NETL Life Cycle Inventory Data
Process Documentation File

Process Name: Petroleum, Domestic Extraction, Production and Transport

Reference Flow: 1 kg of Petroleum, Domestic Extraction

Brief Description: This process includes all inputs for the raw material acquisition and raw material transportation for 1 kg of domestic crude oil.

Section I: Meta Data

Geographical Coverage: US **Region:** N/A

Year Data Best Represents: 2005

Process Type: Extraction Process (EP)

Process Scope: Cradle-to-Gate Process (CG)

Allocation Applied: No

Completeness: Individual Relevant Flows Captured

Flows Aggregated in Data Set:

☒ Process ☒ Energy Use ☒ Energy P&D ☐ Material P&D

Relevant Output Flows Included in Data Set:

Releases to Air:	☒ Greenhouse Gases	☒ Criteria Air Pollutants	☐ Other
Releases to Water:	☒ Inorganic Emissions	☒ Organic Emissions	☒ Other
Water Usage:	☒ Water Consumption	☒ Water Demand (throughput)	
Releases to Soil:	☒ Inorganic Releases	☐ Organic Releases	☐ Other

Adjustable Process Parameters:

S2_F_TRAIN_DIS	*Train transport distance*
S2_TRK_TANK_DIS	*Tanker truck transport distance*
S2_WATDOMDISZ	*Domestic water carrier (tanker) transport distance*
S2_WATFOREDISZ	*Foreign water carrier (tanker) transport distance*
S2D_PIPE_LENGTH	*Domestic pipeline length*
S2F_PIPE_LENGTH	*Foreign pipeline length*
Onshore_prod	*Percent of crude extracted onshore*

Offshore_prod	*Percent of crude extracted offshore*

Tracked Input Flows:

Tracked Output Flows:

Petroleum, Domestic Extraction	*Crude oil extracted within the United States*

Section II: Process Description

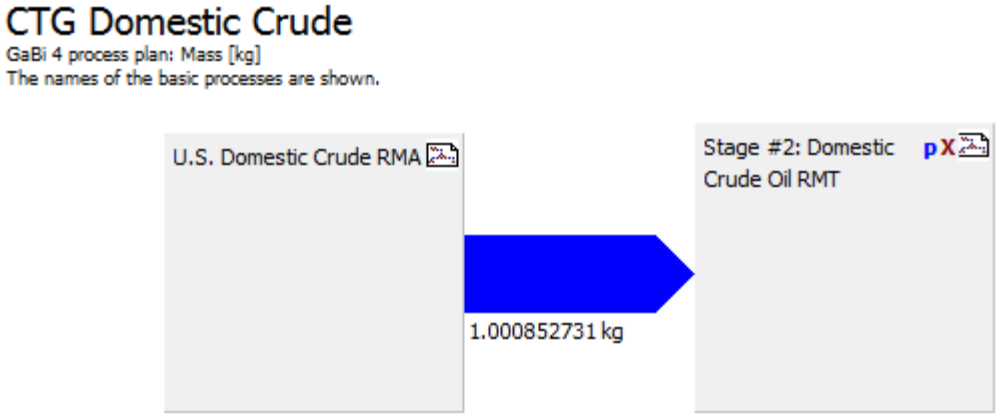
Associated Documentation

This unit process is composed of this document and the data sheet (DS) *DS_CTG_Petroleum_Domestic_2011.02.xls*, which provides additional details regarding relevant calculations, data quality, and references.

Goal and Scope

The scope of this unit process covers all aspects of raw material acquisition (RMA) and raw material transportation (RMT) to the energy conversion facility as seen in **Figure 1**. At the end, one kilogram of domestic crude oil is delivered to the life cycle (LC) Stage #3 boundary. The RMA and RMT are discussed separately below.

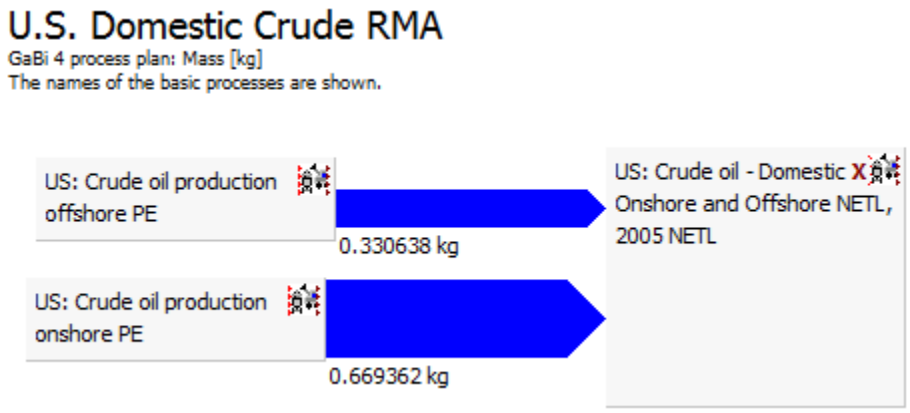
Figure 1: Plan for RMA and RMT of Domestic Crude Oil



Boundary and Description

LC stage #1, RMA of domestic crude oil, includes extraction of domestic crude oil from its source within the U.S. As shown in **Figure 2**, Domestic Crude Oil RMA is composed of a combination of proprietary crude oil production processes for onshore and offshore crude oil production, all of which are available within the GaBi database. These processes also account for any initial processing of the oil. The plan for RMA of domestic crude oil is provided in **Figure 2**.

