



Expert Group Workshop Identification of the good practices in waste wood management

**MODEL REGION OF BADEN-
WURTEMBERG**

Germany context



- Location



Source: www.mygeo.info



Source: www.deutschland-navigator.de



Germany context



- Market
 - High treatment rate and only landfilled 1% of municipal waste in 2014 (Landfilling banned for organic products).
 - Disposal of Waste wood)
 - ✦ Recycling material = 20% (class A1)
 - According to WKI, the valuation of materials in 2010/2011 reaches 33%.
 - ✦ Energy recover = 80% (classes AII - A IV)
 - Cogeneration plants: building and municipal waste
 - ✦ Panel industry after transit in sorting facilities: BTP, industry, packaging



Germany context



• Market

- Germany is a net importer of waste wood (750 kt- 900 kt)
 - ✦ The greatest volumes come from the Netherlands with an import volume of 333,000 tons amounting to about 50 % of total imports. In contrast, quantities exported, predominantly to the Netherlands, are very little.

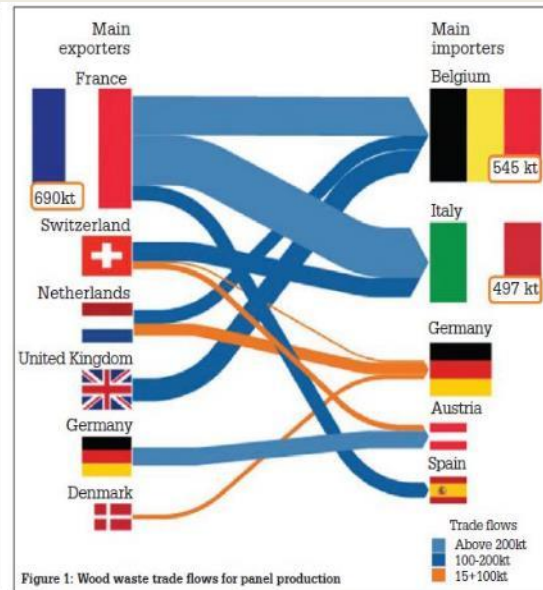
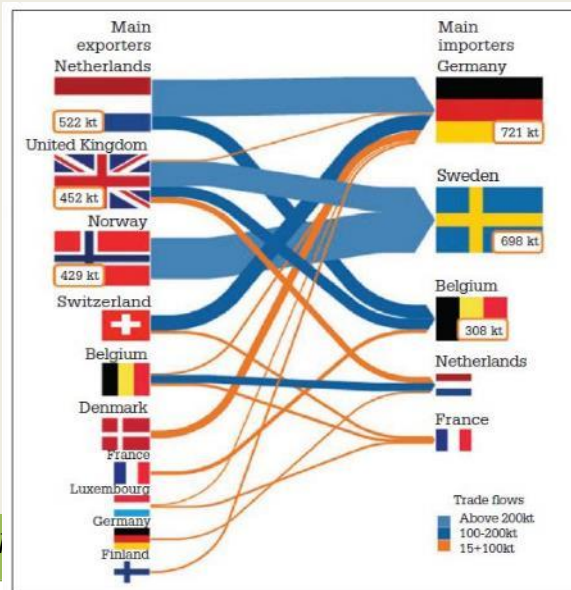


Figure 1: Wood waste trade flows for panel production



der grant agreement no 727958

Germany context



- Regulatory framework concerning waste wood
 - Recycling management is governed by a variety of legislation : EU law, federal German law, law of state Baden-Württemberg and municipal law.

European framework



Germany



Lander



Municipal



Germany context



- Regulatory framework concerning waste wood
 - European framework : waste, IED, RE directives
 - Germany
 - ✦ **Waste management act 2012**
 - Remind waste hierarchy : reuse, recycling and recovery, and finally disposal
 - ✦ **Producer responsibility : Packaging ordinance**
 - ✦ **Wood Waste Ordinance (2002)**
 - Very thorough act : has allowed the development of the collecting of waste wood and its valorisation since 15 last years.
 - **Classification** which split waste wood in 4 categories, depending of the origin and quality of wood.
 - According to the classification, different valorisations are recommended.



