



# Good practices in wood waste management- Austria

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# Legal Framework Conditions in Austria



- Austrian Waste Management Law (WML 2002)
  - Definition of overall framework conditions
  - Order of priority for waste management measures:
    1. Waste prevention/avoidance
    2. Preparation for re-use
    3. Recycling
    4. Other utilization measures (e.g. combustion)
    5. Disposal
  - Definition of areas of responsibility
    - ✦ Municipal waste and waste from commercial operations similar to municipal waste is managed by the nine Austrian provinces (municipal wood waste, demolition wood)
    - ✦ All other waste is managed at federal level (industrial waste wood streams)





- Specific ordinances, based on the WML, which are relevant for waste wood are:
  - Landfill ordinance (LO)
    - ✦ Since its amendment of 2004, waste with more than 5 % (weight) organic carbon must not be disposed of in landfills
    - ✦ All waste wood has to be either reused/recycled or, burned in designated heating or combined heat and power plants
  - Recycling wood ordinance (RWO 2012)
    - ✦ Was prepared with the aim to increase the recycling rate of waste wood
    - ✦ The maximum share of waste wood that can be recycled in a product increases with increasing quality (e.g. decreasing contents of harmful substances)



# Legal Framework Conditions in Austria



- Amendment to the Recycling Wood Ordinance (in force since January 1, 2019)
  - ✦ The aim of the amendment is to introduce a recycling requirement for wood waste in order to take the five-level waste hierarchy into account. The quality of the recycled waste wood is to be increased with better sorting at the point of origin (source sorting) and adapted specifications.
  - ✦ Waste wood fractions are assigned to 4 waste groups:
    - Waste wood for material recycling (e.g. untreated wood, clean pallets, OSB boards, chipboard)
    - Waste wood for thermal treatment (e.g. chemically treated wood, such as window frames, soiled pallets, firewood)
    - Hazardous waste wood (e.g. railway sleepers, wood impregnated with tar oil)
    - Fractions that are not waste wood





- Specific ordinances relevant for waste wood (continued):
  - Waste incineration ordinance (WIO)
    - ✦ Definition of framework conditions for waste incineration plants, including waste wood combustion plants
    - ✦ Based on the respective EU directives (2000/76/EG and 2010/75/EU)
- Law regarding the remediation of contaminated sites
  - ✦ Provides the financial resources to remedy contaminated sites by collecting fees and fines for legal and illegal waste utilization and disposal measures → promotion of measures aiming for a re-use of waste over others like combustion



# Case Study Vorarlberg - Overview



- Overall waste wood generation: 48,000 t/a
- Waste wood treatment infrastructure:
  - Several local waste collection centres, where also waste wood is sorted and treated
  - 1 waste wood incineration plant with a capacity of about 15,000 tons per year.
  - There is no particle board industry in Vorarlberg, so a large amount of waste wood is transported to a large particle board manufacturer in Tyrol, the province east of Vorarlberg and other particle board manufacturers
  - A small amount of the waste wood is also used in composting.



