- 1 Life Cycle Assessment of Chitosan modified Ni-Fe Layered Double Hydroxide for
- 2 adsorptive removal of Arsenic(III) from water: Comparison on the impacts of
- 3 adsorbent recycling, instrument use and source of energy
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Table S1: Category wise impacts associated with the use of magnetic stirrer for As(III) removal by Ni-Fe LDH/Ch

Name	Category	Impact result	Unit
human toxicity: non-carc (HTPnc)	inogenic - human toxicity potential	102.85	kg 1,4- DCB- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	58.88	kg 1,4- DCB- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	32.76	kg 1,4- DCB- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	3.32	kg 1,4- DCB- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	2.71	kg 1,4- DCB- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	2.44	kg 1,4- DCB- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	2.38	kg 1,4- DCB- Eq
ecotoxicity: terrestrial - te	errestrial ecotoxicity potential (TETP)	113.22	kg 1,4- DCB- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	30.14	kg 1,4- DCB- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	27.34	kg 1,4- DCB- Eq

nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	13.88	kg 1,4- DCB- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	13.65	kg 1,4- DCB- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	13.15	kg 1,4- DCB- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	12.15	kg 1,4- DCB- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential, S - RER	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	2.67	kg 1,4- DCB- Eq
material resources: metal	s/minerals - surplus ore potential (SOP)	2.68	kg Cu- Ea
material resources: metals ionising radiation - ionising		2.68 0.8	Eq kBq Co-60-
ionising radiation - ionising	radiation potential (IRP) nation: human health - photochemical		Eq kBq
ionising radiation - ionising photochemical oxidant form	radiation potential (IRP) nation: human health - photochemical : humans (HOFP)	0.8	Eq kBq Co-60- Eq kg NOx-
ionising radiation - ionising photochemical oxidant form oxidant formation potential water use - water consumpt	radiation potential (IRP) nation: human health - photochemical : humans (HOFP)	0.8	Eq kBq Co-60- Eq kg NOx- Eq
ionising radiation - ionising photochemical oxidant form oxidant formation potential water use - water consumpt	radiation potential (IRP) nation: human health - photochemical : humans (HOFP) ion potential (WCP)	0.8 0.12 0.62	Eq kBq Co-60- Eq kg NOx- Eq m3 kg 1,4- DCB-
ionising radiation - ionising photochemical oxidant form oxidant formation potential water use - water consumpt ecotoxicity: freshwater - f market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S -	a radiation potential (IRP) nation: human health - photochemical : humans (HOFP) ion potential (WCP) reshwater ecotoxicity potential (FETP) 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and	0.8 0.12 0.62 6.54	Eq kBq Co-60- Eq kg NOx- Eq m3 kg 1,4- DCB- Eq kg 1,4- DCB-

liquid Consequential, S - UN-SEASIA	and nitrogen compounds		
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.084165	kg 1,4- DCB- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.076527	kg 1,4- DCB- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.069941	kg 1,4- DCB- Eq
human toxicity: carcinoge	enic - human toxicity potential (HTPc)	2.53	kg 1,4- DCB- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	1.57	kg 1,4- DCB- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.59	kg 1,4- DCB- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.098174	kg 1,4- DCB- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.095028	kg 1,4- DCB- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.086393	kg 1,4- DCB- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.078903	kg 1,4- DCB- Eq
-	nation: terrestrial ecosystems - nation potential: ecosystems (EOFP)	0.13	kg NOx-

			Eq
eutrophication: marine - 1	narine eutrophication potential (MEP)	0.002737	kg N- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid	 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 	0.001459	kg N- Eq
market for wastewater, average wastewater, average Consequential, S - RoW	370:Sewerage / 3700:Sewerage	0.000562	kg N- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.000306	kg N- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.000206	kg N- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.000174	kg N- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.000111	kg N- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	-1E-04	kg N- Eq
energy resources: non-ren	ewable, fossil - fossil fuel potential (FFP)	16.73	kg oil- Eq
ecotoxicity: marine - mari	ne ecotoxicity potential (METP)	8.36	kg 1,4- DCB- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	6.59	kg 1,4- DCB- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S	351:Electric power generation,transmission and distribution /3510:Electric power generation,transmission and distribution	1.19	kg 1,4- DCB- Eq