Germany context



- Regulatory framework concerning waste wood
 - Germany
 - ✦ Pollution Control Act on incinération and co-incinération - 17. BImSchV)
 - ✦ German Renewable Energy Sources Act “EEG”
 - implementation of EU Directive 2009the promotion of the use of energy from renewable sources.
 - 18% of gross final energy consumption by 2020
 - **feed-in tariff** system combined with a **guaranteed right of access to the grid for renewable energy projects**
 - **FIT applied 20 years after commissioning**
 - ✦ Overall policy “**energy transition**” aiming to :
 - phase-out nuclear energy by 2022,
 - to significantly reduce fossil energy use in the longer-term (i.e. by 2050),
 - and achieve GHG emission reductions in parallel.



Germany context



- Regulatory framework concerning waste wood
 - GUIDE VDI 4087
 - ✦ The application of this standard contributes to a consistent approach for Germany in the approval procedures, the implementation and monitoring.
 - ✦ The standard addresses operators, consultants, contractors and relevant authorities.
 - ✦ The standard describes the state of the art and applies to stationary, mobile and semi-mobile equipment and adherent facilities of other industries such as particle board plants or power plants, where waste wood is stored, treated and handled.



Germany context



- Regulatory framework concerning waste wood
 - Focus on the waste wood classification
 - ✦ Most thorough classification on waste wood in Europe and probably beyond
 - ✦ Regulates the mass flow practicably, effectively and sustainably
 - ✦ Has given visibility to the actors since 2002 : same frame for all
 - Accepted by all stakeholders
 - ✦ The classification crosses origins and outlets and promotes recycling for best categories (AI, AII) at the expense of energy recovering
 - In line with waste directive (waste management hierarchisation)
 - ✦ Based on the **European waste catalogue** (EWC)
 - ✦ Specifics threshold for panel recycling and more binding than EPF(European panel federation) standard



Baden-W. : Identified success factors

• Focus on the ordinance on waste wood

Column 1		Column 2				Column 3
No.	Recovery method	Permissible waste wood categories				Special requirements
		A I	A II	A III	A IV	
1	Processing of waste wood to wood chips for the manufacture of derived timber products	Yes	Yes	(Yes)		The processing of waste wood from category A III is only permissible if varnishes and coatings have been largely removed by pretreatment or will be largely removed during processing.
2	Production of synthetic gas for further chemical use	Yes	Yes	Yes	Yes	Recycling is only permitted in installations licensed for this purpose under Article 4 of the Federal Immission Control Act.
3	Manufacture of active carbon/industrial charcoal	Yes	Yes	Yes	Yes	Recycling is only permitted in installations licensed for this purpose under Article 4 of the Federal Immission Control Act.

Column 1	Column 2
Element/compound	Concentration (milligrams per kilogram dry mass)
Arsenic	2
Lead	30
Cadmium	2
Chromium	30
Copper	20
Mercury	0.4
Chlorine	600
Fluorine	100
Pentachlorophenol	3
Polychlorinated biphenyls	5