# Case Study Vorarlberg – Waste Wood Incineration Plant (I)

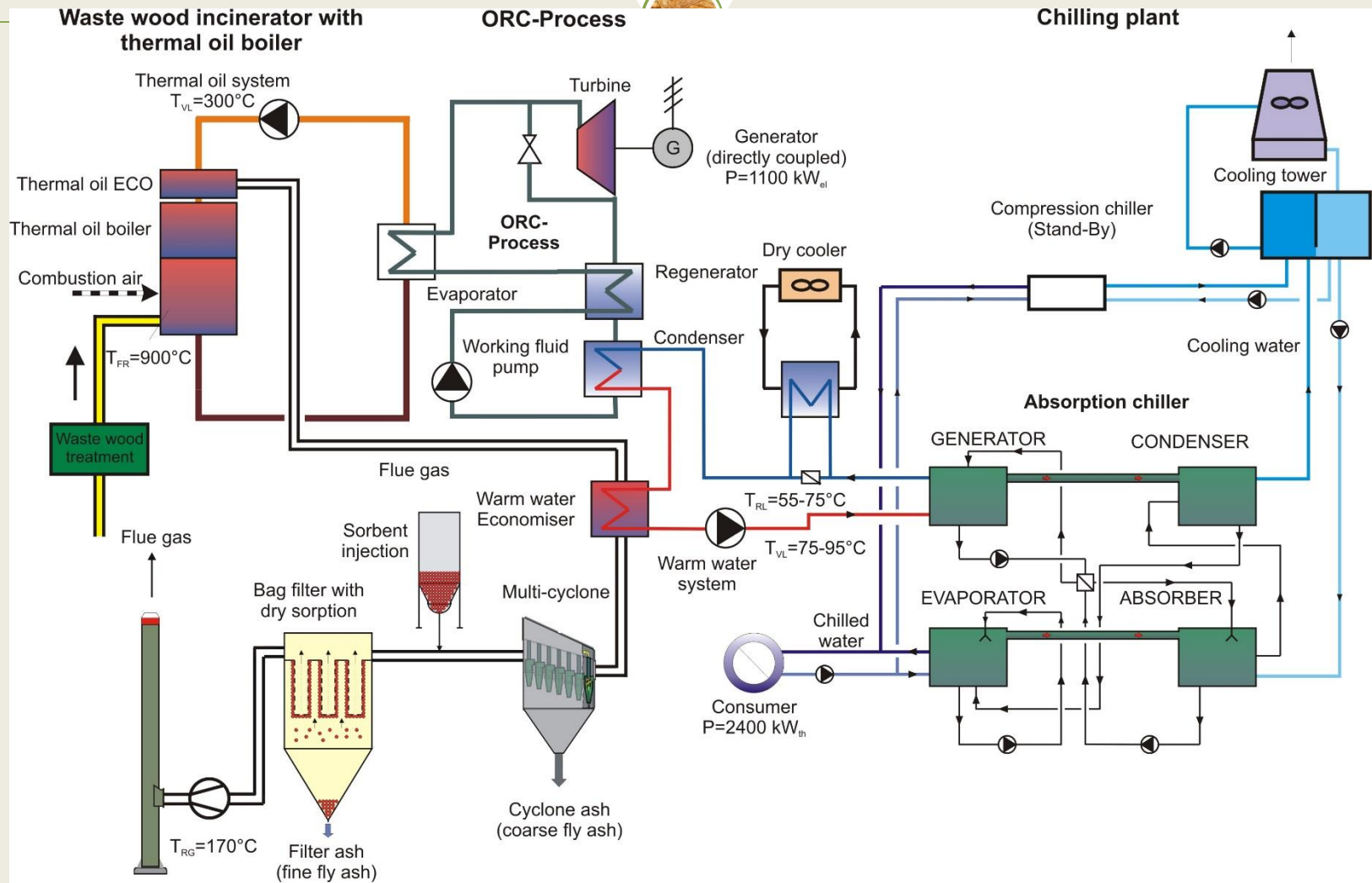


- Waste wood-fired combined heat, cooling and power plant based on an ORC process
  - Utilizes 15,000 tons of quality sorted waste wood per year
  - Waste wood is treated in a specific treatment plant before it enters the combustion plant
  - Thermal capacity of the furnace: 7,800 kW
  - Electric capacity: 1,150 kW
  - Thermal capacity available for heating and cooling: 6,000 kW
  - Start of operation: 2002
  - Operated by a limited liability company that is specialised in waste collection, treatment and reutilization





# Case Study Vorarlberg – Waste Wood Incineration Plant (II)



# Case Study Vorarlberg – Waste Wood Incineration Plant (III)



- Main waste wood categories utilized
  - municipal bulky waste from waste collection centres
  - demolition wood
  - packaging (pallets etc.) and other used wood products
  - x No waste wood containing halogenated organic compounds or wood preservatives
- Waste wood sources/suppliers
  - The operator itself, since it collects waste wood in several municipal and industrial waste collection centres. There, the waste wood is pre-sorted by using an excavator with a grab. The pre-treated waste is then transported to the waste wood treatment plant at the CHP plant.