- IN-NORDERD ORD			
- IN-Northern grid ammonia production,	201:Manufacture of basic chemicals,	0.24	kg 1,4-
steam reforming, liquid	fertilizers and nitrogen compounds,	0.47	DCB-
ammonia, anhydrous,	plastics / 2012:Manufacture of fertilizers		Eq
liquid Consequential, S -	and nitrogen compounds		29
UN-SEASIA			
urea production urea	201:Manufacture of basic chemicals,	0.12	kg 1,4-
Consequential, S - CN	fertilizers and nitrogen compounds,		DCB-
	plastics / 2012:Manufacture of fertilizers		Eq
	and nitrogen compounds		
nitric oxide production	201:Manufacture of basic chemicals,	0.11	kg 1,4-
nitric oxide	fertilizers and nitrogen compounds,		DCB-
Consequential, S - GLO	plastics / 2011:Manufacture of basic		Eq
	chemicals		
nitric acid production,	201:Manufacture of basic chemicals,	0.097266	kg 1,4-
product in 50% solution	fertilizers and nitrogen compounds,		DCB-
state nitric acid, without	plastics / 2012:Manufacture of fertilizers		Eq
water, in 50% solution	and nitrogen compounds		
state Consequential, S -			
RoW			
ozone depletion - ozone de	epletion potential (ODPinfinite)	0.000124	kg
			CFC-
			11-Eq
	ion - particulate matter formation	0.11	kg
potential (PMFP)			PM2.5-
acidification: terrestrial to	rrestrial acidification potential (TAP)	0.25	Eq ka
acidification: terrestrial - te	rrestrial acidification potential (TAP)	0.25	kg
acidification: terrestrial - te	rrestrial acidification potential (TAP)	0.25	kg SO2-
			kg SO2- Eq
	rrestrial acidification potential (TAP) er - freshwater eutrophication potential	0.25 0.033779	kg SO2- Eq kg P-
eutrophication: freshwate	r - freshwater eutrophication potential		kg SO2- Eq kg P- Eq
eutrophication: freshwate (FEP)		0.033779	kg SO2- Eq kg P-
eutrophication: freshwate (FEP) market for electricity,	r - freshwater eutrophication potential 351:Electric power generation,	0.033779	kg SO2- Eq kg P- Eq kg P-
eutrophication: freshwate (FEP) market for electricity, medium voltage	er - freshwater eutrophication potential 351:Electric power generation, transmission and distribution /	0.033779	kg SO2- Eq kg P- Eq kg P-
eutrophication: freshwate (FEP) market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid	r - freshwater eutrophication potential 351:Electric power generation, transmission and distribution / 3510:Electric power generation,	0.033779	kg SO2- Eq kg P- Eq kg P-
eutrophication: freshwate (FEP) market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid market for nickel	Fr - freshwater eutrophication potential 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 242:Manufacture of basic precious and	0.033779	kg SO2- Eq kg P- Eq kg P-
eutrophication: freshwate (FEP) market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid market for nickel concentrate, 16% Ni	 ar - freshwater eutrophication potential 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 242:Manufacture of basic precious and other non-ferrous metals / 	0.033779 0.023223	kg SO2- Eq kg P- Eq Eq
eutrophication: freshwate (FEP) market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid market for nickel concentrate, 16% Ni nickel concentrate, 16%	 ar - freshwater eutrophication potential 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and 	0.033779 0.023223	kg SO2- Eq kg P- Eq Eq kg P-
eutrophication: freshwate (FEP) market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S -	 ar - freshwater eutrophication potential 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 242:Manufacture of basic precious and other non-ferrous metals / 	0.033779 0.023223	kg SO2- Eq kg P- Eq Eq kg P-
eutrophication: freshwate (FEP) market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid market for nickel concentrate, 16% Ni nickel concentrate, 16%	 ar - freshwater eutrophication potential 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and 	0.033779 0.023223	kg SO2- Eq kg P- Eq Eq kg P-
eutrophication: freshwate (FEP) market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO nitric oxide production	 Fr - freshwater eutrophication potential 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals / 201:Manufacture of basic chemicals, 	0.033779 0.023223	kg SO2- Eq kg P- Eq Eq kg P-
eutrophication: freshwate (FEP) market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO nitric oxide production nitric oxide	 ar - freshwater eutrophication potential 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, 	0.033779 0.023223 0.006358	kg SO2- Eq kg P- Eq kg P- Eq
eutrophication: freshwate (FEP) market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO nitric oxide production	 Fr - freshwater eutrophication potential 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals / 201:Manufacture of basic chemicals, 	0.033779 0.023223 0.006358	kg SO2- Eq kg P- Eq kg P- Eq kg P- Eq
eutrophication: freshwate (FEP) market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO nitric oxide production nitric oxide	 a freshwater eutrophication potential 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 	0.033779 0.023223 0.006358 0.00124	kg SO2- Eq kg P- Eq kg P- Eq kg P- Eq
eutrophication: freshwate (FEP) market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO nitric oxide production nitric oxide Consequential, S - GLO nitric acid production,	 ar - freshwater eutrophication potential 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 201:Manufacture of basic chemicals, 	0.033779 0.023223 0.006358	kg SO2- Eq kg P- Eq kg P- Eq kg P- Eq
eutrophication: freshwate (FEP) market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO nitric oxide production nitric oxide Consequential, S - GLO nitric acid production, product in 50% solution	 ar - freshwater eutrophication potential 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics and nitrogen compounds, 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, 	0.033779 0.023223 0.006358 0.00124	kg SO2- Eq kg P- Eq kg P- Eq kg P- Eq
eutrophication: freshwate (FEP) market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO nitric oxide production nitric oxide production nitric oxide Consequential, S - GLO nitric acid production, product in 50% solution state nitric acid, without	 ar - freshwater eutrophication potential 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 201:Manufacture of basic chemicals, 	0.033779 0.023223 0.006358 0.00124	kg SO2- Eq kg P- Eq kg P- Eq kg P- Eq kg P- Eq
eutrophication: freshwate (FEP) market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO nitric oxide production nitric oxide Consequential, S - GLO nitric acid production, product in 50% solution	 ar - freshwater eutrophication potential 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics and nitrogen compounds, 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, 	0.033779 0.023223 0.006358 0.00124	kg SO2- Eq kg P- Eq kg P- Eq kg P- Eq kg P- Eq

RoW			
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.001004	kg P- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.000594	kg P- Eq
	arming potential (GWP100)	61.23	kg CO2- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	30.47	kg CO2- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	13.68	kg CO2- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	5.24	kg CO2- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	4.99	kg CO2- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	3.84	kg CO2- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	2.25	kg CO2- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential, S - RER	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.65	kg CO2- Eq

20 Table S2: Category wise impacts associated with the use of ultrasonicator for As(III) 21 removal by Ni-Fe LDH/Ch

Name	Categor y	Inventor y result	Uni t	Impac t factor	Unit	Impact result	Unit
acidification: terrestria (TAP)	al - terrestr	ial acidifica	tion po	otential		0.25	kg SO2- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	and nitrog	facture of ba en compoun ufacture of f s	ds, plas	stics /		0.00634 6	kg SO2- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid	and distrib	ic power gen ution / 3510 , transmissio):Electr	ic power		0.09603 8	kg SO2- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	non-ferrou	facture of ba is metals / 24 ious and othe	420:Ma	nufacture	e of	0.00744	kg SO2- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	and nitrog	facture of ba en compoun ufacture of f s	ds, plas	stics /		0.01432	kg SO2- Eq
nitric oxide production nitric oxide Consequential, S - GLO	and nitrog	facture of ba en compoun ufacture of b	ds, plas	stics /	ertilizers	0.11	kg SO2- Eq
urea production urea Consequential, S - CN	and nitrog	facture of ba en compoun ufacture of f s	ds, plas	stics /		0.01273	kg SO2- Eq
climate change - globa			WP10	0)		62.58	kg CO2- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state	and nitrog	facture of ba en compoun ufacture of b	ds, plas	stics /	ertilizers	0.65	kg CO2- Eq

Consequential, S -			
RER ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S -	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	13.68	kg CO2- Eq
UN-SEASIA market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	31.81	kg CO2- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	2.25	kg CO2- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	5.24	kg CO2- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	4.99	kg CO2- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	3.84	kg CO2- Eq
ecotoxicity: freshwater	- freshwater ecotoxicity potential (FETP)	6.58	kg 1,4- DCB- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.18	kg 1,4- DCB- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.92	kg 1,4- DCB- Eq

market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	5.23	kg 1,4- DCB- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.06994 1	kg 1,4- DCB- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.07652 7	kg 1,4- DCB- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.08416 5	kg 1,4- DCB- Eq
ecotoxicity: marine - m	narine ecotoxicity potential (METP)	8.41	kg 1,4- DCB- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.24	kg 1,4- DCB- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	1.24	kg 1,4- DCB- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	6.59	kg 1,4- DCB- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.09726	kg 1,4- DCB- Eq
nitric oxide production	201:Manufacture of basic chemicals, fertilizers	0.11	kg 1,4-

nitric oxide Consequential, S -	and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals		DCB- Eq
GLO urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.12	kg 1,4- DCB- Eq
ecotoxicity: terrestrial	- terrestrial ecotoxicity potential (TETP)	114.43	kg 1,4- DCB- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential, S - RER	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	2.67	kg 1,4- DCB- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	30.14	kg 1,4- DCB- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	28.55	kg 1,4- DCB- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	13.65	kg 1,4- DCB- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	12.15	kg 1,4- DCB- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	13.88	kg 1,4- DCB- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	13.15	kg 1,4- DCB- Eq

energy resources: non-	renewable, fossil - fossil fuel potential (FFP)	17.09	kg oil- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential, S - RER	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.35	kg oil- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	4.63	kg oil- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	8.49	kg oil- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.52	kg oil- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.65	kg oil- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	1.42	kg oil- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	1	kg oil- Eq
eutrophication: freshw (FEP)	ater - freshwater eutrophication potential	0.03480	kg P- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00059 4	kg P- Eq

market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.02425	kg P- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.00635 8	kg P- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00101 5	kg P- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.00124	kg P- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00100 4	kg P- Eq
eutrophication: marine	e - marine eutrophication potential (MEP)	0.00280 2	kg N- Eq
ammonia production,	201:Manufacture of basic chemicals, fertilizers	0.00020	kg N-
steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	6	Eq
steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-	2012:Manufacture of fertilizers and nitrogen	6 0.00152 4	Eq kg N- Eq
steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA market for electricity, medium voltage electricity, medium voltage	2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power	0.00152	kg N-

