SRIP MATPRO

Gospodarska zbornica Slovenije

REPUBLIKA SLOVENIJA
MINISTRSTVO ZA GOSPODARSKI RAZVOJ IN TEHNOLOGIJO

EVROPSKA UNIJA
EVROPSKI SKLAD ZA REGIONALNI RAZVOJ
NALOŽBA V VAŠO PRIHODNOST

Posvet SRIP MATPRO 2022

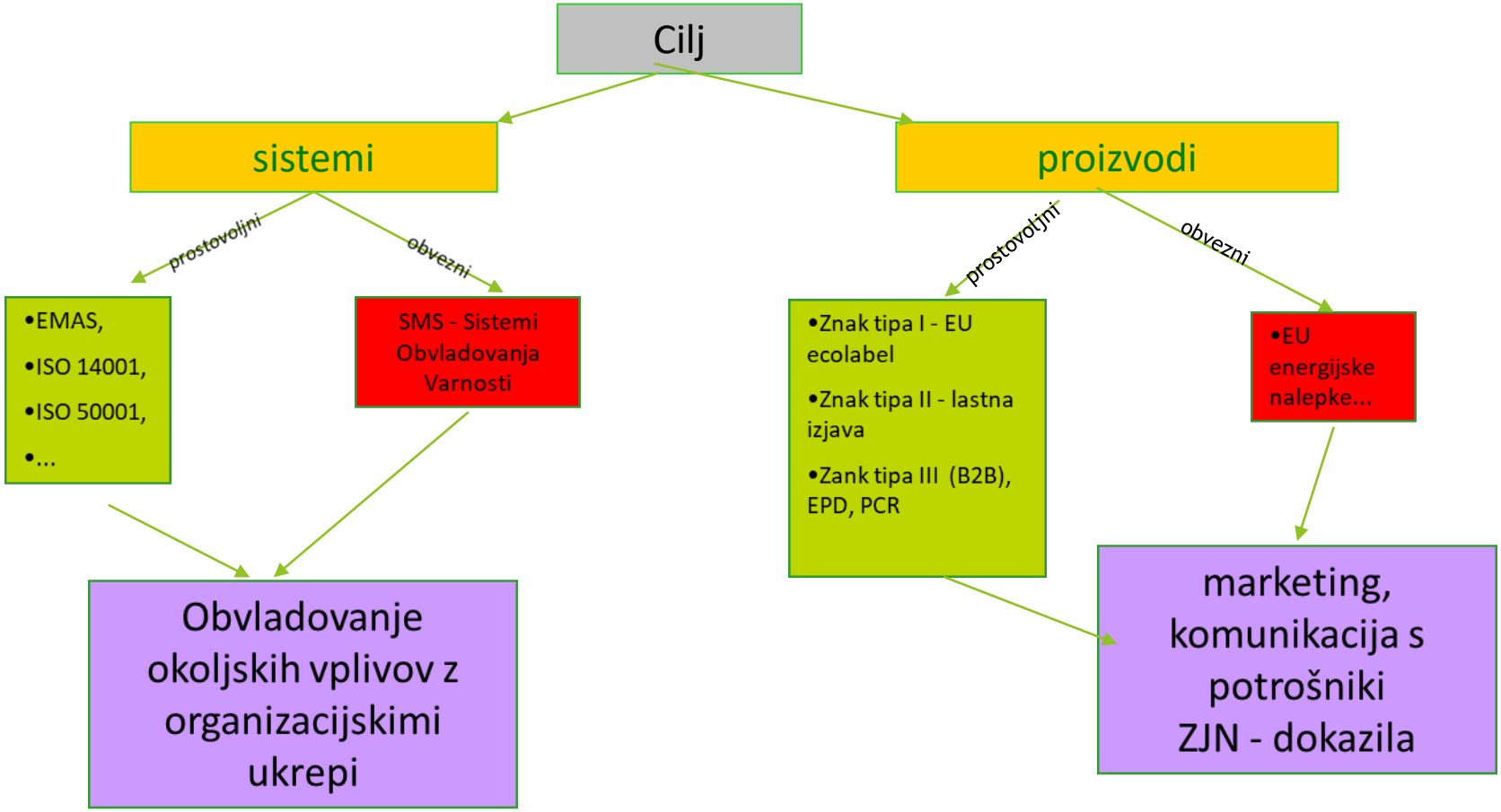
„Pot do zelenega proizvoda – trajnost izven okvirjev“

Pilotne študije EU za različne proizvode PEF (Product Environmental Footprint), Antonija Božič Cerar, GZS