# Case Study Vorarlberg – Waste Wood Incineration Plant (IV)



- Waste wood treatment plant

1. Coarse grinding
  2. Ferreous metal separation
  3. Fine grinding
  4. Ferreous metal separation
  5. Non-ferreous metal separation
  6. Fine particle separation
- Especially the removal of non-ferreous metals is very important for a smooth operation of the incineration plant (to avoid damage to plant components and slagging in the combustion zone)



# Case Study Vorarlberg – Waste Wood Incineration Plant (V)



- Operational Knowledge
  - *Waste wood treatment plant:* quality of treated waste wood is good but frequent stops are necessary to remove metal pieces that block the sieves. In addition, the capacity of the non-ferrous metal removal is smaller than the treatment steps before, leading to capacity problems.
  - *Waste wood incineration plant:* about half a year after the start of operation, a leakage in the thermal oil-cooled secondary combustion chamber (caused by wrongly dimensioned expansion joint) led to a fire that destroyed most of the plant. In 2003, the plant was rebuilt with an improved design of the thermal oil boiler system. Since then, the plant reaches about 7,500 operating hours per year.



# Case Study Vorarlberg – Waste Wood Incineration Plant (VI)



- Causes of its success
  - At the time the project was initiated increased feed-in tariffs for biomass-fired CHP plants in Austria were available (the period with increased feed-in tariffs ended 2015)
  - A constant base load for the heat demand was given, leading to better economic feasibility compared to a power only generation plant
  - Funding by the Austrian Bank for Infrastructure (Kommunal-kredit) with 30% of the investment costs
  - Legal framework conditions that prohibit the disposal of waste wood on landfills provide a rather constant supply of waste wood (however, the RWO 2012 put some pressure on the waste wood to energy market).





# Case Study Styria - Overview



- Overall waste wood generation: 157,300 t/a
- Waste wood treatment infrastructure:
  - Several local waste collection centres, where also waste wood is sorted and treated
  - 1 waste wood incineration plant with a capacity of about 15,000 tons per year (currently out of operation).
  - There is no particle board industry in Styria, so a large amount of waste wood is transported to large particle board manufacturers located in other Austrian provinces (Carinthia, Salzburg and Tyrol)
  - A small amount of the waste wood is also re-used in furniture and building construction and in composting.



# Case Study Styria – Data (I)



- It is difficult to find a specific success story in Styria, since there are no big players in the region
- However, the overall statistics of Styria give a good example, how legal framework conditions can lead to a successful utilization of a waste stream that was mainly landfilled 15 years ago
- In 2015, 100% of the waste wood collected was reused/recycled or thermally utilized.



# Case Study Styria – Data (II)



- Waste wood sources and their end use in Styria

Source	Total t/a	Reuse/ recycling t/a	Composting t/a	Thermal utilizaiton t/a
Municipal	32.500	22.400	200	9.800
Trade and Industry	52.800	36.400	400	16.000
Saw dust, shavings, untreated	67.800	67.800	0	0
Cuttings, untreated	4.200	4.200	0	0
<b>Total</b>	<b>157.300</b>	<b>130.800</b>	<b>600</b>	<b>25.900</b>
	100,00%	83,15%	0,38%	16,47%