Consequential, S -			
RoW nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00017 4	kg N- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.00011	kg N- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00030 6	kg N- Eq
human toxicity: carcin	ogenic - human toxicity potential (HTPc)	2.6	kg 1,4- DCB- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.08639	kg 1,4- DCB- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	1.64	kg 1,4- DCB- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.59	kg 1,4- DCB- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.07890	kg 1,4- DCB- Eq
nitric oxide production nitric oxide Consequential, S -	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.09502 8	kg 1,4- DCB- Eq

GLO			
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.09817 4	kg 1,4- DCB- Eq
human toxicity: non-ca (HTPnc)	arcinogenic - human toxicity potential	104.3	kg 1,4- DCB- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	3.32	kg 1,4- DCB- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	34.21	kg 1,4- DCB- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	58.88	kg 1,4- DCB- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	2.38	kg 1,4- DCB- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	2.71	kg 1,4- DCB- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	2.44	kg 1,4- DCB- Eq
ionising radiation - ion	ising radiation potential (IRP)	0.85	kBq Co-60- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.05987 1	kBq Co-60- Eq

Consequential, S - RER			
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.02617	kBq Co-60- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	1.11	kBq Co-60- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	-0.00905	kBq Co-60- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	-0.18	kBq Co-60- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	-0.15	kBq Co-60- Eq
	land occupation (LOP)	1.3	m2*a crop- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential, S - RER	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.03723 5	m2*a crop- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.05895 8	m2*a crop- Eq
market for electricity, medium voltage electricity, medium	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.61	m2*a crop- Eq

voltage Consequential, S - IN-			
Northern grid market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.24	m2*a crop- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.18	m2*a crop- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.13	m2*a crop- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.02886 9	m2*a crop- Eq
material resources: me (SOP)	etals/minerals - surplus ore potential	2.68	kg Cu- Eq
iron pellet production iron pellet Consequential, S - CA-QC	241:Manufacture of basic iron and steel / 2410:Manufacture of basic iron and steel	0.02949 7	kg Cu- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	2.6	kg Cu- Eq
ozone depletion - ozono	e depletion potential (ODPinfinite)	0.00012 5	kg CFC- 11-Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	7.63E- 06	kg CFC- 11-Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S -	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	3.46E- 06	kg CFC- 11-Eq

GLO			
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S -	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00011 2	kg CFC- 11-Eq
RoW particulate matter form potential (PMFP)	nation - particulate matter formation	0.11	kg PM2.5 -Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00324 9	kg PM2.5 -Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.07606	kg PM2.5 -Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.00375 4	kg PM2.5 -Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00346	kg PM2.5 -Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.01795 1	kg PM2.5 -Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00568 6	kg PM2.5 -Eq
-	formation: human health - photochemical ential: humans (HOFP)	0.13	kg NOx- Eq
ammonia production, steam reforming, liquid ammonia,	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen	0.01165 5	kg NOx- Eq

anhydrous, liquid	compounds		
Consequential, S - UN-SEASIA			
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.06867 5	kg NOx- Eq
Northern grid market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.01397 4	kg NOx- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00391 5	kg NOx- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.01972 2	kg NOx- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00733	kg NOx- Eq
	formation: terrestrial ecosystems - formation potential: ecosystems (EOFP)	0.13	kg NOx- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential, S - RER	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.00137 8	kg NOx- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.01311 3	kg NOx- Eq
market for electricity, medium voltage electricity, medium voltage	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.06957 6	kg NOx- Eq

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Consequential, S - IN-			
Northern grid			
market for nickel	242:Manufacture of basic precious and other	0.01438	kg
concentrate, 16% Ni	non-ferrous metals / 2420:Manufacture of	4	NOx-
nickel concentrate,	basic precious and other non-ferrous metals		Eq
16% Ni			
Consequential, S -			
GLO			
nitric acid production,	201:Manufacture of basic chemicals, fertilizers	0.00413	kg
product in 50%	and nitrogen compounds, plastics /	4	NOx-
solution state nitric	2012:Manufacture of fertilizers and nitrogen		Eq
acid, without water, in	compounds		
50% solution state			
Consequential, S -			
RoW			
nitric oxide production	201:Manufacture of basic chemicals, fertilizers	0.02031	kg
nitric oxide	and nitrogen compounds, plastics /	3	NOx-
Consequential, S -	2011:Manufacture of basic chemicals	-	Eq
GLO			-1
urea production urea	201:Manufacture of basic chemicals, fertilizers	0.00802	kg
Consequential, S - CN	and nitrogen compounds, plastics /	0.00002	NOx-
e ensequentiai, s er er	2012:Manufacture of fertilizers and nitrogen		Eq
	compounds		29
water use - water cons	umption potential (WCP)	0.63	m3
acetic acid production,	201:Manufacture of basic chemicals, fertilizers	0.01971	m3
product in 98%	and nitrogen compounds, plastics /	1	
solution state acetic	2011:Manufacture of basic chemicals		
acid, without water, in			
98% solution state			
Consequential, S -			
RER			
ammonia production,	201:Manufacture of basic chemicals, fertilizers		
	201. Manufacture of basic chemicals, fertilizers	0.27	m3
steam reforming.		0.27	m3
steam reforming, liquid ammonia.	and nitrogen compounds, plastics /	0.27	m3
liquid ammonia,	and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen	0.27	m3
liquid ammonia, anhydrous, liquid	and nitrogen compounds, plastics /	0.27	m3
liquid ammonia, anhydrous, liquid Consequential, S -	and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen	0.27	m3
liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds		
liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA market for electricity,	and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission	0.27	m3 m3
liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA market for electricity, medium voltage	 and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power 		
liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA market for electricity, medium voltage electricity, medium	and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission		
liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA market for electricity, medium voltage electricity, medium voltage	 and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power 		
liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-	 and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power 		
liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid	and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.12	m3
liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid nitric acid production,	 and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers 	0.12	
liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid nitric acid production, product in 50%	 and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 	0.12	m3
liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid nitric acid production, product in 50% solution state nitric	 and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen 	0.12	m3
liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid nitric acid production, product in 50% solution state nitric acid, without water, in	 and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 	0.12	m3
liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state	 and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen 	0.12	m3
liquid ammonia, anhydrous, liquid Consequential, S - <u>UN-SEASIA</u> market for electricity, medium voltage electricity, medium voltage Consequential, S - IN- Northern grid nitric acid production, product in 50% solution state nitric acid, without water, in	 and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen 	0.12	m3

nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.06306	m3
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.11	m3

Table S3: Category wise impacts associated with the use of ultrasonicator for As(III) removal by Ni-Fe LDH/Ch and 5 cycles of reuse (5REC)