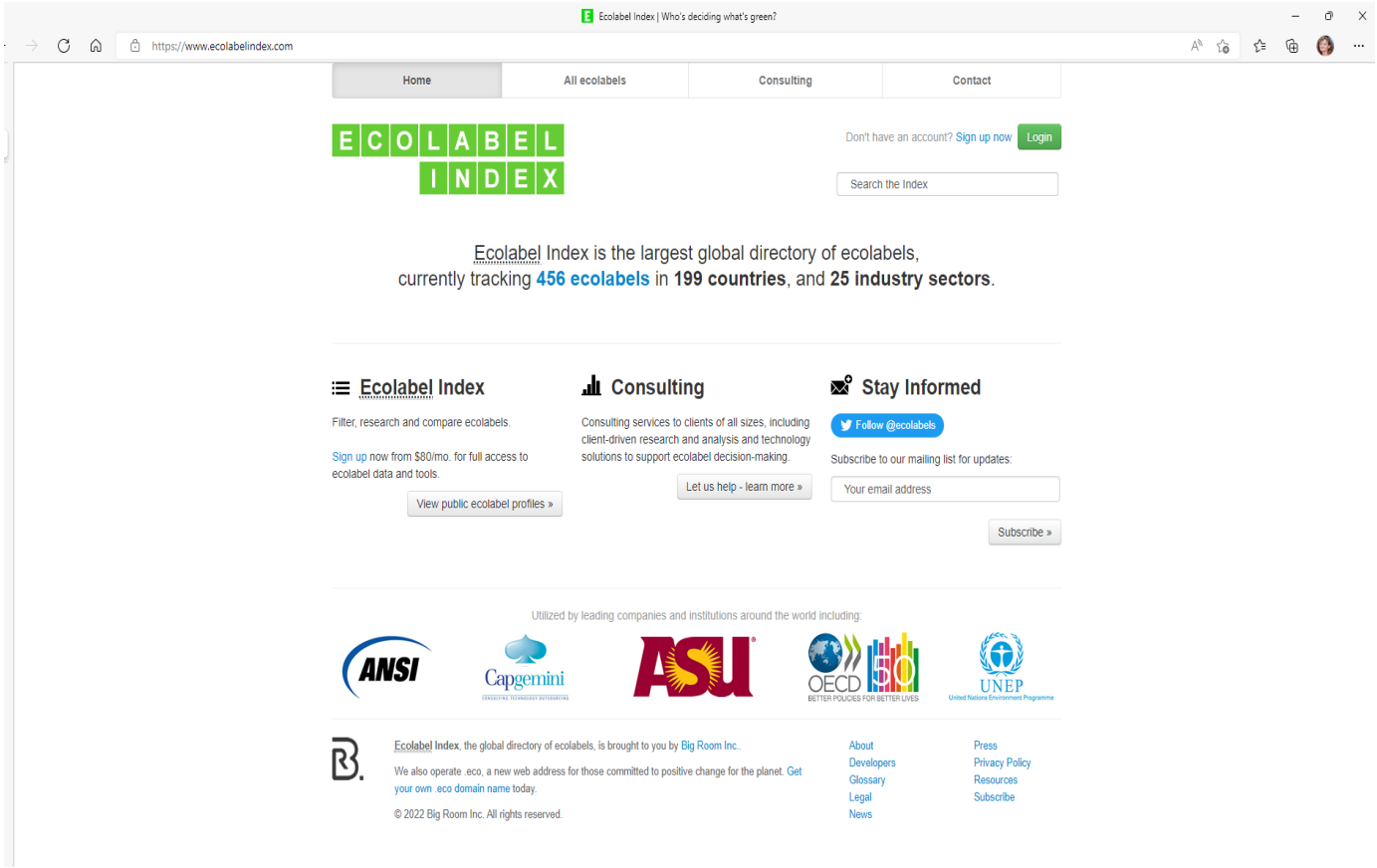
Portorož, Hotel Bernardin, 13. oktober 2022

