Supplementary Data

Manuscript Title:

Comparative life cycle assessment of tailings management and energy scenarios for a copper ore mine: A case study in Northern Norway

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Table S1
Assumptions on life cycle inventory data of this study.

Item	Assumptions	Reference(s)
Raw ore mining	The annual average amount of raw ore produced (up to 2 million tons) was assumed to be 75% from the Nussir deposit (1.15% copper) and 25% from the Ulveryggen deposit (0.8% copper).	NEA (2016)
Copper recovery	The estimated copper recovery rate by the mining company (Nussir ASA) is 94–95.5%. In the study, we assumed 94% copper recovery rate.	Nussir ASA (2014)
Basting agent	The explosive Tovex was used in the study, since the blasting process is available in in ecoinvent database. But the pumped slurry explosive will be used in practice.	Ecoinvent database v3; Nussir ASA (2014)
Water use	Water was from a river reservoir and no extra pumping energy needed.	
Electricity mix	Assuming 100% electricity from Norwegian electricity supply mix (hydro 98%, fossil 0.2 %, and other 1.8%.)	Ecoinvent database v3
Engine efficiency (diesel trucks)	Heavy-duty diesel trucks converted ≈ 39% of energy stored in diesel to power at the wheels.	Thiruvengadam et al. (2014)
Engine efficiency (all-electric trucks)	All-electric trucks converted ≈ 60% of the electrical energy from the grid to power at the wheels.	US DOE (2016)
Chemicals	The maximum amount of chemicals granted by the tailings discharge permit was used for MIBC, CMC, Magnafloc 10, and burnt lime. The use of SIPX, pending in the granted permit, was assumed to be 25 g / ton ore.	NEA (2016) Nussir ASA (2011)
Chemical emissions to water	Chemical emissions from tailings were assumed to be 10% of the total amount of chemical use.	
Land use	A lifetime of 20 years (operational period) was assumed, according to the estimated available mineral resource in 2013. Only the build-up area of the plant was addressed in LCIA, while the underground mining exploration area was not considered in the study.	NEA (2016)
Dust emissions	One ton of dust emissions from crushing and transport was assumed to be 50 kg PM<2.5, 450 kg PM2.5-10 and 500 kg PM>10. For simplification, we assumed a linear relationship between the amount of ore processed and dust emitted.	Classen et al. (2007)
Waste rock	We excluded the produced metal-free waste rock from the study, which was assumed to be of relatively low toxicity.	
Cation exchange membrane	We estimated the following membrane layer thickness (and density): 0.2 µm Polyamide (1.27 g/cm^3), 40 µm Polysulfone (1.24 g/cm^3) and 120 µm Polyester (1.37 g/cm^3).	
Copper recovery rate of acidic electrodialysis	According to an electrodialysis experimental, up to 64% of Cu in tailings (in mass) could be recovered in acidic electrodialysis.	Pedersen et al. (2017)

Table S2
Main background processes taken from Ecoinvent database v3.3 within SimaPro 8.3.

Activity name (Market)[a]	Geography	Database time period	Notes[b]
Blasting	GLO (Global)	2011-01-01 to 2016-12-31	Blasting of 100% Tovex.
Conveyor belt	GLO (Global)	2011-01-01 to 2016-12-31	
Carboxymethyl cellulose, powder	GLO (Global)	2011-01-01 to 2016-12-31	
Carbon disulfide	GLO (Global)	2011-01-01 to 2016-12-31	
Sodium hydroxide	GLO (Global)	2011-01-01 to 2016-12-31	Sodium hydroxide, without water, in 50% solution state.
Isopropanol	GLO (Global)	2011-01-01 to 2016-12-31	
1-propanol	GLO (Global)	2011-01-01 to 2016-12-31	
Acrylonitrile	GLO (Global)	2011-01-01 to 2016-12-31	
Limestone, crushed, washed	RoW (Rest of World)	2011-01-01 to 2016-12-31	Expert judgement was used to develop product specific transport distance estimations.
Electricity, high voltage	NO (Norway)	2012-01-01 to 2016-12-31	High voltage level above 24 kV (large scale industry).
Heat production, heavy fuel oil, at industrial furnace 1MW	Europe without Switzerland	2001-01-01 to 2016-12-31	Heat, district or industrial, other than natural gas.
Heat production, natural gas, at industrial furnace low-NOx >100kW	Europe without Switzerland	2011-01-01 to 2016-12-31	Heat, district or industrial, natural gas.
Diesel, burned in building machine	GLO (Global)	2011-01-01 to 2016-12-31	Building machine including infrastructure, lubricating oil and fuel consumption as inputs, and some measured air emissions as output.
Sodium nitrate	GLO (Global)	2010-01-01 to 2016-12-31	
Polyamide	GLO (Global)	2011-01-01 to 2016-12-31	Glass fibre reinforced plastic, polyamide, injection moulded.
Polysulfone	GLO (Global)	2012-01-01 to 2014-12-31	For membrane filtration production.
Polyester	GLO (Global)	2011-01-01 to 2016-12-31	Glass fibre reinforced plastic, polyester resin, hand lay-up.