Name	Categor y	Inventor y result	Uni t	Impac t factor	Uni t	Impact result	Unit
land use - agricultural la	and occupat	tion (LOP)	1	1	1	1.30063	m2*a crop- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution					0.57684	m2*a crop- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	non-ferrou	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals				0.23763	m2*a crop- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	fertilizers	facture of ba and nitrogen ufacture of f	o compo	ounds, pla		0.18077	m2*a crop- Eq
nitric oxide production nitric oxide Consequential, S - GLO	fertilizers	facture of ba and nitrogen ufacture of b	compc	ounds, pla	stics /	0.12562	m2*a crop- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds				0.05866	m2*a crop- Eq	
electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN	192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products				0.03819	m2*a crop- Eq	
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential, S - RER	fertilizers	facture of ba and nitrogen ufacture of b	o compo	ounds, pla	stics /	0.03705	m2*a crop- Eq
urea production urea Consequential, S - CN	fertilizers	facture of ba and nitrogen ufacture of f	o compo	ounds, pla		0.02872	m2*a crop- Eq
human toxicity: non-car			icity po	tential		104.241	kg 1,4-

(HTPnc)		4	DCB- Eq		
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	entrate, 16% Ni non-ferrous metals / 2420: Manufacture of basic precious and other non-ferrous metals Consequential, S -				
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	32.3039 1	kg 1,4- DCB- Eq		
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	3.30418	kg 1,4- DCB- Eq		
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	2.69445	kg 1,4- DCB- Eq		
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	2.42381	kg 1,4- DCB- Eq		
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	2.36542	kg 1,4- DCB- Eq		
electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN	192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products	2.18234	kg 1,4- DCB- Eq		
· · · · ·	terrestrial ecotoxicity potential (TETP)	122.759 5	kg 1,4- DCB- Eq		
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	29.9944 1	kg 1,4- DCB- Eq		
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	26.9624 2	kg 1,4- DCB- Eq		
nitric oxide production	201:Manufacture of basic chemicals,	13.8134	kg 1,4-		

mituio arrital	foutilizing and nitro and some some 1 - 1 - 1	2	DCD
nitric oxide Consequential S GLO	fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	3	DCB-
Consequential, S - GLO market for nickel		13.5798	Eq kg 1.4
concentrate, 16% Ni	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of	13.5798 9	kg 1,4- DCB-
nickel concentrate, 16%	basic precious and other non-ferrous metals	, ,	Eq
Ni Consequential, S -	basic precious and other non-remous metals		Ľq
GLO			
urea production urea	201:Manufacture of basic chemicals,	13.0810	kg 1,4-
Consequential, S - CN	fertilizers and nitrogen compounds, plastics /	13.0010	DCB-
	2012:Manufacture of fertilizers and nitrogen		Eq
	compounds		29
nitric acid production,	201:Manufacture of basic chemicals,	12.0942	kg 1,4-
product in 50% solution	fertilizers and nitrogen compounds, plastics /	8	DCB-
state nitric acid,	2012:Manufacture of fertilizers and nitrogen		Eq
without water, in 50%	compounds		1
solution state	L		
Consequential, S - RoW			
electricity production,	192:Manufacture of refined petroleum	10.2978	kg 1,4-
medium voltage,	products / 1920:Manufacture of refined	1	DCB-
petroleum refinery	petroleum products		Eq
operation electricity,			
medium voltage			
Consequential, S - IN			
acetic acid production,	201:Manufacture of basic chemicals,	2.65333	kg 1,4-
product in 98% solution	fertilizers and nitrogen compounds, plastics /		DCB-
state acetic acid,	2011:Manufacture of basic chemicals		Eq
without water, in 98%			
solution state			
Consequential, S - RER	als/minerals - surplus ore potential (SOP)	2.7041	kg Cu-
material resources. meta	ans miner and - sur plus of e potential (501)	2./071	Eq
market for nickel	242:Manufacture of basic precious and other	2.58259	kg Cu-
concentrate, 16% Ni	non-ferrous metals / 2420: Manufacture of		Eq
nickel concentrate, 16%	basic precious and other non-ferrous metals		1
Ni Consequential, S -			
GLO			
electricity production,	192:Manufacture of refined petroleum	0.03836	kg Cu-
medium voltage,	products / 1920:Manufacture of refined		Eq
petroleum refinery	petroleum products		
operation electricity,			
medium voltage			
Consequential, S - IN		0.0000	1.0
iron pellet production	241: Manufacture of basic iron and steel /	0.02935	kg Cu-
iron pellet	2410:Manufacture of basic iron and steel		Eq
Consequential, S - CA-			
QC	ing radiation notantial (IDD)	0.02207	hD~
ionising radiation - ionis	ing radiation potential (IRP)	0.83296	kBq Co-60-
			C0-00- Eq
market for electricity,	351:Electric power generation, transmission	1.04596	kBq
market for electrony,		1.01370	I WDY

Consequential, S - IN			
medium voltage			
petroleum refinery operation electricity,	petroleum products		Eq
medium voltage,	products / 1920:Manufacture of refined		NOx-
electricity production,	192:Manufacture of refined petroleum	0.02552	kg
S - IN-Northern grid			
voltage Consequential,			
electricity, medium	generation, transmission and distribution		Eq
medium voltage	and distribution / 3510:Electric power		NOx-
market for electricity,	351:Electric power generation, transmission	0.06485	kg
oxidant formation poten	tial: humans (HOFP)		NOx- Eq
-	ormation: human health - photochemical	0.14814	kg
Consequential, S - RoW			
solution state	*		
without water, in 50%	compounds		
state nitric acid,	2012:Manufacture of fertilizers and nitrogen		Eq
product in 50% solution	fertilizers and nitrogen compounds, plastics /	0.17073	КБЧ Со-60-
nitric acid production,	2011:Manufacture of basic chemicals,	-0.17845	kBq
Consequential, S - GLO	2011:Manufacture of basic chemicals		Eq
nitric oxide	fertilizers and nitrogen compounds, plastics /	-0.13404	КБЧ Со-60-
nitric oxide production	201:Manufacture of basic chemicals,	-0.15404	kBq
GLO			
Ni Consequential, S -	suste precious and other non-terrous metals		L-4
nickel concentrate, 16%	basic precious and other non-ferrous metals		Eq
concentrate, 16% Ni	non-ferrous metals / 2420:Manufacture of	-0.009	КБЧ Со-60-
market for nickel	242:Manufacture of basic precious and other	-0.009	kBq
- UN-SEASIA			
liquid Consequential, S	compounds		
ammonia, anhydrous,	2012:Manufacture of fertilizers and nitrogen		Eq
steam reforming, liquid	fertilizers and nitrogen compounds, plastics /	0.02004	КВЧ Со-60-
ammonia production,	201:Manufacture of basic chemicals,	0.02604	kBq
Consequential, S - IN			
operation electricity, medium voltage			
1			Eq
medium voltage, petroleum refinery	products / 1920:Manufacture of refined petroleum products		
electricity production,	192:Manufacture of refined petroleum	0.04795	kBq Co-60-
Consequential, S - RER	102. Monufacture of ratio day to 1	0.04705	lrD ~
solution state			
without water, in 98%			
state acetic acid,	2011:Manufacture of basic chemicals		Eq
product in 98% solution	fertilizers and nitrogen compounds, plastics /		Co-60-
acetic acid production,	201:Manufacture of basic chemicals,	0.05957	kBq
S - IN-Northern grid		0.05055	1.D
voltage Consequential,			
electricity, medium	generation, transmission and distribution		Eq
medium voltage	and distribution / 3510:Electric power		Co-60-