Operacijo delno financira Evropska unija iz Evropskega sklada za regionalni razvoj. Operacija se izvaja v okviru *Prednostne naložbe: 1.2.»Spodbujanje naložb podjetij v raziskave in inovacije ter vzpostavljanje povezav in sinergij med podjetji, centri za raziskave in razvoj ter visokošolskim izobraževalnim sektorjem, zlasti s spodbujanjem naložb na področju razvoja izdelkov in storitev, prenosa tehnologij, socialnih in ekoloških inovacij, aplikacij javnih storitev, spodbujanjem povpraševanja, mreženja, grozdov in odprtih inovacij prek pametne specializacije ter podpiranjem tehnoloških in uporabnih raziskav, pilotnih linij, ukrepov za zgodnje ovrednotenje izdelkov, naprednih proizvodnih zmogljivosti in prve proizvodnje zlasti na področju ključnih spodbujevalnih tehnologij ter razširjanje tehnologij za splošno rabo«.*

razvoj okoljskih standardov



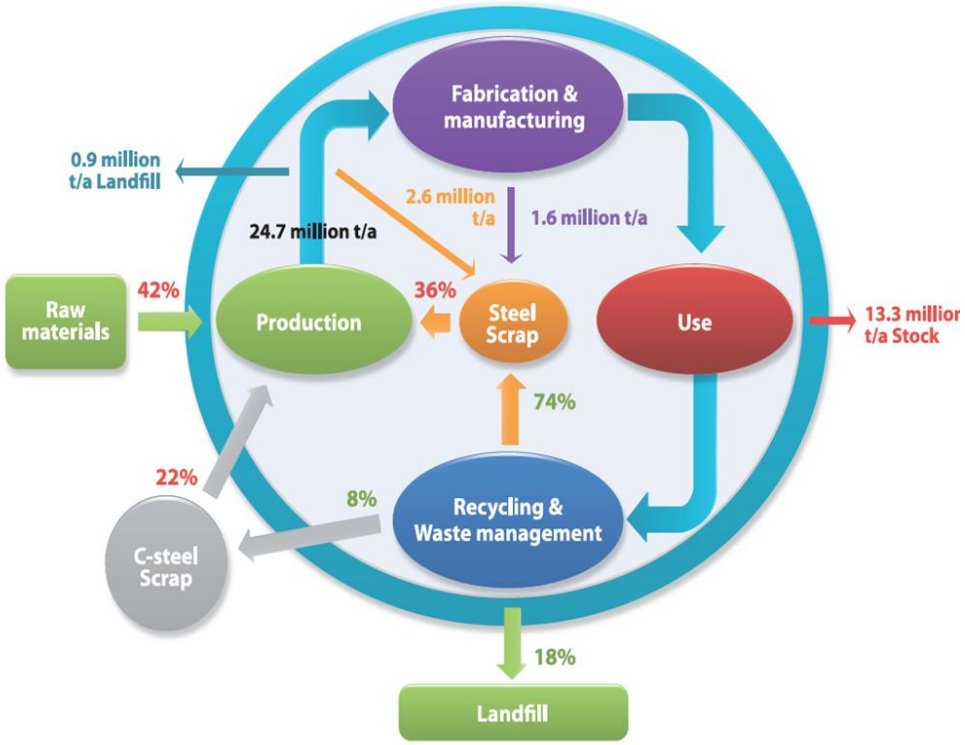
okoljske oznake



okoljske oznake in deklaracije

•ne smejo biti zavajajoče ali predstavljati tržno oviro ,
•morajo biti točne, preverljive,
•ne smejo povzročati zmedo na trgu,
•osnovane morajo bi na znanstveni metodologiji in morajo biti skladne tudi z vidika vplivov proizvoda skozi njegov življenjski krog, čeprav ni nujno, da se za vsako vrsto oznake ali deklaracije izdela podrobna ocena življenjskega kroga
•ne smejo biti nejasne in preveč splošne:" okolju prijazno", "zeleno" itd

primer življenjskega cikla



SRIP MATPRO

Gospodarska zbornica Slovenije

REPUBLIKA SLOVENIJA
MINISTRSTVO ZA GOSPODARSKI RAZVOJ IN TEHNOLOGIJO

EVROPSKA UNIJA
EVROPSKI SKLAD ZA REGIONALNI RAZVOJ
NALOŽBA V VAŠO PRIHODNOST

ocenjevanje življenjskega kroga

Vsi proizvodi, izdelki in tudi storitve, imajo vpliv na okolje.

Življenjski krog proizvoda je zaporedje medsebojno povezanih faz skozi celotno vrednostno verigo proizvoda, od nakupa in prevoza surovin ter primarnih proizvodov, proizvodnje, distribucije, uporabe do reciklaže in njegove končne odstranitve.

Osnovno metodologijo za ocenjevanje vpliva proizvodov na okolje skozi njihov življenjski krog/Life Cycle Assessment (LCA) določata standarda ISO 14040:2006 in ISO 14044:2006.

The Six Blind Men and the Elephant.

plenice, pralne ali za enkratno uporabo?