[a] Market activity starts at the site of the production activities with the product being ready to be transported to the consumers and ends at the site of the consumers.
[b] Taken from SimaPro 8.3 PhD version and the ecoinvent database v3.3 at www.ecoinvent.org.

Table S3

Results of sequential extraction of tailings after electrodialysis (ED), mg/kg tailings (on dry solid basis).

	Al	As	Ba	Ca	Cd	Co	Cr	Cu	Fe	K	Mg
Exchangeable	13.1	0	4.9	611.8	0	0	0.1	119.2	19.1	81.3	210.9
Reducible	51.4	0.2	33.8	50.8	0	0	1.1	22.2	1056.3	253.6	50.8
Oxidizable	26.8	0	5.8	39.5	0	0	1.2	64.5	63.8	226.2	77.9
Residual	4261.7	0.6	49.3	68.4	0.02	1.7	33.8	28.9	4162.0	3046.0	4633.6
Desorbed in ED	83.2	0.001	9.3	90068.4	0.0004	0.01	0.9	409.3	738.9	332.0	6609.8
Total mass	4436.3	0.8	103.1	90838.9	0.02	1.71	37.1	644.1	6040.2	3939.1	11583.0

	Mn	Mo	Na	Ni	P	Pb	Sb	Sr	V	Zn	Zr
Exchangeable	20.1	0	40.2	0.4	25.3	0.2	0.2	0.2	0.003	5.1	0.002
Reducible	13.2	0	13.4	0.4	67.2	1.0	0.2	0.1	0.5	1.7	0.0
Oxidizable	2.4	0.3	9546.3	0.6	20.1	0.4	0.0	0.1	0.2	1.9	0.02
Residual	51.0	1.1	113.2	15.1	73.4	0.3	0.0	0.1	8.1	13.6	1.1
Desorbed in ED	927.0	0	1685.0	0.8	37.9	0.3	0.01	4.7	0.02	1.4	0.002
Total mass	1013.7	1.4	11398.1	17.3	223.9	2.2	0.41	5.2	8.8	23.7	1.12

(Data source: Pedersen et al., 2017)

Table S4

Results of sequential extraction of tailings before electrodialysis, mg/kg tailings (on dry solid basis).

	Al	As[a]	Ba	Ca	Cd[a]	Co[a]	Cr	Cu	Fe	K[a]	Mg
Exchangeable	0.7	0.0002	26.2	35475.7	0.0001	0.004	0.1	23.5	0.4	164.4	1796.0
Reducible	2.5	0.2	17.4	6090.3	0.0001	0.004	0.2	2.7	650.1	336.6	2240.3
Oxidizable	77.8	0.0002	4.3	1033.5	0.0001	0.004	2.2	263.6	257.3	309.2	457.8
Residual	4283	0.6	30.5	96.3	0.02	1.7	33.9	362.2	5567.6	3128.9	4634.6
Total mass	4364	0.8	78.3	42695.9	0.02	1.71	36.4	651.9	6475.3	3939.1	9128.7
Difference[b]	-1.7%	0	-31.7%	-112.8%	0	0	-1.8%	1.2%	6.7%	0	-26.9%