fortilizara and nitra can as me avenda mlastica /		NOx-
fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals		Eq
	0.0139	kg
1	0.0157	NOx-
		Eq
caste presidad and conter non rentous means		29
201:Manufacture of basic chemicals.	0.0116	kg
	0.0110	NOx-
		Eq
-		
1		
201:Manufacture of basic chemicals,	0.0073	kg
fertilizers and nitrogen compounds, plastics /		NOx-
		Eq
compounds		
201:Manufacture of basic chemicals,	0.0039	kg
fertilizers and nitrogen compounds, plastics /		NOx-
2012: Manufacture of fertilizers and nitrogen		Eq
compounds		
nption potential (WCP)	0.63208	m3
201:Manufacture of basic chemicals,	0.27031	m3
-		
compounds		
201:Manufacture of basic chemicals,	0.11027	m3
fertilizers and nitrogen compounds, plastics /	0.11027	m3
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen	0.11027	m3
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds		
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission	0.11027	m3 m3
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power		
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission		
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power		
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.10898	m3
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals,		
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics /	0.10898	m3
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.10898	m3 m3
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 201:Manufacture of basic chemicals,	0.10898	m3
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 201:Manufacture of basic chemicals 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics /	0.10898	m3 m3
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen	0.10898	m3 m3
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 201:Manufacture of basic chemicals 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics /	0.10898	m3 m3
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen	0.10898	m3 m3
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.10898 0.06275 0.04262	m3 m3 m3
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 2012:Manufacture of fertilizers and nitrogen compounds	0.10898	m3 m3
fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.10898 0.06275 0.04262	m3 m3 m3
	 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals0.0139201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds0.0116201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds0.0073201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds0.0039201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds0.0039201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds0.027031aption potential (WCP)0.63208 0.27031201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen0.27031

solution state			
Consequential, S - RER electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN	192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products	0.01209	m3
	freshwater ecotoxicity potential (FETP)	6.60289	kg 1,4- DCB- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	5.20661	kg 1,4- DCB- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.86975	kg 1,4- DCB- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.17858	kg 1,4- DCB- Eq
electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN	192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products	0.10269	kg 1,4- DCB- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.08375	kg 1,4- DCB- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.07615	kg 1,4- DCB- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.06959	kg 1,4- DCB- Eq
· · · · · · · · · · · · · · · · · · ·	genic - human toxicity potential (HTPc)	2.52989	kg 1,4- DCB- Eq
market for electricity, medium voltage	351:Electric power generation, transmission and distribution / 3510:Electric power	1.54444	kg 1,4- DCB-

	1	1	
electricity, medium	generation, transmission and distribution		Eq
voltage Consequential,			
S - IN-Northern grid			
market for nickel	242:Manufacture of basic precious and other	0.59064	kg 1,4-
concentrate, 16% Ni	non-ferrous metals / 2420:Manufacture of		DCB-
nickel concentrate, 16%	basic precious and other non-ferrous metals		Eq
Ni Consequential, S -	•		
GLO			
urea production urea	201:Manufacture of basic chemicals,	0.09769	kg 1,4-
Consequential, S - CN	fertilizers and nitrogen compounds, plastics /		DCB-
1 7	2012:Manufacture of fertilizers and nitrogen		Eq
	compounds		1
nitric oxide production	201:Manufacture of basic chemicals,	0.09455	kg 1,4-
nitric oxide	fertilizers and nitrogen compounds, plastics /		DCB-
Consequential, S - GLO	2011:Manufacture of basic chemicals		Eq
ammonia production,	201:Manufacture of basic chemicals,	0.08596	kg 1,4-
steam reforming, liquid	fertilizers and nitrogen compounds, plastics /	0.00570	DCB-
ammonia, anhydrous,	2012:Manufacture of fertilizers and nitrogen		Eq
liquid Consequential, S	compounds		LA
- UN-SEASIA	compounds		
nitric acid production,	201:Manufacture of basic chemicals,	0.07851	kg 1,4-
product in 50% solution	fertilizers and nitrogen compounds, plastics /	0.07051	DCB-
state nitric acid,	2012:Manufacture of fertilizers and nitrogen		Eq
without water, in 50%	compounds		Ľq
solution state	compounds		
Consequential, S - RoW			
	ormation: terrestrial ecosystems -	0.15692	kα
-	ormation potential: ecosystems (EOFP)	0.13092	kg NOx-
photoenemical oxidant i	ormation potential. ecosystems (EOFT)		Eq
market for electricity,	351:Electric power generation, transmission	0.0657	kg
medium voltage	and distribution / 3510:Electric power	0.0057	NOx-
electricity, medium	generation, transmission and distribution		ITOA
cicculotty, moulum			Fa
voltage Consequential	generation, transmission and distribution		Eq
voltage Consequential, S - IN-Northern grid			Eq
S - IN-Northern grid		0.02988	
S - IN-Northern grid electricity production,	192:Manufacture of refined petroleum	0.02988	kg
S - IN-Northern grid electricity production, medium voltage,	192:Manufacture of refined petroleum products / 1920:Manufacture of refined	0.02988	kg NOx-
S - IN-Northern grid electricity production, medium voltage, petroleum refinery	192:Manufacture of refined petroleum	0.02988	kg
S - IN-Northern grid electricity production, medium voltage, petroleum refinery operation electricity,	192:Manufacture of refined petroleum products / 1920:Manufacture of refined	0.02988	kg NOx-
S - IN-Northern grid electricity production, medium voltage, petroleum refinery operation electricity, medium voltage	192:Manufacture of refined petroleum products / 1920:Manufacture of refined	0.02988	kg NOx-
S - IN-Northern grid electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN	192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products		kg NOx- Eq
S - IN-Northern grid electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN nitric oxide production	192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products 201:Manufacture of basic chemicals,	0.02988	kg NOx- Eq kg
S - IN-Northern grid electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN nitric oxide production nitric oxide	192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics /		kg NOx- Eq kg NOx-
S - IN-Northern grid electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN nitric oxide production nitric oxide Consequential, S - GLO	192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.02021	kg NOx- Eq kg NOx- Eq
S - IN-Northern grid electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN nitric oxide production nitric oxide Consequential, S - GLO market for nickel	 192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 242:Manufacture of basic precious and other 		kg NOx- Eq kg NOx- Eq kg
S - IN-Northern grid electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN nitric oxide production nitric oxide Consequential, S - GLO market for nickel concentrate, 16% Ni	 192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of 	0.02021	kg NOx- Eq kg NOx- Eq kg NOx-
S - IN-Northern grid electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN nitric oxide production nitric oxide Consequential, S - GLO market for nickel concentrate, 16% Ni nickel concentrate, 16%	 192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 242:Manufacture of basic precious and other 	0.02021	kg NOx- Eq kg NOx- Eq kg
S - IN-Northern grid electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN nitric oxide production nitric oxide production nitric oxide Consequential, S - GLO market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S -	 192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of 	0.02021	kg NOx- Eq kg NOx- Eq kg NOx-
S - IN-Northern grid electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN nitric oxide production nitric oxide production nitric oxide Consequential, S - GLO market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	 192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals 	0.02021	kg NOx- Eq kg NOx- Eq kg NOx- Eq
S - IN-Northern grid electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN nitric oxide production nitric oxide Consequential, S - GLO market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S -	 192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of 	0.02021	kg NOx- Eq kg NOx- Eq kg NOx-