- 1990 – The American Paper Institute določi, da so za enkratno uporabo boljše. (LCA: Franklin Associates)
- 1991 – The National Association of Diaper Services ugotovi, da so pralne boljše. (LCA: Lehrberger & Jones)
- 1992 – Procter & Gamble ponovno ugotovi, da so za enkratno uporabo boljše.. (LCAA. D. Little)
- 1992 – Nova LCA Franklin Associates, zaključi, da je odgovor odvisen od tega kaj spremljaš, porabo energije, vode ali nastajanja trdnih odpadkov

okoljski odtisi organizacije / izdelka

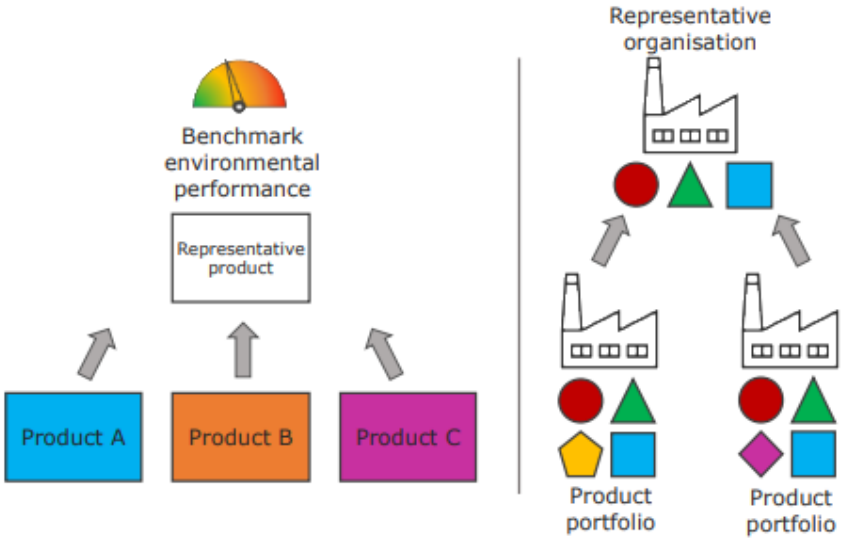


Figure 7. Representative product and benchmark, and representative organization (average based on technology and market share)

21 sektorskih okoljskih odtisov

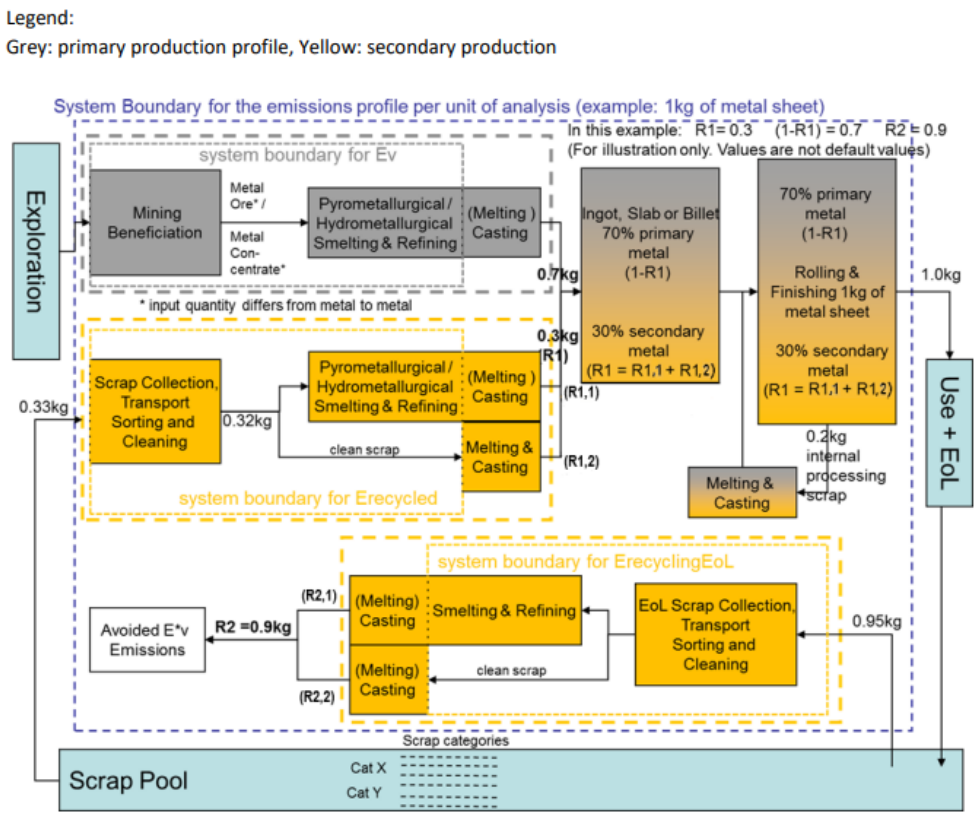
Existing **PEFCRs** are reported below. The whole documentation is available here.