	Mn	Mo[a]	Na[a]	Ni[a]	P[a]	Pb[a]	Sb[a]	Sr[a]	V[a]	Zn[a]	Zr[a]
Exchangable	1096.9	0	461.4	0.6	34.7	0.2	0.2	1.3	0.01	5.5	0.002
Reducible	399.0	0	434.7	0.6	76.7	1.1	0.2	1.3	0.5	2.0	0.001
Oxidizable	53.6	0.3	9967.5	0.8	29.5	0.5	0.002	1.2	0.2	2.3	0.02
Residual	63.3	1.1	534.5	15.3	82.9	0.4	0.002	1.3	8.1	13.9	1.1
Total mass	1612.8	1.4	11398.1	17.3	223.9	2.2	0.41	5.2	8.8	23.7	1.1
Difference[b]	37.15%	0	0	0	0	0	0	0	0	0	0

(Data source: based on Pedersen et al., 2017)

[a] Sequential extraction of those marked metals was not performed in the original experiment; in this study, they were estimated by allocating the amount of desorbed metals (Table S3) equally into the four fractions after ED.

[b] It was calculated as: Difference = (Total mass (before ED) – Total mass (after ED)) / Total mass (before ED).

Table S5

Results of the estimated metal leaching from tailings before electrodialysis (in scenarios A and B).

ReCiPe perspective	Metals, mg/kg tailings (on dry solid basis)										
	Al	As	Ba	Ca	Cd	Co	Cr	Cu	Fe	K	Mg
Individualist	0.7	0.0002	26.2	35475.7	0.0001	0.004	0.1	23.5	0.4	164.4	1796.0
Hierarchist	3.2	0.2	43.5	41566.0	0.0002	0.007	0.3	26.3	650.5	501.0	4036.3
Egalitarian	81.0	0.2	47.8	42599.6	0.0003	0.01	2.5	289.7	907.8	810.1	4494.1

ReCiPe perspective	Metals, mg/kg tailings (on dry solid basis)										
	Mn	Mo	Na	Ni	P	Pb	Sb	Sr	V	Zn	Zr
Individualist	1096.9	0.0	461.4	0.6	34.7	0.2	0.2	1.3	0.01	5.5	0.002
Hierarchist	1495.9	0.0	896.1	1.2	111.4	1.3	0.4	2.6	0.5	7.5	0.003
Egalitarian	1549.5	0.3	10863.6	2.1	140.9	1.8	0.4	3.8	0.7	9.8	0.02

Table S6

Results of the estimated metal leaching from tailings after electrodialysis (in scenario C).

ReCiPe perspective	Metals, mg/kg tailings (on dry solid basis)										
	Al	As	Ba	Ca	Cd	Co	Cr	Cu	Fe	K	Mg
Individualist	13.1	0	4.9	611.8	0	0	0.1	119.2	19.1	81.3	210.9
Hierarchist	64.5	0.2	38.7	662.6	0	0	1.2	141.4	1075.4	334.9	261.7
Egalitarian	91.4	0.2	44.5	702.2	0	0	2.4	205.8	1139.3	561.1	339.6

ReCiPe perspective	Metals, mg/kg tailings (on dry solid basis)										
	Mn	Mo	Na	Ni	P	Pb	Sb	Sr	V	Zn	Zr
Individualist	20.1	0	40.2	0.4	25.3	0.2	0.2	0.2	0.0003	5.1	0.002
Hierarchist	33.3	0	53.6	0.8	92.5	1.2	0.4	0.3	0.5	6.8	0.003
Egalitarian	35.7	0.3	9599.9	1.5	112.6	1.5	0.4	0.4	0.7	8.7	0.02

Table S7
The life cycle environmental impacts per kg of copper in concentrate in the baseline scenario A (ReCiPe midpoint/hierarchist).