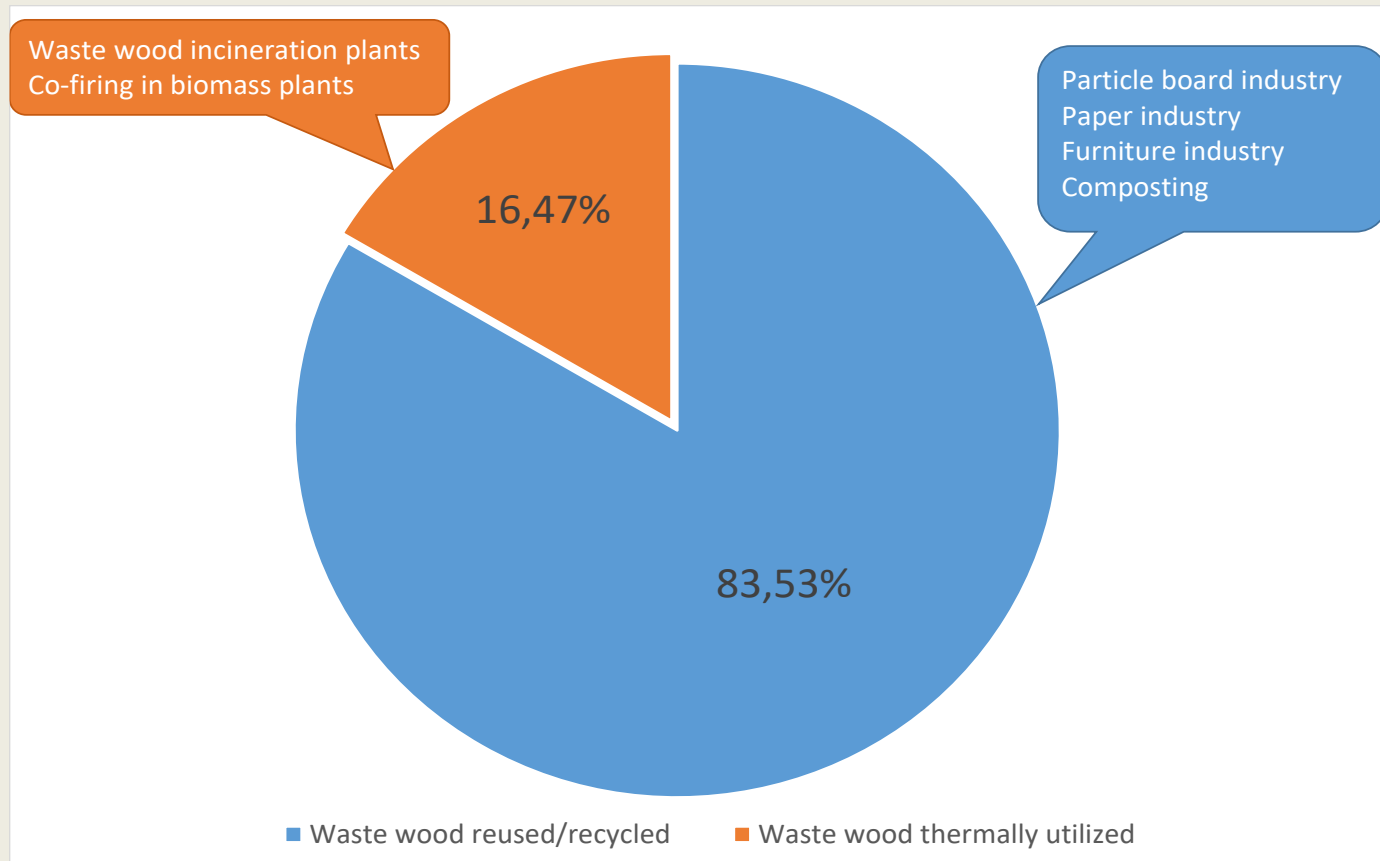




# Case Study Styria – Data (III)



## • Waste wood utilization in Styria



# Case Study Styria



- Causes of its success
  - Current legal framework conditions that prohibit the disposal of waste wood on landfills (LO) and promote the use of waste wood in wood products such as particle board, ply wood or OSB (RWO).
  - A dense net of municipal waste collection centres and the foundation or expansion of commercial waste management operations promoted by the WML 2002.
  - Short distances to the next waste collection centre for private suppliers and the wide range of waste management services commercial and industrial waste wood suppliers can choose from enable an easy and convenient manipulation, sorting, treatment and end-use of waste wood in Styria.



# Summary and Conclusions



- The situation in Vorarlberg and Styria shows that with the right legal framework conditions the reuse/recycling or thermal utilization of waste wood can be promoted successfully.
- But not only the legal regulations themselves are important but also the establishment of a successful waste management system (WMS) is inevitable. The WMS covers municipal (via waste collection centres of the communities) and commercial/ industrial waste wood (via waste wood management operation and services) streams and provides the infrastructure and logistics needed to collect, sort and treat the waste wood streams in a way that the highest possible added value for the communities and industries can be generated.





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