2012:Manufacture of fertilizers and nitrogen		Eq
compounds		
201:Manufacture of basic chemicals,	0.00798	kg
,		NOx-
• • •		Eq
compounds		-
201:Manufacture of basic chemicals,	0.00411	kg
fertilizers and nitrogen compounds, plastics /		NOx-
2012:Manufacture of fertilizers and nitrogen		Eq
compounds		
marine eutrophication potential (MEP)	0.00331	kg N- Eq
351:Electric power generation. transmission	0.00144	kg N-
1 0		Eq
1		
192:Manufacture of refined petroleum	0.00058	kg N-
products / 1920:Manufacture of refined		Eq
petroleum products		-
370:Sewerage / 3700:Sewerage	0.00056	kg N-
		Eq
	0.0003	kg N-
• • •		Eq
e e		
	0.00021	1NT
	0.00021	kg N-
		Eq
compounds		
201. Manufacture of basic chemicals	0.00017	kg N-
	0.0001/	Eq
C 1 1		
201:Manufacture of basic chemicals.	0.00011	kg N-
		Eq
2011:Manufacture of basic chemicals		1
	1	1
242:Manufacture of basic precious and other	-9.94E-	kg N-
	compounds 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds marine eutrophication potential (MEP) 351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution 192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products 370:Sewerage / 3700:Sewerage 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of basic chemicals, fertilize	compounds0.00798201:Manufacture of basic chemicals, fertilizers and nitrogen compounds 201:Manufacture of fertilizers and nitrogen compounds0.00411201:Manufacture of basic chemicals,

nickel concentrate, 16% Ni Consequential, S - GLO	basic precious and other non-ferrous metals		
energy resources: non-re	enewable, fossil - fossil fuel potential (FFP)	24.9434 5	kg oil- Eq
electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN	192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products	8.36464	kg oil- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	8.01788	kg oil- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	4.60596	kg oil- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	1.41485	kg oil- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.99599	kg oil- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.64588	kg oil- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.51446	kg oil- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential, S - RER	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.34944	kg oil- Eq
	rine ecotoxicity potential (METP)	8.45332	kg 1,4- DCB- Eq
market for nickel concentrate, 16% Ni	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of	6.55241	kg 1,4- DCB-

Eq
17 kg 1,4-
DCB-
Eq
1
69 kg 1,4-
DCB-
Eq
24
42 kg 1,4-
DCB-
Eq
-83 kg 1,4-
DCB-
Eq
/33 kg 1,4-
233 kg 1,4- DCB-
Eq
678 kg 1,4-
DCB-
Eq
13 kg
CFC-
11-Eq
0
CFC-
11-Eq
E- kg
CFC-
11-Eq
E- kg
CFC-
11-Eq
11 29

GLO			
electricity production, medium voltage, petroleum refinery operation electricity, medium voltage	192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products	1.98E- 06	kg CFC- 11-Eq
Consequential, S - IN			
particulate matter forma potential (PMFP)	ation - particulate matter formation	0.11403	kg PM2.5 -Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.07183	kg PM2.5- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.01786	kg PM2.5- Eq
electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN	192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products	0.00736	kg PM2.5- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00566	kg PM2.5- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.00374	kg PM2.5- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00344	kg PM2.5- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00323	kg PM2.5- Eq
acidification: terrestrial	- terrestrial acidification potential (TAP)	0.2671	kg SO2- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.11312	kg SO2- Eq

market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.09069	kg SO2- Eq
electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN	192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products	0.02084	kg SO2- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.01425	kg SO2- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.01267	kg SO2- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.00741	kg SO2- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00631	kg SO2- Eq
eutrophication: freshwat (FEP)	ter - freshwater eutrophication potential	0.03379	kg P- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.0229	kg P- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.00633	kg P- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.00123	kg P- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50%	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00101	kg P- Eq

			1
solution state			
Consequential, S - RoW urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.001	kg P- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00059	kg P- Eq
electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN	192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products	0.00038	kg P- Eq
	varming potential (GWP100)	90.29	kg CO2- Eq
market for electricity, medium voltage electricity, medium voltage Consequential, S - IN-Northern grid	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	30.0415 1	kg CO2- Eq
electricity production, medium voltage, petroleum refinery operation electricity, medium voltage Consequential, S - IN	192:Manufacture of refined petroleum products / 1920:Manufacture of refined petroleum products	29.6330 3	kg CO2- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	13.6107 9	kg CO2- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	5.21108	kg CO2- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	4.9701	kg CO2- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	3.8191	kg CO2- Eq
	L COITIDOUTIOS		

concentrate, 16% Ni	non-ferrous metals / 2420:Manufacture of	CO2-
nickel concentrate, 16%	basic precious and other non-ferrous metals	Eq
Ni Consequential, S -		
GLO		

26

27 Table S4: Category wise impacts associated with the use of ultrasonicator for As(III)

28 removal using renewable source of electricity

Name	Categor	Inventor	Uni	Impact	Impact	Unit
	y	y result	t	factor	result	
land use - agricultural la	nd occupati	on (LOP)			0.56226	m2*a
						crop-
	242.24	<u> </u>	•	• 1.1	0.0000	Eq
market for nickel			-	cious and other	0.23882	m2*a
concentrate, 16% Ni nickel concentrate, 16%	non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals					crop-
Ni Consequential, S -	basic preci	ous and othe		lerrous metals		Eq
GLO						
nitric acid production,	201·Manu	facture of ba	sic che	micals	0.18167	m2*a
product in 50% solution				ounds, plastics	0.10107	crop-
state nitric acid, without		nufacture of				Eq
water, in 50% solution	nitrogen co			ers and		Lq
state Consequential, S -		Shipounus				
RoW						
nitric oxide production	201:Manuf	facture of ba	sic che	micals,	0.12624	m2*a
nitric oxide	fertilizers a	and nitrogen	compo	ounds, plastics		crop-
Consequential, S - GLO		nufacture of				Eq
ammonia production,	201:Manuf	facture of ba	sic che	micals,	0.05896	m2*a
steam reforming, liquid	fertilizers a	and nitrogen	compo	ounds, plastics		crop-
ammonia, anhydrous,	/ 2012:Mar	nufacture of	fertiliz	ers and		Eq
liquid Consequential, S	nitrogen co	ompounds				
- UN-SEASIA						
acetic acid production,		facture of ba			0.03725	m2*a
product in 98% solution		•	-	unds, plastics		crop-
state acetic acid,	/ 2011:Mai	nufacture of	basic c	hemicals		Eq
without water, in 98%						
solution state						
Consequential, S - RER	201.Monut	facture of ba	ria aha	miaala	0.02887	m2*a
urea production urea Consequential, S - CN					0.02887	
Consequential, 5 - CN		nufacture of		ounds, plastics		crop- Eq
	nitrogen co					LY
market for water,			reatme	nt and supply /	0.01226	m2*a
deionised water,		,		ent and supply	0.01220	crop-
deionised			# • • • •			Eq
Consequential, S - RoW						
market for electricity,	351:Electr	ic power ger	eration	, transmission	-0.12571	m2*a
medium voltage,		ution / 3510				crop-
renewable energy		, transmissio				Eq