Impact category[a]	Unit	Total	On-site emissions[b]	Blasting	Conveyor belt	Reagents	Diesel (truck)	Electricity	Heating (HFO)	Tailings (STD)
CC	kg CO_2 eq	6.9E-01	0	1.4E-01	1.9E-02	5.8E-02	3.6E-01	1.1E-01	3.7E-03	0
OD	kg CFC-11 eq	9.8E-08	0	7.3E-09	1.3E-09	7.7E-09	6.7E-08	1.4E-08	6.7E-10	0
TA	kg SO_2 eq	1.2E-02	0	8.7E-03	8.2E-05	3.1E-04	2.9E-03	3.4E-04	2.3E-05	0
FE	kg P eq	1.1E-04	0	2.9E-05	1.5E-05	1.8E-05	1.6E-05	3.0E-05	8.8E-08	0
ME	kg N eq	7.4E-04	0	4.9E-04	4.1E-06	5.9E-05	1.7E-04	1.6E-05	2.6E-07	0
HT	kg 1.4-DB eq	1.2E+01	3.7E-07	3.9E-02	2.4E-02	1.9E-02	2.0E-02	2.9E-02	3.9E-04	1.2E+01
POF	kg NMVOC	1.6E-02	0	1.0E-02	7.8E-05	3.3E-04	5.0E-03	2.7E-04	8.6E-06	0
PMF	kg PM_{10} eq	2.3E-02	1.8E-02	2.6E-03	7.4E-05	1.3E-04	1.5E-03	2.2E-04	5.9E-06	0
TET	kg 1.4-DB eq	8.2E-05	5.4E-10	4.8E-05	9.7E-06	5.3E-06	1.3E-05	5.6E-06	4.7E-07	3.3E-24
FET	kg 1.4-DB eq	4.0E-03	8.8E-10	9.6E-04	8.0E-04	5.0E-04	6.9E-04	1.0E-03	4.0E-06	2.6E-24
MET	kg 1.4-DB eq	3.9E+00	3.4E-05	9.7E-04	7.7E-04	4.8E-04	6.6E-04	9.5E-04	8.0E-06	3.9E+00
IR	kBq U235 eq	7.9E-02	0	4.3E-03	1.1E-03	4.9E-03	2.5E-02	4.3E-02	2.6E-04	0
ALO	m^2a	6.3E-02	0	8.0E-03	7.3E-04	1.3E-02	1.3E-03	3.9E-02	1.1E-05	0
ULO	m^2a	4.3E-03	6.7E-04	9.7E-04	2.6E-04	5.1E-04	8.0E-04	1.1E-03	5.8E-06	0
NLT	m^2	2.4E-04	0	1.9E-05	2.9E-06	1.2E-05	1.4E-04	6.6E-05	1.4E-06	0
WD	m^3	1.9E-01	6.6E-02	1.3E-03	2.7E-04	9.7E-04	7.3E-04	1.2E-01	6.3E-06	0
MRD	kg Fe eq	3.9E+01	3.9E+01	6.8E-03	2.2E-02	2.2E-03	1.2E-02	1.2E-02	1.9E-05	0
FD	kg oil eq	2.1E-01	0	2.2E-02	4.6E-03	2.7E-02	1.3E-01	3.0E-02	1.3E-03	0

[a] CC, climate change; OD, ozone depletion; TA, terrestrial acidification; FE, freshwater eutrophication; ME, marine eutrophication; HT, human toxicity; POF, photochemical oxidant formation; PMF, particulate matter formation; TET, terrestrial ecotoxicity; FET, freshwater ecotoxicity; MET, marine ecotoxicity; IR, ionizing radiation; ALO, agricultural land occupation; ULO, urban land occupation; NLT, natural land transformation; WD, water depletion; MRD; mineral resource depletion; FD, fossil depletion.

[b] The "on-site emissions" category did not include the on-site use of blasting, diesel, heavy fuel oil and natural gas, which were part of the corresponding cradle-to-gate processes used in the study. Besides, tailings were discussed separately

Table S8
The life cycle environmental impacts per kg of copper in concentrate in the energy-oriented scenario B (ReCiPe midpoint/hierarchist).