Beer	Dairy	Household liquid laundry detergents	Decorative paints
			
Hot and cold water supply pipe systems	Intermediate paper product	Feed for food producing animals	IT equipment
			
Leather	Metal sheets	Packed water	Pasta
			
Pet Food	Photovoltaic electricity production	Rechargeable batteries	T-shirt
			
Thermal insulation	Uninterrupted Power Supply	Wine	PEFCRs under development
			

referenčni proizvodi - pločevine

- za gradnjo
  - Jeklo
  - Svinec
  - Baker
  - Aluminij
- za proizvodnjo naprav
  - Aluminij
  - Jeklo

določitev meje sistema



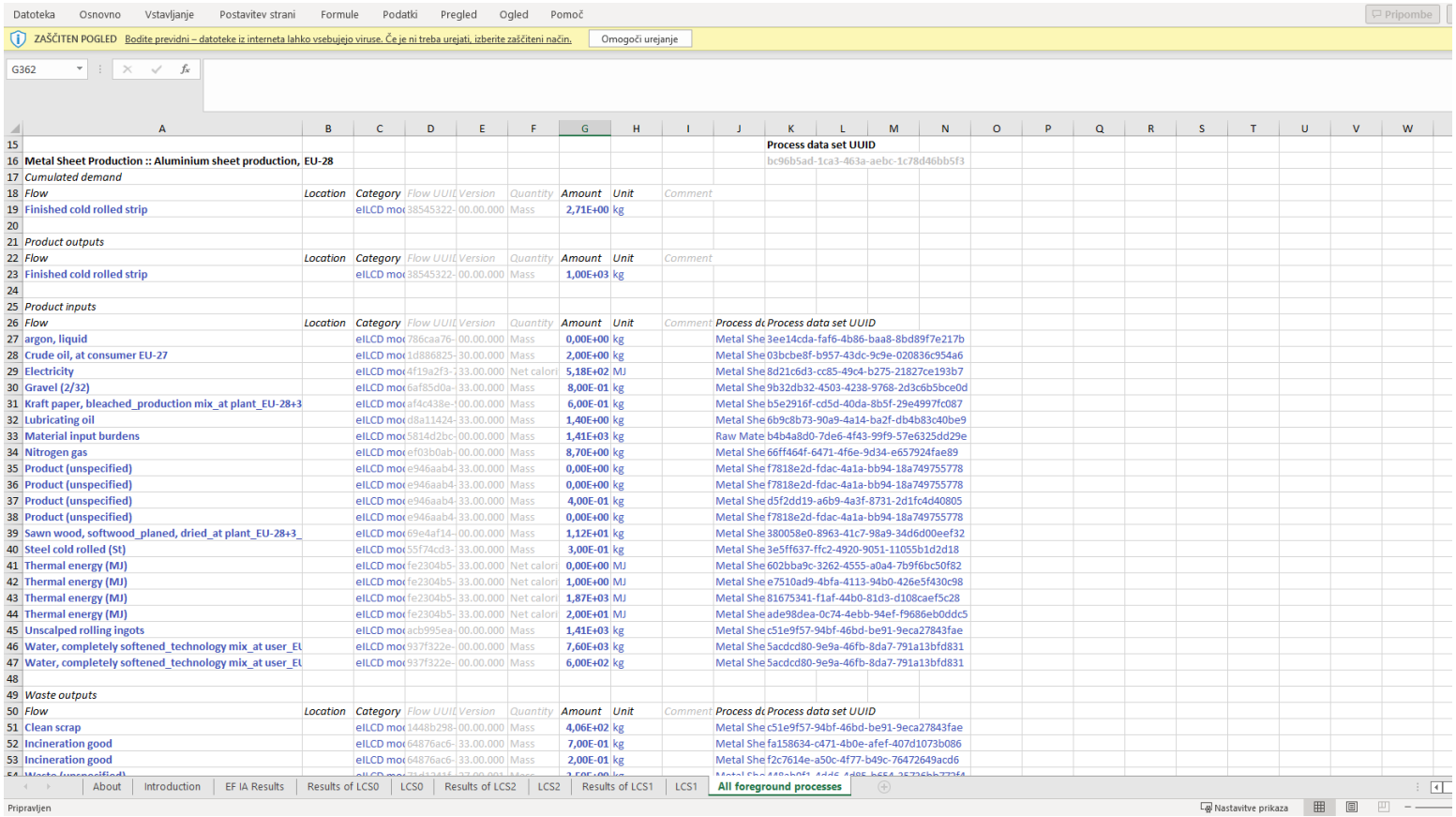
SRIP MATPRO

Gospodarska zbornica Slovenije

REPUBLIKA SLOVENIJA
MINISTRSTVO ZA GOSPODARSKI RAZVOJ IN TEHNOLOGIJO

EVROPSKA UNIJA
EVROPSKI SKLAD ZA REGIONALNI RAZVOJ
NALOŽBA V VAŠO PRIHODNOST

materialni, energijski in odpadni tokovi



Datoteka Osnovno Vstavljanje Postavitev strani Formule Podatki Pregled Ogled Pomoč

ZAŠČITEN POGLED Bodite previdni – datoteke iz interneta lahko vsebujejo viruse. Če je ni treba urejati, izberite zaščiteni način. Omogoči urejanje

G362

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
15											Process data set UUID			
16	**Metal Sheet Production :: Aluminium sheet production, EU-28**										bc96b5ad-1ca3-463a-aebc-1c78d46bb5f3			
17	*Cumulated demand*													
18	*Flow*	*Location*	*Category*	*Flow UUI*	*Version*	*Quantity*	*Amount*	*Unit*	*Comment*					
19	Finished cold rolled strip		eILCD mo	38545322-	00.00.000	Mass	2,71E+00	kg						
20														
21	*Product outputs*													
22	*Flow*	*Location*	*Category*	*Flow UUI*	*Version*	*Quantity*	*Amount*	*Unit*	*Comment*					
23	Finished cold rolled strip		eILCD mo	38545322-	00.00.000	Mass	1,00E+03	kg						
24														
25	*Product inputs*													
26	*Flow*	*Location*	*Category*	*Flow UUI*	*Version*	*Quantity*	*Amount*	*Unit*	*Comment*	*Process da*	*Process data set UUID*			
27	argon, liquid		eILCD mo	786caa76-	00.00.000	Mass	0,00E+00	kg		Metal She	3ee14cda-faf6-4b86-baa8-8bd89f7e217b			
28	Crude oil, at consumer EU-27		eILCD mo	1d886825-	30.00.000	Mass	2,00E+00	kg		Metal She	03bcbe8f-b957-43dc-9c9e-020836c954a6			
29	Electricity		eILCD mo	4f19a2f3-	33.00.000	Net calori	5,18E+02	MJ		Metal She	8d21c6d3-cc85-49c4-b275-21827ce193b7			
30	Gravel (2/32)		eILCD mo	6af85d0a-	33.00.000	Mass	8,00E-01	kg		Metal She	9b32db32-4503-4238-9768-2d3c6b5bce0d			
31	Kraft paper, bleached_production mix_at plant_EU-28+3		eILCD mo	af4c438e-	00.00.000	Mass	6,00E-01	kg		Metal She	b5e2916f-cd5d-40da-8b5f-29e4997fc087			