Common types of waste wood		Usual assignment	Waste code
Wood waste from woodworking and machining	Waste, cuttings, shavings from solid wood in its natural state	A I	03 01 05
	Waste, cuttings, shavings from derived timber products and other treated wood (with no harmful contaminants)	A II	03 01 05
Packaging	Pallets	A I	15 01 03
	Pallets made from solid wood such as: Europallets, industrial pallets made from solid wood	A II	15 01 03
	Pallets made from derived timber products	A III	15 01 03
	Other pallets with composite materials	A I	15 01 03
	Transport cases, crates made from solid wood	A II	15 01 03
	Transport cases made from derived timber products	A I	15 01 03
	Boxes for fruit, vegetables and ornamental plants as well as similar boxes made from solid wood	A IV	15 01 10*
	Ammunition boxes	A IV	15 01 10*
	Cable reels made from solid wood (made before 1989)	A I	15 01 03
	Cable reels made from solid wood (made after 1989)	A I	17 02 01
Waste wood from the construction industry	Waste wood from building sites	A I	17 02 01
	Solid wood in its natural state	A II	17 02 01
	Derived timber products, barked wood, treated solid wood (with no harmful contaminants)	A II	17 02 01
	Waste wood from demolition and restoration work	A II	17 02 01
	Boards, false ceilings, planks from interior works (with no harmful contaminants)	A II	17 02 01
	Door leaves and frames (with no harmful contaminants)	A II	17 02 01
	Profile boards for the fitting out of rooms, ceiling panels, ornamental beams etc. (with no harmful contaminants)	A II	17 02 01
	Heat and sound insulating board treated with agents containing polychlorinated biphenyls	Disposal	17 06 03*
	Chipboard used in construction	A II	17 02 01
	Wood used in construction for load-bearing elements	A IV	17 02 04*
	Timber framework and rafters	A IV	17 02 04*
	Windows, window posts, outer doors	A IV	17 02 04*
	Impregnated wood used in external structures	A IV	17 02 04*
	Wood from construction and demolition work containing harmful contaminants	A IV	17 02 04*
	Impregnated waste wood used in external structures	A IV	17 02 04*
Furniture	Railway sleepers	A IV	17 02 04*
	Telephone masts	A IV	17 02 04*
	Various wood used in horticulture and landscaping, impregnated garden furniture	A IV	17 02 04*
	Various wood used in agriculture	A I	17 02 04*
	Furniture, solid wood in its natural state	A I	20 01 38
	Furniture, with no halogenated organic compounds in the coating	A II	20 01 38
	Furniture, with halogenated organic compounds in the coating	A III	20 01 38
	Waste wood from bulky refuse (mixed)	A III	20 03 07
	Waste wood from industrial use (e.g. industrial flooring, cooling towers)	A IV	17 02 04*
	Waste wood from dismantled vessels and goods wagons	A IV	17 02 04*
Waste wood from damaged structures (e.g. burnt wood)		A IV	17 02 04*
Fine fraction from the processing of waste wood to make derived timber products		A IV	19 12 06*

Baden-W. : Specific regulations and plans



- Waste management plan for municipal waste 2015.
 - Six priority areas : biowaste, green waste, recyclable materials, electronic waste, sewage sludge and construction waste. In these fields, the state government plans to increase volumes, optimize energy recovery and recycling and improve the recovery of raw materials.
 - ✦ In 2011, Baden-Wurttemeber has recovered 86 % of construction and demolition waste, 97 % of household waste and 91 % of commercial and industrial waste.
 - ✦ Construction and demolition waste rely on voluntary commitments made by the sector
- Relevant structures in Baden-Wurttemberg
 - Fraunhofer instituts, Max planck research centers (nationa)
 - KIT
 - EIFER
 - Cluster of BW



Baden-W. : end-users



- Sorting/processing
 - At least 4 sorting sites, of which one on the site of the valorisation

Name	Location	Capacity (t)
BEB Karlsruhe	Karlsruhe	
Holz-recycling (HRU)	ULM	20 000 t
Lämmle Recycling GmbH	Furamoos	
BKO	Odenwald	72 000 (directly on the site of the CHP plant)