Impact category[a]	Unit	Total	On-site emissions[b]	Blasting	Conveyor belt	Reagents	Electricity (truck)	Electricity (facility)	Heating (NG)	Tailings (STD)
CC	kg CO_2 eq	3.5E-01	0	1.4E-01	1.9E-02	5.8E-02	2.1E-02	1.1E-01	3.0E-03	0
OD	kg CFC-11 eq	3.4E-08	0	7.3E-09	1.3E-09	7.7E-09	2.6E-09	1.4E-08	4.5E-10	0
TA	kg SO_2 eq	9.5E-03	0	8.7E-03	8.2E-05	3.1E-04	6.1E-05	3.4E-04	3.6E-06	0
FE	kg P eq	9.7E-05	0	2.9E-05	1.5E-05	1.8E-05	5.3E-06	3.0E-05	2.2E-07	0
ME	kg N eq	5.7E-04	0	4.9E-04	4.1E-06	5.9E-05	3.0E-06	1.6E-05	1.3E-07	0
HT	kg 1.4-DB eq	1.2E+01	3.7E-07	3.9E-02	2.4E-02	1.9E-02	5.3E-03	2.9E-02	1.7E-04	1.2E+01
POF	kg NMVOC	1.1E-02	0	1.0E-02	7.8E-05	3.3E-04	4.8E-05	2.7E-04	3.1E-06	0
PMF	kg PM_{10} eq	2.1E-02	1.8E-02	2.6E-03	7.4E-05	1.3E-04	3.9E-05	2.2E-04	1.4E-06	0
TET	kg 1.4-DB eq	6.9E-05	5.4E-10	4.8E-05	9.7E-06	5.3E-06	1.0E-06	5.6E-06	3.8E-08	3.3E-24
FET	kg 1.4-DB eq	3.4E-03	8.8E-10	9.6E-04	8.0E-04	5.0E-04	1.8E-04	1.0E-03	5.9E-06	2.6E-24
MET	kg 1.4-DB eq	3.9E+00	3.4E-05	9.7E-04	7.7E-04	4.8E-04	1.7E-04	9.5E-04	5.9E-06	3.9E+00
IR	kBq U235 eq	6.1E-02	0	4.3E-03	1.1E-03	4.9E-03	7.8E-03	4.3E-02	1.2E-04	0
ALO	m^2a	6.9E-02	0	8.0E-03	7.3E-04	1.3E-02	7.1E-03	3.9E-02	1.9E-05	0
ULO	m^2a	3.7E-03	6.7E-04	9.7E-04	2.6E-04	5.1E-04	2.0E-04	1.1E-03	2.2E-06	0
NLT	m^2	1.1E-04	0	1.9E-05	2.9E-06	1.2E-05	1.2E-05	6.6E-05	7.6E-07	0
WD	m^3	2.1E-01	6.6E-02	1.3E-03	2.7E-04	9.7E-04	2.2E-02	1.2E-01	4.9E-06	0
MRD	kg Fe eq	3.9E+01	3.9E+01	6.8E-03	2.2E-02	2.2E-03	2.1E-03	1.2E-02	2.0E-05	0
FD	kg oil eq	9.0E-02	0	2.2E-02	4.6E-03	2.7E-02	5.4E-03	3.0E-02	1.1E-03	0

[a] CC, climate change; OD, ozone depletion; TA, terrestrial acidification; FE, freshwater eutrophication; ME, marine eutrophication; HT, human toxicity; POF, photochemical oxidant formation; PMF, particulate matter formation; TET, terrestrial ecotoxicity; FET, freshwater ecotoxicity; MET, marine ecotoxicity; IR, ionizing radiation; ALO, agricultural land occupation; ULO, urban land occupation; NLT, natural land transformation; WD, water depletion; MRD; mineral resource depletion; FD, fossil depletion.
[b] The "on-site emissions" category did not include the on-site use of blasting, diesel, heavy fuel oil and natural gas, which were part of the corresponding cradle-to-gate processes used in the study. Besides, tailings were discussed separately

Table S9
Comparison of the life cycle environmental impacts between the electrodialytic tailings remediation process and scenarios A & C (ReCiPe midpoint/hierarchist).