32	Lubricating oil		eILCD mo	d8a11424-	33.00.000	Mass	1,40E+00	kg		Metal She	6b9c8b73-90a9-4a14-ba2f-db4b83c40be9			
33	Material input burdens		eILCD mo	5814d2bc-	00.00.000	Mass	1,41E+03	kg		Raw Mate	b4b4a8d0-7de6-4f43-99f9-57e6325dd29e			
34	Nitrogen gas		eILCD mo	ef03b0ab-	00.00.000	Mass	8,70E+00	kg		Metal She	66ff464f-6471-4f6e-9d34-e657924fae89			
35	Product (unspecified)		eILCD mo	e946aab4-	33.00.000	Mass	0,00E+00	kg		Metal She	f7818e2d-fdac-4a1a-bb94-18a749755778			
36	Product (unspecified)		eILCD mo	e946aab4-	33.00.000	Mass	0,00E+00	kg		Metal She	f7818e2d-fdac-4a1a-bb94-18a749755778			
37	Product (unspecified)		eILCD mo	e946aab4-	33.00.000	Mass	4,00E-01	kg		Metal She	d5f2dd19-a6b9-4a3f-8731-2d1fc4d40805			
38	Product (unspecified)		eILCD mo	e946aab4-	33.00.000	Mass	0,00E+00	kg		Metal She	f7818e2d-fdac-4a1a-bb94-18a749755778			
39	Sawn wood, softwood_planed, dried_at plant_EU-28+3_		eILCD mo	69e4af14-	00.00.000	Mass	1,12E+01	kg		Metal She	380058e0-8963-41c7-98a9-34d6d00eef32			
40	Steel cold rolled (St)		eILCD mo	55f74cd3-	33.00.000	Mass	3,00E-01	kg		Metal She	3e5ff637-ffc2-4920-9051-11055b1d2d18			
41	Thermal energy (MJ)		eILCD mo	fe2304b5-	33.00.000	Net calori	0,00E+00	MJ		Metal She	602bba9c-3262-4555-a0a4-7b9f6bc50f82			
42	Thermal energy (MJ)		eILCD mo	fe2304b5-	33.00.000	Net calori	1,00E+00	MJ		Metal She	e7510ad9-4bfa-4113-94b0-426e5f430c98			
43	Thermal energy (MJ)		eILCD mo	fe2304b5-	33.00.000	Net calori	1,87E+03	MJ		Metal She	81675341-f1af-44b0-81d3-d108caef5c28			
44	Thermal energy (MJ)		eILCD mo	fe2304b5-	33.00.000	Net calori	2,00E+01	MJ		Metal She	ade98dea-0c74-4ebb-94ef-f9686eb0ddc5			
45	Unscalped rolling ingots		eILCD mo	acb995ea-	00.00.000	Mass	1,41E+03	kg		Metal She	c51e9f57-94bf-46bd-be91-9eca27843fae			
46	Water, completely softened_technology mix_at user_EU		eILCD mo	937f322e-	00.00.000	Mass	7,60E+03	kg		Metal She	5acdcd80-9e9a-46fb-8da7-791a13bfd831			
47	Water, completely softened_technology mix_at user_EU		eILCD mo	937f322e-	00.00.000	Mass	6,00E+02	kg		Metal She	5acdcd80-9e9a-46fb-8da7-791a13bfd831			
48														
49	*Waste outputs*													
50	*Flow*	*Location*	*Category*	*Flow UUI*	*Version*	*Quantity*	*Amount*	*Unit*	*Comment*	*Process da*	*Process data set UUID*			
51	Clean scrap		eILCD mo	1448b298-	00.00.000	Mass	4,06E+02	kg		Metal She	c51e9f57-94bf-46bd-be91-9eca27843fae			
52	Incineration good		eILCD mo	64876ac6-	33.00.000	Mass	7,00E-01	kg		Metal She	fa158634-c471-4b0e-afef-407d1073b086			
53	Incineration good		eILCD mo	64876ac6-	33.00.000	Mass	2,00E-01	kg		Metal She	f2c7614e-a50c-4f77-b49c-76472649acd6			

