum load volume of transport system	(m^3)	165
Other input demand			Maximum load weight of transport system	(t)	
Pre-treatment efficiency	(output/input)		Typical lifetime of equipment	(years)	5
Input processing capacity	(m^3/h)	80	Labour requirements pre-treatment	(h/t)	
Storage capacity for input	(t)		Labour requirements storage	(h/t)	
Storage capacity for output	(t)		Labour requirements transport	(h/t)	
			Transportability		Mobile

3. Biomass input specifications

View details of Doppstadt DZ 750 Kombi

BIOMASS INPUT SPECIFICATIONS

Acceptable biomass input groups	Wood;			Moisture content input (%, wet base)	Minimum Maximum
Received (intermediate) biomass	Log wood, firewood			Bulk density input (kg/m^3, wet base)	Minimum Maximum
Minimum particle size input	length (mm)	width / diameter (mm)	height (mm)	Maximum input level of contamination with exogenous material (%, dry base)	
Maximum particle size input	length (mm)	width / diameter (mm) 400	height (mm)	Maximum ash content input (%, dry base)	

4. Biomass output specifications

View details of Doppstadt DZ 750 Kombi

BIOMASS OUTPUT SPECIFICATIONS

Indication of follow up process(es)	Transport;	Moisture content output (%, wet base)	Minimum Maximum
Delivered (intermediate) biomass	Wood chips	Bulk density output (kg/m^3, wet base)	Minimum Maximum
Dimensions	P300: 3,15 mm < P < 300 mm Fine fraction F05: < 5 %	Maximum output level of contamination with exogenous material (%, dry base)	
		Maximum ash content output (%, dry base)	

5. Financial and economic properties

View details of Doppstadt DZ 750 Kombi

FINANCIAL AND ECONOMIC PROPERTIES			
Specific investment costs of equipment, included auxiliaries	(€)	Transport costs per kilometer	(€/km)
Operation and maintenance costs	(€/t)	Transport costs per tonne	(€/t)
- Calculation method	Effective operation time	Transport costs per load	(€)
Storage costs	(€/t)	Transport costs fixed	(€)
Loading costs	(€/t)	Infrastructure needed	None
Unloading costs	(€/t)		

4.4 Database for biomass matching tool

The database for the Biomass Matching tool will consist of the 3 database described in the former, additional compositional information on the physical and cemical composition of the iomass and an additional knowledge database providing the rules according to which a biomass type matches with a biomass conversion technology and/or with a pre-treatment technology to adapt the physical composition of the biomass to the requirements of a specific conversion technology.

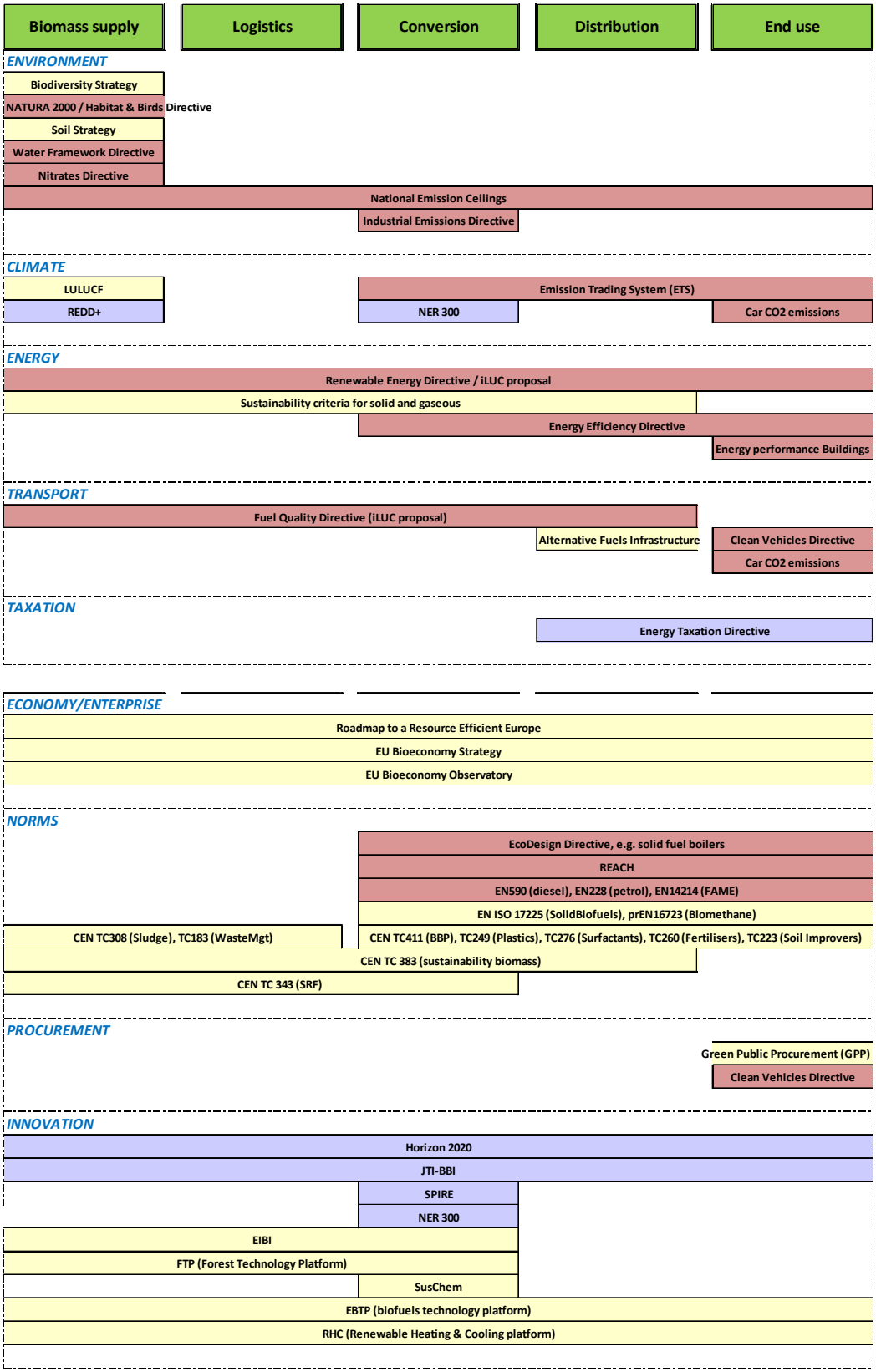
The further design of this database particularly in relation to the biomass composition and the knowledge database on the matching of biomass to conversion and pre-treatment technologies is currently in process and the final structure of these databases cannot be displayed at this stage.