Impact category[a]	Unit	Scenario A		Scenario C		Electrodialytic (acidic) remediation process in scenario C					
		Total	Tailings	Total	Tailings	Total	Sodium nitrate	Electricity	Polyamide (membrane)	Polysulfone (membrane)	Polyester (membrane)
CC	kg CO_2 eq	6.9E-01	0	7.4E-01	0	7.0E-02	6.9E-02	6.1E-04	3.4E-07	7.0E-05	1.0E-04
OD	kg CFC-11 eq	9.8E-08	0	9.9E-08	0	4.1E-09	4.0E-09	7.6E-11	6.5E-15	9.9E-12	9.8E-12
TA	kg SO_2 eq	1.2E-02	0	1.2E-02	0	2.8E-04	2.7E-04	1.8E-06	1.2E-09	2.9E-07	4.6E-07
FE	kg P eq	1.1E-04	0	1.2E-04	0	1.4E-05	1.3E-05	1.6E-07	3.2E-11	2.6E-08	2.8E-08
ME	kg N eq	7.4E-04	0	9.1E-04	0	1.9E-04	1.9E-04	8.8E-08	2.7E-10	1.6E-08	3.1E-08
HT	kg 1.4-DB eq	1.2E+01	1.2E+01	4.9E-01	3.5E-01	1.8E-02	1.8E-02	1.6E-04	2.3E-08	3.1E-05	5.2E-05
POF	kg NMVOC	1.6E-02	0	1.5E-02	0	1.5E-04	1.5E-04	1.4E-06	8.7E-10	3.0E-07	6.5E-07
PMF	kg PM_{10} eq	2.3E-02	0	2.2E-02	0	1.0E-04	9.9E-05	1.1E-06	4.8E-10	1.6E-07	2.2E-07
TET	kg 1.4-DB eq	8.2E-05	3.3E-24	8.5E-05	1.4E-23	5.6E-06	5.5E-06	3.0E-08	6.5E-12	1.0E-08	8.9E-08
FET	kg 1.4-DB eq	4.0E-03	2.6E-24	4.3E-03	3.7E-24	4.4E-04	4.3E-04	5.3E-06	1.0E-09	6.4E-07	7.7E-07
MET	kg 1.4-DB eq	3.9E+00	3.9E+00	9.4E+00	9.4E+00	4.4E-04	4.3E-04	5.1E-06	9.1E-10	6.5E-07	7.5E-07
IR	kBq U235 eq	7.9E-02	0	7.9E-02	0	3.3E-03	3.1E-03	2.3E-04	9.0E-09	4.5E-06	7.5E-06
ALO	m^2a	6.3E-02	0	6.3E-02	0	2.0E-03	1.8E-03	2.1E-04	9.3E-09	2.4E-06	8.1E-06
ULO	m^2a	4.3E-03	0	4.7E-03	0	3.9E-04	3.8E-04	6.0E-06	8.4E-10	5.8E-07	8.5E-07
NLT	m^2	2.4E-04	0	2.4E-04	0	8.8E-06	8.4E-06	3.5E-07	1.3E-11	6.4E-09	4.6E-08
WD	m^3	1.9E-01	0	1.8E-01	0	1.5E-03	8.3E-04	6.4E-04	8.0E-09	1.4E-06	1.3E-06
MRD	kg Fe eq	3.9E+01	0	3.7E+01	0	3.4E-03	3.4E-03	6.1E-05	1.7E-09	2.7E-06	5.0E-06
FD	kg oil eq	2.1E-01	0	2.2E-01	0	1.1E-02	1.1E-02	1.6E-04	1.1E-07	3.5E-05	3.3E-05

[a] CC, climate change; OD, ozone depletion; TA, terrestrial acidification; FE, freshwater eutrophication; ME, marine eutrophication; HT, human toxicity; POF, photochemical oxidant formation; PMF, particulate matter formation; TET, terrestrial ecotoxicity; FET, freshwater ecotoxicity; MET, marine ecotoxicity; IR, ionizing radiation; ALO, agricultural land occupation; ULO, urban land occupation; NLT, natural land transformation; WD, water depletion; MRD; mineral resource depletion; FD, fossil depletion.

Table S10

Results of Monte Carlo simulation for the life cycle environmental impacts of the scenarios A, B and C (ReCiPe midpoint/hierarchist).