About | Introduction | EF IA Results | Results of LCS0 | LCS0 | Results of LCS2 | LCS2 | Results of LCS1 | LCS1 | All foreground processes

Pripravljen

Nastavitve prikaza

okoljski vplivi

Table 5. List of the impact categories to be used to calculate the PEF profile

Impact category	*Indicator*	*Unit*	*Recommended default LCIA method*
Climate change	*Radiative forcing as Global Warming Potential (GWP100)*	*kg $CO_{2\,eq}$*	*Baseline model of 100 years of the IPCC (based on IPCC 2013)*
Ozone depletion	*Ozone Depletion Potential (ODP)*	*kg CFC-11eq*	*Steady-state ODPs 1999 as in WMO assessment*
*Human toxicity, cancer**	*Comparative Toxic Unit for humans (CTU_h)*	*CTUh*	*USEtox model (Rosenbaum et al, 2008)*
*Human toxicity, non-cancer**	*Comparative Toxic Unit for humans (CTU_h)*	*CTUh*	*USEtox model (Rosenbaum et al, 2008)*
Particulate matter	*Impact on human health*	*disease incidence*	*UNEP recommended model (Fantke et al 2016)*
Ionising radiation, human health	*Human exposure efficiency relative to U^{235}*	*kBq $U^{235}{}_{eq}$*	*Human health effect model as developed by Dreicer et al. 1995 (Frischknecht et al, 2000)*
Photochemical ozone formation, human health	*Tropospheric ozone concentration increase*	*kg $NMVOC_{eq}$*	*LOTOS-EUROS model (Van Zelm et al, 2008) as implemented in ReCiPe*
Acidification	*Accumulated Exceedance (AE)*	*mol $H+_{eq}$*	*Accumulated Exceedance (Seppälä et al. 2006, Posch et al, 2008)*
Eutrophication, terrestrial	*Accumulated Exceedance (AE)*	*mol N_{eq}*	*Accumulated Exceedance (Seppälä et al. 2006, Posch et al, 2008)*
Eutrophication, freshwater	*Fraction of nutrients reaching freshwater end compartment (P)*	*kg P_{eq}*	*EUTREND model (Struijs et al, 2009b) as implemented in ReCiPe*
Eutrophication, marine	*Fraction of nutrients reaching marine end compartment (N)*	*kg N_{eq} equivalent*	*EUTREND model (Struijs et al, 2009b) as implemented in ReCiPe*
*Ecotoxicity, freshwater**	*Comparative Toxic Unit for ecosystems (CTU_e)*	*CTUe*	*USEtox model, (Rosenbaum et al, 2008)*
Land use	• *Soil quality index*[9] • *Biotic production* • *Erosion resistance* • *Mechanical filtration*	• *Dimensionless (pt)* • *kg biotic production*[10] • *kg soil/(m^2*a)* • *m^3 water* • *m3 groundwater*	• *Soil quality index based on LANCA (EC-JRC)*[11] • *LANCA (Beck et al. 2010)* • *LANCA (Beck et al. 2010)* • *LANCA (Beck et al. 2010)*

