

**EPIS LIFE CYCLE INVENTORY DATA FOR NORTHERN BLEACHED SOFTWOOD KRAFT PULP (NBSK)
2020 and 2015 data**

16 mills' weighted averages			
	2020	2015	change
PRODUCTION, AIR DRY METRIC TONS/YEAR	551189	323581	70 %
- Water (moisture) content, %	10	10	0 %
ENERGY SOLD			
- Electricity sold, MWh/ton	0,394	0,278	42 %
- Steam, GJ/ton	0,934	0,933	0 %
- Warm water, GJ/ton	0,069	0,072	-5 %
BY-PRODUCTS SOLD, in tons/ton			
- Tall oil	0,030	0,032	-6 %
- Turpentine	0,001	0,001	32 %
- Bark	0,192	0,028	588 %
- Saw dust	0,0005	0,003	-82 %
- Fiber reject	0,002	0,004	-50 %
- Lime sludge	0,009	0,003	185 %
- Methanol	0,003	0	
- White liquor	0,00001	0	
WOOD INPUT, in m3/ton			
- SPECIES 1, SCOTS PINE (<i>Pinus sylvestris</i>)			
- input in dry tons/ton	0,5950		
WOOD TRANSPORT FOR PINE			
- lorry / road, %	62		
-- transport distance	109		
- inland water, %			
-- transport distance			
- railway, %	40		
-- transport distance	268		
- ship, %	25		
-- transport distance	387		
- see barge, %			
-- transport distance			
- SPECIES 2, NORWAY SPRUCE (<i>Picea abies</i>)			
- input in dry tons/ton	0,2840		
WOOD TRANSPORT FOR SPRUCE			
- lorry / road, %	67		
-- transport distance, km	110		
- inland water, %			
-- transport distance, km			
- railway, %	36		
-- transport distance, km	281		
- ship, %	33		
-- transport distance, km	430		
- see barge, %			
-- transport distance, km			
- SPECIES 3, SPRUCE&PINE MIX			
- input in dry tons/ton	0,988		
WOOD TRANSPORT FOR SRUCE&PINE MIX			
- lorry / road, %	81		
-- transport distance, km	97		
- inland water, %	5		
-- transport distance, km	281		
- railway, %	47		
-- transport distance, km	262		
- ship, %	69		
-- transport distance, km	320		
- see barge, %			
-- transport distance, km			
- SPECIES 4, DOUGLAS FIR/LARCH (<i>Pseudotsuga menziesii</i> / <i>Larix decidua</i>)			
- input in dry tons/ton	0,0004		
WOOD TRANSPORT FOR FIR/LARCH			
- lorry / road, %	100		
-- transport distance, km	104		
- inland water, %			
-- transport distance, km			
- railway, %			
-- transport distance, km			
- ship, %			
-- transport distance, km			
- see barge, %			
-- transport distance, km			

WOOD CHIPS, in dry tons/ton

- SW (spruce&pine mix)	0,2192
- lorry / road, %	81
-- transport distance, km	93
- inland water, %	5
-- transport distance, km	281
- railway, %	24
-- transport distance, km	317
- ship, %	9
-- transport distance, km	900
- see barge, %	
-- transport distance, km	

SAW MILL RESIDUES, in dry tons/ton

- SW (pine&spruce mix)

chips as Bdt/Adt assuming 50% moisture	0,2260
- lorry / road, %	67
-- transport distance, km	115
- inland water, %	
-- transport distance, km	
- railway, %	58
-- transport distance, km	268
- ship, %	61
-- transport distance, km	335
- see barge, %	
-- transport distance, km	

TOTAL WOOD INPUT IN Bdt/Adt	2,264	2,240	1 %
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CERTIFICATION OF WOOD INPUTS

- share certified, %	92	93	-1 %
-% CoC certified under a forest management system	84	84	0 %
-% FSC	33	29	13 %
-% FSC CW	74	58	28 %
-% PEFC	59	63	-6 %
-% PEFC Controlled Sources	95	35	170 %

ENERGY INPUTS, MJ/ton**Internal supply**

Biofuel - Biogas	55	65	-16 %
Biofuel - Bark (wet weight)	1952	716	173 %
Biofuel - Black liquor	18349	17001	8 %
Biofuel - Sludge	61	24	160 %
Scrap wood (wet weight)	0	0	
Hydrogen	0	0	
Methanol	145	354	-59 %
Biofuel - Biomass	6	173	-96 %
Biofuel - Biomass - pitch oil/tall oil pitch	229	0	
Biofuel - Biomass - wood residuals	84	0	
Other	0	152	-100 %