Impact category[a]	Unit	Scenario A				Scenario B				Scenario C			
		Mean	Median	SD	CV (%)	Mean	Median	SD	CV (%)	Mean	Median	SD	CV (%)
CC	kg CO_2 eq	6.9E-01	6.8E-01	1.1E-01	16	3.5E-01	3.4E-01	7.5E-02	21	7.4E-01	7.3E-01	1.1E-01	14
OD	kg CFC-11 eq	9.8E-08	8.8E-08	4.3E-08	44	3.4E-08	3.2E-08	7.1E-09	21	9.8E-08	8.9E-08	4.1E-08	42
TA	kg SO_2 eq	1.2E-02	1.2E-02	3.1E-03	25	9.5E-03	9.0E-03	3.0E-03	32	1.2E-02	1.2E-02	3.0E-03	25
FE	kg P eq	1.1E-04	9.6E-05	5.0E-05	46	9.7E-05	8.7E-05	4.4E-05	45	1.2E-04	1.1E-04	5.1E-05	43
ME	kg N eq	7.4E-04	7.1E-04	1.8E-04	24	5.8E-04	5.5E-04	1.7E-04	30	9.1E-04	8.8E-04	1.8E-04	20
HT	kg 1.4-DB eq	1.2E+01	6.3E+00	1.9E+01	157	1.2E+01	6.3E+00	2.0E+01	168	5.0E-01	3.6E-01	4.7E-01	95
POF	kg NMVOC	1.6E-02	1.5E-02	3.8E-03	25	1.1E-02	1.0E-02	3.7E-03	34	1.5E-02	1.5E-02	3.8E-03	25
PMF	kg PM_{10} eq	2.3E-02	2.2E-02	6.2E-03	27	2.1E-02	2.0E-02	6.2E-03	29	2.2E-02	2.1E-02	6.1E-03	27
TET	kg 1.4-DB eq	8.2E-05	7.6E-05	3.0E-05	37	6.9E-05	6.3E-05	2.9E-05	41	8.5E-05	7.9E-05	2.9E-05	33
FET	kg 1.4-DB eq	3.9E-03	3.6E-03	1.3E-03	33	3.4E-03	3.2E-03	1.2E-03	35	4.3E-03	4.0E-03	1.5E-03	36
MET	kg 1.4-DB eq	4.0E+00	2.4E+00	5.1E+00	130	4.0E+00	2.4E+00	5.7E+00	144	9.7E+00	5.1E+00	1.7E+01	172
IR	kBq U235 eq	7.8E-02	6.6E-02	4.5E-02	57	6.2E-02	4.7E-02	5.2E-02	85	7.9E-02	6.7E-02	4.9E-02	62
ALO	m2a	6.3E-02	6.2E-02	1.1E-02	18	6.9E-02	6.7E-02	1.2E-02	18	6.3E-02	6.2E-02	1.1E-02	18
ULO	m2a	4.3E-03	4.2E-03	7.8E-04	18	3.7E-03	3.6E-03	7.1E-04	19	4.7E-03	4.6E-03	7.9E-04	17
NLT	m^2	2.4E-04	2.3E-04	2.6E-04	108	1.1E-04	1.0E-04	2.7E-04	251	2.4E-04	2.4E-04	2.5E-04	105
WD	m^3	2.2E-01	3.6E-01	1.1E+00	508	1.9E-01	3.5E-01	1.3E+00	699	1.7E-01	2.9E-01	1.1E+00	645
MRD	kg Fe eq	3.9E+01	3.9E+01	1.3E+00	3	3.9E+01	3.9E+01	1.3E+00	3	3.7E+01	3.7E+01	1.2E+00	3
FD	kg oil eq	2.1E-01	2.1E-01	4.2E-02	20	9.0E-02	8.8E-02	1.4E-02	16	2.2E-01	2.1E-01	4.2E-02	19

[a] CC, climate change; OD, ozone depletion; TA, terrestrial acidification; FE, freshwater eutrophication; ME, marine eutrophication; HT, human toxicity; POF, photochemical oxidant formation; PMF, particulate matter formation; TET, terrestrial ecotoxicity; FET, freshwater ecotoxicity; MET, marine ecotoxicity; IR, ionizing radiation; ALO, agricultural land occupation; ULO, urban land occupation; NLT, natural land transformation; WD, water depletion; MRD; mineral resource depletion; FD, fossil depletion.

[b] SD, standard deviation; CV, coefficient of variation.

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