CONSIDERATION OF THE CUMULATED ENERGY DEMAND OF DIFFERENT TERRACE DECKING TYPES

Rank	Wood Species	Cumulated Energy Demand Sawn Timber KD 15%	Transports till Arrival in EU Region		Energy Demand Transportation*	Processing		Usage	ENERGY DEMAND PER YEAR
		kWh/kg	Ship (km)	Truck (km)	kWh/kg	Description	kWh/kg	Years	kWh/kg
1	Ipe South America	1,83	*10.000*	*1.000*	0,68	*Planing*	0,4	30	**0,097**
2	Robinia Central Europe	1,83	*0*	*1.000*	0,36	*Planing*	0,4	25	**0,104**
3	Thermo-Ash Central Europe	1,83	*0*	*1.000*	0,36	*Thermo treatment, Planing*	1,00	30	**0,106**
4	Thermo-Ash North America	1,83	*6.000*	*1.000*	0,55	*Thermo treatment, Planing*	1,00	30	**0,113**
5	Oak Central Europe	1,83	*0*	*1.000*	0,36	*Planing*	0,4	20	**0,130**
6	Thermo-Ash Eastern Europe	1,83	*0*	*3.000*	1,08	*Thermo treatment, Planing*	1,00	30	**0,130**
7	Oak North America	1,83	*6.000*	*1.000*	0,55	*Planing*	0,4	20	**0,139**
8	WPC Central Europe	2,50	*0*	*1.000*	0,36	*Extrusion*	1,7	30	**0,152**
9	Larch Central Europe	1,23	*0*	*1.000*	0,36	*Planing*	0,4	13	**0,153**
10	Douglas Fir Central Europe	1,23	*0*	*1.000*	0,36	*Planing*	0,4	13	**0,153**
11	Bangkirai Indonesia	1,83	*15.000*	*1.000*	0,84	*Planing*	0,4	20	**0,154**
12	WPC North America	2,50	*6.000*	*1.000*	0,55	*Extrusion*	1,7	30	**0,158**
13	Oak Eastern Europe	1,83	*0*	*3.000*	1,08	*Planing*	0,4	20	**0,166**
14	Douglas Fir North America	1,23	*6.000*	*1.000*	0,55	*Planing*	0,4	13	**0,168**
15	Pine impregnated Central Europe	1,23	*0*	*1.000*	0,36	*Impregantion, Planing*	1,00	13	**0,199**
16	Pine impregnated Eastern Europe	1,23	*0*	*3.000*	1,08	*Impregnation, Planing*	1,00	13	**0,255**
17	Larch Siberia	1,23	*0*	*6.000*	2,16	*Planing*	0,4	13	**0,292**

*Ship 0,000032 kWh/kg*km; Truck 0,00036 kWh/kg*km

ASSUMPTIONS:

1) The terrace deckings are not coated during usage. If coating would be considered, thermo-ash would perform better due to its reduced swelling & shrinking behavior. Coatings stay longer on surfaces that show low movement. Reduced consumption of paints reduces also the energy demand for the production of these paints and thereby contributes directly to the energy balance of terrace deckings.

2) It is assumed that 1 kg of each wood species covers about the same area. In most cases this is not true due to different densities of wood species. If different densities would be respected, the heavier species would perform worse due to the additional energy consumption from transportation.

3) As truck we assume a modern trailer truck corresponding to EU norms of the year 2010. One can assume that truck transports outside the EU area come with higher energy demands due to poor vehicle technology and road infrastructure. If this issue would be precisely accounted for, a species like Siberian Larch would perform worse.

4) For impregnated pine the energy demand for producing the impregnation agent hasn't been considered. If this aspect would be considered as well, impregnated pine would perform worse.

5) For WPC products the plastics content is assumed to be 50%. The wood content is not accounted for at all. Most WPC products bear a higher plastics content than 50%, which would lead to a worse energy balance than described here.

6) For all transports we assume the transport of finished products. In reality, most tropical hardwoods as well as most wood species from Eastern Europe and Russia are transported in fresh undried condition. North American and Central European wood species are shipped usually in dry state. If this aspect would be considered, fluctuations of up to 50% could occur for the energy demand for transportation.

DATA SOURCES:

Data are taken from the ProBas database maintained by German Federal Institute for the Environment (Umweltbundesamt) and the German Ökoinstitut. Other data is taken from the European Plastics Manufacturer's Association (APME), verified by Umweltbundesamt, respectively are calculated from these data sources.