1 4 1 1 4 1 4			
products electricity,			
medium voltage,			
renewable energy			
products Consequential,			
S - CH	• • • • • • • •	80 4118	
human toxicity: non-card (HTPnc)	cinogenic - human toxicity potential	73.4117 3	kg 1,4- DCB- Eq
market for nickel	242:Manufacture of basic precious and other	58.8845	kg 1,4-
concentrate, 16% Ni	non-ferrous metals / 2420: Manufacture of	1	DCB-
nickel concentrate, 16%	basic precious and other non-ferrous metals		Eq
Ni Consequential, S -			_
GLO			
market for electricity,	351:Electric power generation, transmission	3.32096	kg 1,4-
medium voltage,	and distribution / 3510:Electric power		DCB-
renewable energy	generation, transmission and distribution		Eq
products electricity,			-
medium voltage,			
renewable energy			
products Consequential,			
S - CH			
ammonia production,	201:Manufacture of basic chemicals,	3.3207	kg 1,4-
steam reforming, liquid	fertilizers and nitrogen compounds, plastics		DCB-
ammonia, anhydrous,	/ 2012:Manufacture of fertilizers and		Eq
liquid Consequential, S	nitrogen compounds		
- UN-SEASIA			
nitric oxide production	201:Manufacture of basic chemicals,	2.70792	kg 1,4-
nitric oxide	fertilizers and nitrogen compounds, plastics		DCB-
Consequential, S - GLO	/ 2011:Manufacture of basic chemicals		Eq
urea production urea	201:Manufacture of basic chemicals,	2.43593	kg 1,4-
Consequential, S - CN	fertilizers and nitrogen compounds, plastics		DCB-
	/ 2012:Manufacture of fertilizers and		Eq
	nitrogen compounds		
nitric acid production,	201:Manufacture of basic chemicals,	2.37725	kg 1,4-
product in 50% solution	fertilizers and nitrogen compounds, plastics		DCB-
state nitric acid, without	/ 2012:Manufacture of fertilizers and		Eq
water, in 50% solution	nitrogen compounds		
state Consequential, S - RoW			
ecotoxicity: terrestrial - t	errestrial ecotoxicity potential (TETP)	91.5354	kg 1,4-
		3	DCB-
		20.1.1.2	Eq
ammonia production,	201:Manufacture of basic chemicals,	30.1443	kg 1,4-
steam reforming, liquid	fertilizers and nitrogen compounds, plastics	8	DCB-
ammonia, anhydrous,	/ 2012:Manufacture of fertilizers and		Eq
liquid Consequential, S	nitrogen compounds		
- UN-SEASIA		10.005-	
nitric oxide production	201:Manufacture of basic chemicals,	13.8825	kg 1,4-
nitric oxide	fertilizers and nitrogen compounds, plastics		DCB-
Consequential, S - GLO	/ 2011:Manufacture of basic chemicals		Eq

market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	13.6477 9	kg 1,4- DCB- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	13.1464 1	kg 1,4- DCB- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	12.1547 5	kg 1,4- DCB- Eq
market for electricity, medium voltage, renewable energy products electricity, medium voltage, renewable energy products Consequential, S - CH	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	5.66018	kg 1,4- DCB- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential, S - RER	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	2.66776	kg 1,4- DCB- Eq
material resources: meta	ls/minerals - surplus ore potential (SOP)	2.67311	kg Cu- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	2.5955	kg Cu- Eq
iron pellet production iron pellet Consequential, S - CA- QC	241:Manufacture of basic iron and steel / 2410:Manufacture of basic iron and steel	0.0295	kg Cu- Eq
ionising radiation - ionisi	ng radiation potential (IRP)	-0.27453	kBq Co-60- Eq
acetic acid production, product in 98% solution	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.0599	kBq Co-60- Eq
state acetic acid, without water, in 98% solution state Consequential, S - RER			

r		1	
steam reforming, liquid ammonia, anhydrous, liquid Consequential, S	fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds		Co-60- Eq
- UN-SEASIA			
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	-0.00562	kBq Co-60- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	-0.00905	kBq Co-60- Eq
market for electricity, medium voltage, renewable energy products electricity, medium voltage, renewable energy products Consequential, S - CH	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	-0.01259	kBq Co-60- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	-0.15481	kBq Co-60- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	-0.17935	kBq Co-60- Eq
photochemical oxidant fo oxidant formation potent	rmation: human health - photochemical ial: humans (HOFP)	0.05937	kg NOx- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.01972	kg NOx- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.01397	kg NOx- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.01166	kg NOx- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00733	kg NOx- Eq

nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00391	kg NOx- Eq
market for electricity, medium voltage, renewable energy products electricity, medium voltage, renewable energy products Consequential, S - CH	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.00132	kg NOx- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential, S - RER	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.00118	kg NOx- Eq
water use - water consum	ption potential (WCP)	0.90102	m3
market for electricity, medium voltage, renewable energy products electricity, medium voltage, renewable energy products Consequential, S - CH	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.3877	m3
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.27166	m3
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.11082	m3
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.06306	m3
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.04284	m3
acetic acid production, product in 98% solution state acetic acid,	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.01972	m3

without water, in 98%			
solution state Consequential, S - RER			
	freshwater ecotoxicity potential (FETP)	5.8888	kg 1,4- DCB- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	5.23265	kg 1,4- DCB- Eq
market for electricity, medium voltage, renewable energy products electricity, medium voltage, renewable energy products Consequential, S - CH	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.23014	kg 1,4- DCB- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.17947	kg 1,4- DCB- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.08416	kg 1,4- DCB- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.07653	kg 1,4- DCB- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.06994	kg 1,4- DCB- Eq
human toxicity: carcinog	enic - human toxicity potential (HTPc)	1.08644	kg 1,4- DCB- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.59359	kg 1,4- DCB- Eq
market for electricity, medium voltage, renewable energy products electricity, medium voltage,	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.11853	kg 1,4- DCB- Eq

renewable energy products Consequential, S - CH			
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.09817	kg 1,4- DCB- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.09503	kg 1,4- DCB- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.08639	kg 1,4- DCB- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.0789	kg 1,4- DCB- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential S _ PEP	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.0163	kg 1,4- DCB- Eq
Consequential, S - RER			
photochemical oxidant fo	ormation: terrestrial ecosystems - ormation potential: ecosystems (EOFP)	0.06303	kg NOx- Eq
photochemical oxidant for photochemical oxidant for nitric oxide production nitric oxide		0.06303	NOx- Eq kg NOx-
photochemical oxidant for photochemical oxidant for nitric oxide production	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics		NOx- Eq kg
photochemical oxidant for photochemical oxidant for nitric oxide production nitric oxide Consequential, S - GLO market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S -	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of	0.02031	NOx- Eq kg NOx- Eq kg NOx-
photochemical oxidant for photochemical oxidant fornitric oxide production nitric oxide Consequential, S - GLOmarket for nickel concentrate, 16% Ni nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLOammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals 242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals 201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and	0.02031	NOx- Eq kg NOx- Eq kg NOx- Eq kg NOx-