External supply

Biofuel - Biogas	89	0	
Biofuel - Bark	173	28	510 %
Biofuel - Black liquor	0	0	
Biofuel - Sludge	0	0	
Tall oil pitch	120	55	119 %
Recycled fuel	2	0	
Wood pellets	160	113	41 %
Natural gas	421	505	-17 %
Heavy fuel oil	300	335	-10 %
Light fuel oil	23	115	-80 %
Diesel oil	0	0	
Hard coal	2	0	
Coke	0	0	
Brown coal (lignite)	0	0	
Brown coal briquettes	0	0	
LPG	0	0	
Peat	0	0	
Methanol	0	3	-100 %
Other (sodium formiate)	6	0	
Other (lignin powder)	0	22	-100 %
TOTAL RENEWABLE	21422	18682	95 %
TOTAL INPUTS	22176	19662	13 %

ELECTRICITY, MJ/ton**Type of electricity**

On-site generation, MJ/ton	3731	3313	13 %
Grid supply, MJ/ton	127	163	-22 %
Export to grid, MJ/ton	1419	995	43 %
Total electricity consumption, MJ/ton produced	2440	2353	4 %

TYPE OF STEAM, tot. quantity in MJ/ton

On-site generation, MJ/ton	14710	16519	-11 %
External supply, MJ/ton	39	0,03	151140 %
Export to external system, e.g. district heating net, M	942	891	6 %
Total steam consumption, MJ/ton produced	11820	13355	-11 %
AIR EMISSIONS, in kg/ton			
Dust (unspecified)	0,22	0,32	-32 %
Dust (particle < 2,5 um)	n.m.	n.m.	
Dust (particle > 2,5 and <10 um)	n.m.	n.m.	
Dust (particle > 10 um)	n.m.	n.m.	
CO2 (fossil)	53,68	77,53	-31 %
CO2 (biomass)	2484	2535,30	-2 %
CO	n.m.	1,63	
SOx (as SO2)	0,16	0,25	-36 %
NOx	1,48	1,59	-7 %
TRS (as S)*	0,04	0,08	-47 %
SO2 (reported as S)	0,10		
Particulate Matter (filterable)	n.m.		
*TRS = Total Reduced Sulphur Compounds			
WATER INPUTS , m3/ton			
Ground water , m3/ton	72	78	-8 %
Surface water, m3/ton	0	0,004	-100 %
Surface water, m3/ton	72	78	-8 %
Municipal water supply, m3/ton	0	0,022	-100 %
WATER OUTPUTS, m3/ton			
Cooling water, m3/ton	69	76	-9 %
Cooling water, m3/ton	42	42	0 %
Process water, m3/ton	28	34	-20 %
TOTAL SUBSTANCES IN PROCESS WATER, in kg/ton			
Chemical Oxygen Demand (CODCr)	11,406	12,632	-10 %
Biological Oxygen Demand (BOD 5)	0,408	0,328	24 %
Total suspended solids	0,778	0,803	-3 %
Dissolved Organic Carbon (DOC)	n.m.	n.m.	
Total Organic Carbon (TOC)	4,080	4,219	-3 %
Total Nitrogen	0,120	0,141	-15 %
Total Phosphorus	0,012	0,015	-18 %
AOX as Cl-	0,083	0,071	17 %
MAIN CHEMICALS THAT ARE USED, as dry mass in kg/ton			
Calcium oxide (CaO)	13,51	11,95	13 %
Hydrogen peroxide (H2O2)	10,64	14,61	-27 %
Oxygen (O2)	21,64	28,04	-23 %
Sodium chlorate (NaClO3)	12,42	13,83	-10 %
Sodium hydroxide (NaOH)	29,03	32,07	-9 %
Sulphuric acid (H2SO4)	26,94	32,88	-18 %
Other chemicals	14,40	9,70	48 %
TOTAL CHEMICALS	129	143	-10 %
WASTE FROM THE PROCESS - in kg/ton			
ashes	5,0	6,35	-21 %
green liquor sludge	14,7	9,24	59 %
lime mud	2,3	5,55	-59 %
lubricant residues	0,5	0,02	2817 %
lubricant oil	0,01	0,01	-27 %
phosphorous precipitation sludge			
waste water cooling towers filling			
sand from debarking		0,14	-100 %
Other, please specify	0,001		
fibre (primary sludge)	1,4	1,07	34 %
biological treatment sludge	0,4	0,24	81 %
bark and wood	1,0	19,09	-95 %
wood	0,04		
safety and equalization basins sludge		0,00	
water treatment sludge	1,0	0,00	
Other, please specify	1,1		
recovered paper		0,03	-100 %
reel cover and cores		0,26	-100 %
waste packaging	0,1	0,01	547 %
metals	0,3	0,54	-45 %
electric batteries	0,2	0,00	23274 %
Recycling/Recovery (as material)electrical device	0,001	0,43	-100 %
plastic	0,005	0,00	
domestic waste	0,1	0,05	100 %
hazardous waste	0,2	0,00	5027 %
Other, please specify	2,9		
GENERAL TRASH INORGANIC		0,02	-100 %
GENERAL TRASH ORGANIC		0,02	-100 %
CONSTRUCTION & DEMOLITION WASTE		0,08	-100 %
TOTAL WASTE	31	43	-27 %