Baden-W. : end-users



- Energy

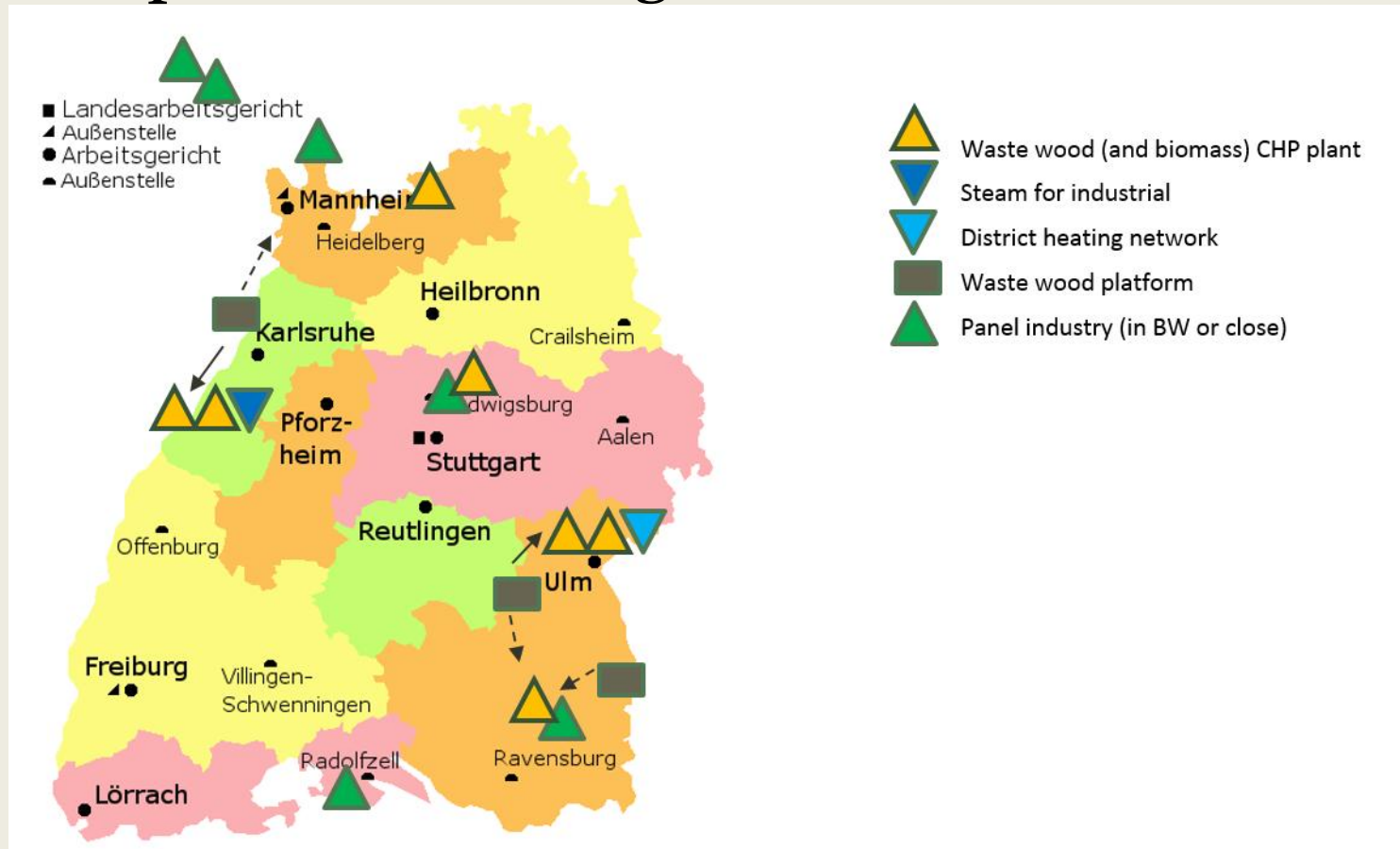
- At least 6 plants which produce energy based on waste wood
- More than 400 000 t/year and for a regional production of waste wood evaluated at 1 million t/year.
- + 6 waste-to-energy plants

Name	Location	Supply
BEB Kehl	Kehl	110 000
Biomass power plant ULM I	Ulm	120 000 (included 50 % waste wood)
Biomass power plant ULM II	Ulm	60 000 (included waste wood)
BioHKW	Herbrechtingen	140 000 (dont jusqu'à 50 % de déchets de bois)
BMHKW Odenwald	Odenwald	72 000 (dont déchets de bois)
	Eberhardzell	53 000 t of which waste wood



Baden-W. : end-users

• Map of outlets in region of Baden-W.