	1		
water, in 50% solution state Consequential, S - RoW	nitrogen compounds		
market for electricity, medium voltage, renewable energy products electricity, medium voltage, renewable energy products Consequential, S - CH	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.00139	kg NOx- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential, S - RER	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.00138	kg NOx- Eq
eutrophication: marine -	marine eutrophication potential (MEP)	0.00134	kg N- Eq
market for wastewater, average wastewater, average Consequential, S - RoW	370:Sewerage / 3700:Sewerage	0.00056	kg N- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00031	kg N- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00021	kg N- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00017	kg N- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.00011	kg N- Eq
market for electricity, medium voltage, renewable energy products electricity, medium voltage, renewable energy products Consequential, S - CH	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	6.13E- 05	kg N- Eq
acetic acid production,	201:Manufacture of basic chemicals,	2.07E-	kg N-

product in 98% solution state acetic acid, without water, in 98%	fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	05	Eq
solution state Consequential, S - RER market for nickel concentrate, 16% Ni	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of	-1E-04	kg N- Eq
nickel concentrate, 16% Ni Consequential, S - GLO	basic precious and other non-ferrous metals		
energy resources: non-re	newable, fossil - fossil fuel potential (FFP)	8.65408	kg oil- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	4.62899	kg oil- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	1.42192	kg oil- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	1.00097	kg oil- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.64911	kg oil- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.51703	kg oil- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential, S - RER	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.35134	kg oil- Eq
ecotoxicity: marine - mar	rine ecotoxicity potential (METP)	7.45976	kg 1,4- DCB- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	6.58517	kg 1,4- DCB- Eq
market for electricity,	351:Electric power generation, transmission	0.2903	kg 1,4-

		1	1
medium voltage	and distribution / 3510:Electric power		DCB-
electricity, medium	generation, transmission and distribution		Eq
voltage Consequential,			
S - IN-Northern grid			
ammonia production,	201:Manufacture of basic chemicals,	0.2429	kg 1,4-
steam reforming, liquid	fertilizers and nitrogen compounds, plastics		DCB-
ammonia, anhydrous,	/ 2012:Manufacture of fertilizers and		Eq
liquid Consequential, S	nitrogen compounds		24
- UN-SEASIA			
	201 Manufacture of basic chamicals	0.11541	$1_{ra} 1.4$
uurea	201:Manufacture of basic chemicals,	0.11341	kg 1,4-
	fertilizers and nitrogen compounds, plastics		DCB-
	/ 2012:Manufacture of fertilizers and		Eq
	nitrogen compounds		
nitric oxide production	201:Manufacture of basic chemicals,	0.10787	kg 1,4-
nitric oxide	fertilizers and nitrogen compounds, plastics		DCB-
Consequential, S - GLO	/ 2011:Manufacture of basic chemicals		Eq
nitric acid production,	201:Manufacture of basic chemicals,	0.09727	kg 1,4-
product in 50% solution	fertilizers and nitrogen compounds, plastics		DCB-
state nitric acid, without	/ 2012:Manufacture of fertilizers and		Eq
water, in 50% solution	nitrogen compounds		-1
state Consequential, S -			
RoW			
	anlation notantial (ODBinfinita)	0.00012	lra
ozone depiction - ozone d	lepletion potential (ODPinfinite)	0.00012	kg
			CFC-
•. • • • • • •		0.00011	11-Eq
nitric acid production,	201:Manufacture of basic chemicals,	0.00011	kg
product in 50% solution	fertilizers and nitrogen compounds, plastics		CFC-
state nitric acid, without	/ 2012:Manufacture of fertilizers and		11-Eq
water, in 50% solution	nitrogen compounds		
state Consequential, S -			
RoW			
market for electricity,	351:Electric power generation, transmission	6.29E-	kg
medium voltage,	and distribution / 3510:Electric power	06	CFC-
renewable energy	generation, transmission and distribution		11-Eq
products electricity,			1
medium voltage,			
e ·			
renewable energy			
renewable energy			
products Consequential,			
products Consequential, S - CH	242: Manufacture of basis presions and other	3 46E	ka
products Consequential, S - CH market for nickel	242:Manufacture of basic precious and other	3.46E-	kg
products Consequential, S - CH market for nickel concentrate, 16% Ni	non-ferrous metals / 2420: Manufacture of	3.46E- 06	CFC-
products Consequential, S - CH market for nickel concentrate, 16% Ni nickel concentrate, 16%	1		
products Consequential, S - CH market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S -	non-ferrous metals / 2420: Manufacture of		CFC-
products Consequential, S - CH market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	06	CFC- 11-Eq
products Consequential, S - CH market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO particulate matter forma	non-ferrous metals / 2420: Manufacture of		CFC- 11-Eq kg
products Consequential, S - CH market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	06	CFC- 11-Eq kg PM2.5
products Consequential, S - CH market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO particulate matter forma	non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	06	CFC- 11-Eq kg
products Consequential, S - CH market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO particulate matter forma	non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	06	CFC- 11-Eq kg PM2.5
products Consequential, S - CH market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO particulate matter forma potential (PMFP)	non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals tion - particulate matter formation	06 0.03493	CFC- 11-Eq kg PM2.5 -Eq
products Consequential, S - CH market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO particulate matter forma potential (PMFP) nitric oxide production	non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals tion - particulate matter formation 201:Manufacture of basic chemicals,	06 0.03493	CFC- 11-Eq kg PM2.5 -Eq kg

urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00569	kg PM2.5- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.00375	kg PM2.5- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00346	kg PM2.5- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00325	kg PM2.5- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential, S - RER	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.00057	kg PM2.5- Eq
· · · · · · · · · · · · · · · · · · ·	terrestrial acidification potential (TAP)	0.15696	kg SO2- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.11368	kg SO2- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.01432	kg SO2- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.01273	kg SO2- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.00744	kg SO2- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous,	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and	0.00635	kg SO2- Eq

liquid Consequential, S - UN-SEASIA	nitrogen compounds		
	er - freshwater eutrophication potential	0.01164	kg P- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	0.00636	kg P- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.00124	kg P- Eq
market for electricity, medium voltage, renewable energy products electricity, medium voltage, renewable energy products Consequential, S - CH	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.00109	kg P- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00102	kg P- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.001	kg P- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	0.00059	kg P- Eq
market for wastewater, average wastewater, average Consequential, S - RoW	370:Sewerage / 3700:Sewerage	0.00025	kg P- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential, S - RER	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.0002	kg P- Eq
market for water, deionised water, deionised Consequential, S - RoW	360:Water collection, treatment and supply / 3600:Water collection, treatment and supply	-0.00012	kg P- Eq
	arming potential (GWP100)	31.2141	kg

		4	CO2- Eq
ammonia production, steam reforming, liquid ammonia, anhydrous, liquid Consequential, S - UN-SEASIA	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	13.6788 5	kg CO2- Eq
nitric acid production, product in 50% solution state nitric acid, without water, in 50% solution state Consequential, S - RoW	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	5.23714	kg CO2- Eq
nitric oxide production nitric oxide Consequential, S - GLO	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	4.99495	kg CO2- Eq
urea production urea Consequential, S - CN	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2012:Manufacture of fertilizers and nitrogen compounds	3.8382	kg CO2- Eq
market for nickel concentrate, 16% Ni nickel concentrate, 16% Ni Consequential, S - GLO	242:Manufacture of basic precious and other non-ferrous metals / 2420:Manufacture of basic precious and other non-ferrous metals	2.24697	kg CO2- Eq
acetic acid production, product in 98% solution state acetic acid, without water, in 98% solution state Consequential, S - RER	201:Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics / 2011:Manufacture of basic chemicals	0.64768	kg CO2- Eq
market for electricity, medium voltage, renewable energy products electricity, medium voltage, renewable energy products Consequential, S - CH	351:Electric power generation, transmission and distribution / 3510:Electric power generation, transmission and distribution	0.44588	kg CO2- Eq