[9] This index is the result of the aggregation, performed by JRC, of the 4 indicators provided by LANCA model as indicators for land use
[10] This refers to occupation. In case of transformation the LANCA indicators are without the year (a)
[11] Forthcoming document on the update of the recommended Impact Assessment methods and factors for the EF

okoljski vplivi

Impact category	*Indicator*	*Unit*	*Recommended default LCIA method*
	• *Groundwater replenishment*		• *LANCA (Beck et al. 2010)*
*Water use***	*User deprivation potential (deprivation-weighted water consumption)*	*m^3 world $_{eq}$*	*Available WAter REmaining (AWARE) Boulay et al., 2016*
Resource use, minerals and metals	*Abiotic resource depletion (ADP ultimate reserves)*	*kg Sb_{eq}*	*CML 2002 (Guinée et al., 2002) and van Oers et al. 2002.*
Resource use, energy carriers	*Abiotic resource depletion – fossil fuels (ADP-fossil)*	*MJ*	*CML 2002 (Guinée et al., 2002) and van Oers et al. 2002*

** Long-term emissions (occurring beyond 100 years) shall be excluded from the toxic impact categories. Toxicity emissions to this sub-compartment have a characterisation factor set to 0 in the EF LCIA (to ensure consistency). If included by the applicant in the LCI modelling, the sub-compartment 'unspecified (long-term)' shall be used.*

***The results for water use might be overestimated and shall therefore be interpreted with caution. Some of the EF datasets tendered during the pilot phase and used in this PEFCR/OEFSR include inconsistencies in the regionalization and elementary flow implementations. This problem has nothing to do with the impact assessment method or the implementability of EF methods, but occurred during the technical development of some of the datasets. The PEFCR/OEFSR remains valid and usable. The affected EF datasets will be corrected by mid-2019. At that time it will be possible to review this PEFCR/OEFSR accordingly, if seen necessary.*

The full list of normalization factors and weighting factors are available in Annex 1 – List of EF normalisation factors and weighting factors.

vrednotenje okoljskih vplivov

Table 6. List of the most relevant processes for aluminium

Impact category	*Life Cycle Stage/Processes*	*Contribution of most relevant processes (%)*
Climate change	Raw material acquisition: EU-28+3: Aluminium ingot (magnesium main solute)	97,2%
Particulate matter	Raw material acquisition: EU-28+3: Aluminium ingot (magnesium main solute)	96,9%
Resource use, energy carriers	Raw material acquisition: EU -28+3: Aluminium ingot (magnesium main solute)	97,0%
Acidification terrestrial and freshwater	Raw material acquisition: EU-28+3: Aluminium ingot (magnesium main solute)	98,0%

Table 7. List of the most relevant processes for copper

Impact category	Life Cycle Stage/Processes	*Contribution of most relevant processes* (%)
Resource use, mineral	Raw material acquisition and pre-processing: Copper Concentrate (Mining. mix technologies)	99,0%
Climate change	Raw material acquisition and pre-processing: EU-28+EFTA: Copper billet/slab* (smelting and refining to produce primary copper cathode)	17,2%
	Raw material acquisition and pre-processing: EU-28+EFTA: Secondary Copper Cathode	16,8%
	Raw material acquisition and pre-processing: Copper Concentrate (Mining. mix technologies)	37,6%

SRIP MATPRO

Gospodarska zbornica Slovenije

REPUBLIKA SLOVENIJA
MINISTRSTVO ZA GOSPODARSKI RAZVOJ IN TEHNOLOGIJO

EVROPSKA UNIJA
EVROPSKI SKLAD ZA REGIONALNI RAZVOJ
NALOŽBA V VAŠO PRIHODNOST

hvala za pozornost!