Baden-W. : 3 examples of success stories

- Integrated organisations
 - Biomass plant Odenwald :
 - ✦ District heating network
 - Biomass plant ULM :
 - ✦ District heating network
 - Biomass plant Khel :
 - ✦ Paper mill



Baden-W. : 3 examples of success stories

- BKO Odenwald

- Gross waste wood are directly received in Bulk and prepared very merely on the site (= no “breaking bulk”/transit = costs saved)
- BKO controls and ensures waste wood supply
 - ✦ STEAG New Energies GmbH (SNE) 88,4 % →
 - ✦ Neckar-Odenwald-Kreises mbH (AWN) 10 % → District waste management company



→ Visit planned with operator the 7th of July with stakeholders of Normandy



Baden-W. : 3 examples of success stories

• Energy : ULM

○ 2 biomass plants feeding in heat the district network

- ✦ 180 000 t of biomass of which more than 100 000 t of waste wood (AI-AIV)
 - In substitution of coal
- ✦ Contribute for 60 % of the heat of the district heating network of ULM



Unloading trucks in buried silos



Removal of coarse material from the scraper scales

This project has received funding from the European Union's H2020 research and innovation programme under grant agreement no 727958

Baden-W. : 3 examples of success stories

- Biomasse plant KHEL
 - 2 biomass plants feeding heat to a pulp mill
 - ✦ BEB : subsidiary of Koehler group



KOEHLER ENERGY GROUP

BEB (Biomass Energy Baden)

Sorting site (Karlsruhe)



Biomass plant



Pulp mill (Khel)



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Baden-W. : 3 examples of success stories



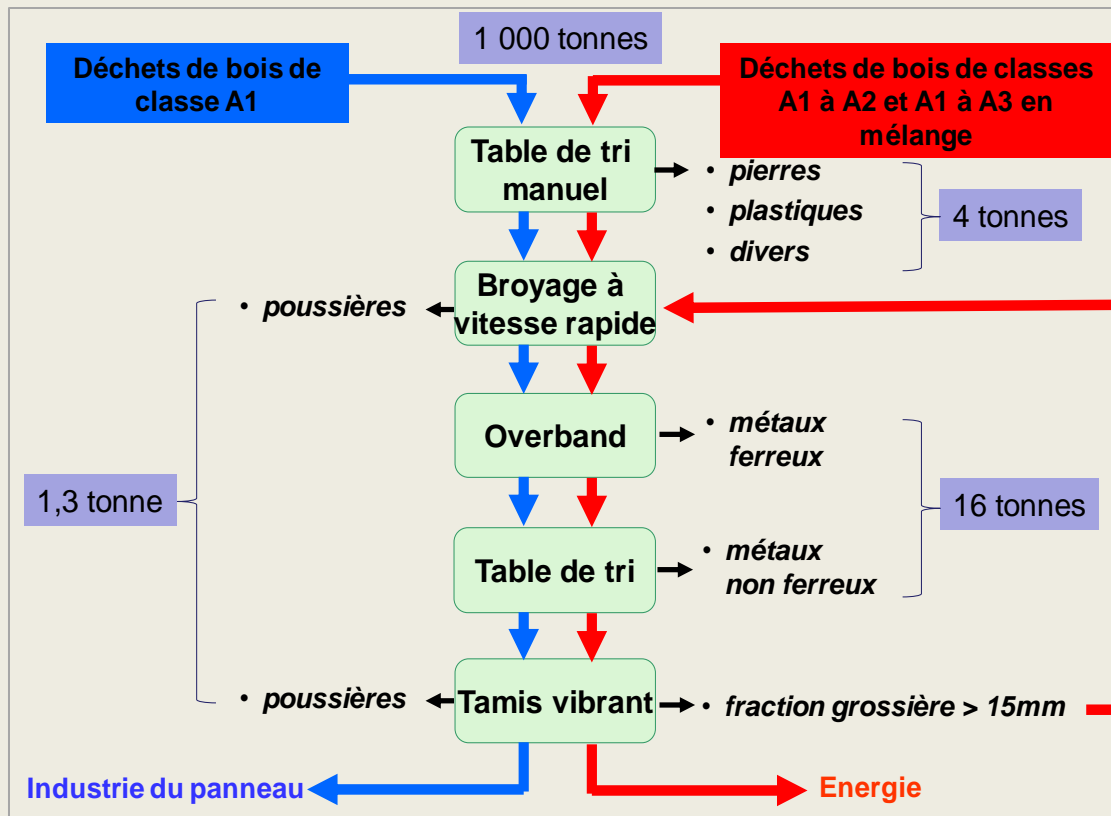
- **Biomass plant KHEL**
 - **The sorting site of Karlsruhe**
 - ✦ 2 ha, included a facility of 5 000 m².
 - ✦ Processing capacity: 200 000 t / year of wood.
 - ✦ Loading rate : 45%, ie 90 000 t / year of wood
 - ✦ 2 sorting and grinding lines: 20 t / h
 - ✦ Origin of wood :
 - Collecting point,
 - Door-to-door (bulky) collections,
 - Transport of goods (industries),
 - Retailers and supermarkets.
 - Supply distance : 70 to 100 km.
 - Operation by "batch" according to the arrivals of raw material.
 - Dusts oriented towards cement plants.