4.5 Database for the regulatory and policy framework

Currently all data on regulations are collected through an excel database in WP6. These excel data have been loaded in a central access database. The data in the access database needs to be transferred to a new PostgreSQL 9.3 database, with the PostGIS2.0 geospatial extension, to make it available to be interactively displayed in a viewing and download tool.

Currently the access database contains field per regulation and policy organised geographically and most interestingly according to place in the biomass delivery chain that it impacts on (see Figure underneath). In the viewing tool the data request can be taken from these different perspectives of biomass delivery chain positions. The PostgreSQL database that is to be populated with the access data will enable access to the data in a viewing tool taking at least 16 different perspectives ranging from geographic, the 5 positions in the chain (from supply to end-use) and according to the 9 issues (from environment to innovation).

Figure 1 Organisation of the regulation and policy database



4.6 Biomass demand and use database

The data in this database will be generated by the ReSolve energy model run in WP7 for the 3 main scenarios in the project. The ReSolve model will generate output at country level on bioenergy demand and use mixes and the level of use of domestic and imported biomass for reaching the different bioenergy demand levels per scenario. The modelled output organised per scenario will be made accessible to end-users through viewing functions which need to be accommodated by a database organised according to the information that needs to be displayed.

A key organisational principle in relation to the database design will be the relative presentation of biomass demand and consumption levels per scenario and per type of biomass. This database is still in design and cannot be presented further as the output of the resolve runs have not been generated yet in this stage of the project.

5 Next steps for database design and construction

Currently the database on cost-supply of biomass is further revised and populated to facilitate the display of this information in the up-dated biomass cost-supply viewing tool. This up-date will be demonstrable and testable as from September 2015.

The design of the databases on conversion technologies and logistical concepts will not be altered anymore except that relational information will be added to all these databases to facilitate the biomass type conversion and pre-treatment links further to be displayed in the iomass matching tool that is currently in development. A further attractive view for users of the conversion, pre-treatment and logistical information incorporated in the databases should be available to end-user for testing by December 2015. The same applies to first matching solutions between technologies and biomass types which will also be testable for end-users by the end of 2015.

The policy and regulation tool should be available to be accessed by end-users by the end of 2015 which implies that the relational database should be ready by November 2015 to facilitate the viewing functionalities.

The biomass demand and use database will be developed in the beginning of 2016 when runs of Resolve are performed and output is generated to populate the database.

First versions of the full chain assessments tools are planned to be tested by spring 2016 which will derive input from the different databases. The full chain assessment tools will also require information at hiher spatial resolution for a selection of countries and regions for which case studies are implemented in the project. For these tools extensions of the developed databases to higher spatial resolution information are planned. These will be implemented until spring 2016.

The full S2BIOM database is planned to be ready by June 2016. After that is will be stabilised and only minor updates and adaptations are possible. For the final fully integrated database a user guideline will be written explain the full structure and facilitating any future up-dates.