Baden-W. : 3 examples of success stories



- Biomass plant KHEL
- The sorting site of Karlsruhe



Baden-W. : 3 examples of success stories



- Biomass plant KHEL

- The 2 biomass plant in Khel

- ✦ Operated by BEB
 - ✦ Valorisation of energy (CHP plant)
 - Electricity feed-in according to the Renewable Energy Sources Act (EEG)
 - Supply of the paper production of the paper factory Koehler Kehl with process steam (heat)
 - ✦ Characteristics of the 2 installations

	Unité 1	Unité 2
Combustion	Fluidized bed	Grate
Fuel	Waste wood	Waste wood
Class	A I A IV	A I A II
Tonnage	110 000 t/an	40 000 t/an



Baden-W. : Identified success factors



- Model region justified by a set of success factors all along the value chain.
- Valorisation mainly focused on energy recover
- A favorable (suitable and incentive) national context
 - Ordinance of waste wood (2002)
 - Landfill forbidden
 - Incentive feed-in tariff
 - Necessity of stop using coal and decision to stop nuclear
 - Long experience of district heating network (few but big towns) with incineration of municipal waste
 - Long experience of separated collecting and recycling
 - Dedicated association (BVA) and dedicated guides
 - Furthermore, a solid facility park for material and energy recovery of waste wood was established
 - Planned end of nuclear power and objective of reduction of coal



Baden-W. : Identified success factors



- A favorable regional context
 - Presence of facilities for sorting of waste wood (Karlsruhe, Ulm...)
 - Presence of several districts heating network, included ULM, some of which were fueled by coal
 - Presence of several industrials producers of wood panel and numerous industrials with high needs of steam
 - Location of the **BVA association**
 - At last, the region hosts several technical and research/technical centers (KIT, EIFER...) which can accompany the development of the valorisation of waste wood
- Threat
 - End of subsidies (EEG) by 2020
 - Energy recovery from waste wood in new plants (2013) is no longer eligible for EEG (until 2013, AI and AII was assimilated to biomass)
 - Strengthening regulatory constraints for energy recovering. MCP directive ?
 - Lack of waste wood (from France, UK) ?