Figure 2: Plan for RMA of Domestic Crude Oil



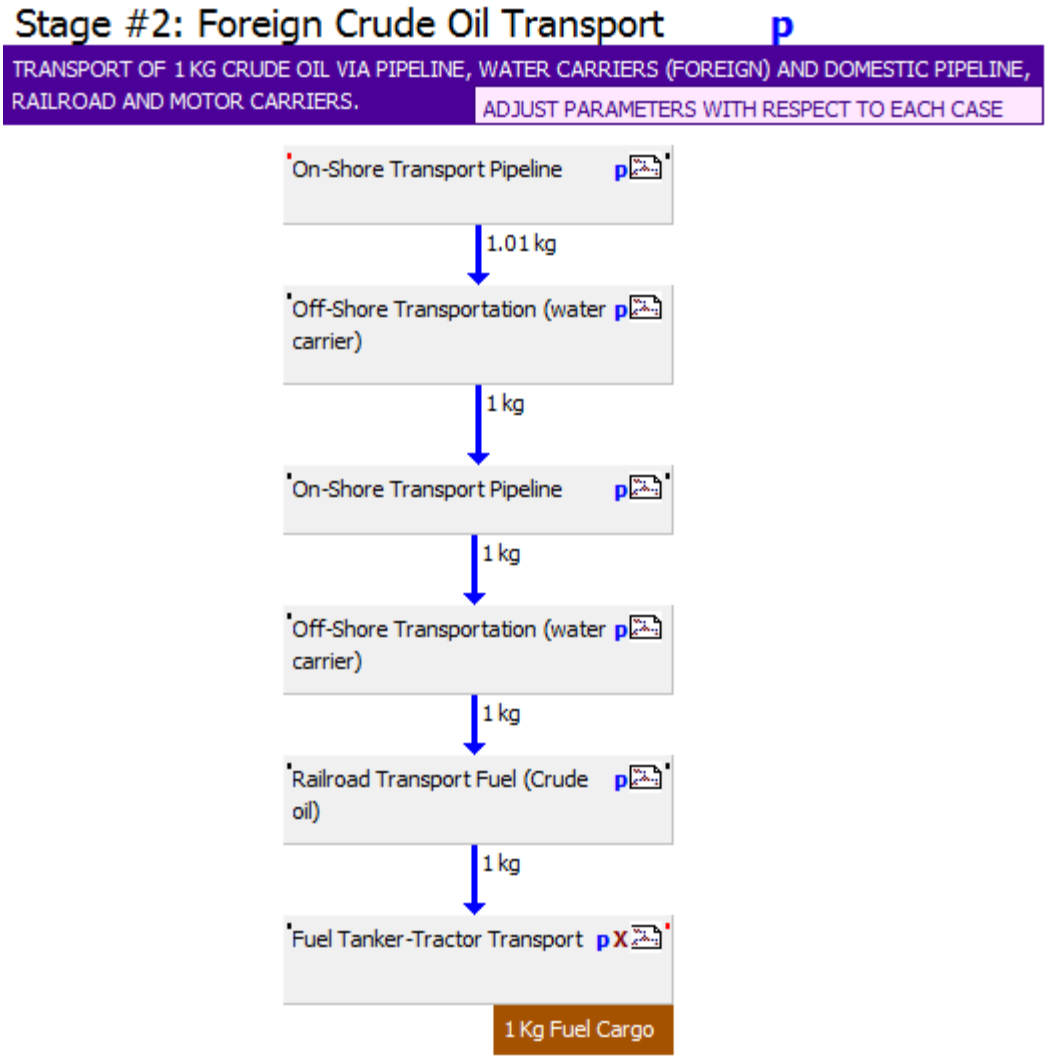
No construction data is included for this RMA. The profiles and processes included in RMA are provided in **Table 1**. Those shown in bold face were developed by NETL.

Table 1: Profiles and Processes Included in RMA for Domestic Crude Oil

Crude Oil - Domestic, 2005-Updated
US: Crude oil - Domestic NETL, 2005 NETL
US: Crude oil production offshore PE
US: Crude oil production onshore PE

LC Stage #2 (RMT) includes the transport of the produced crude oil from the extraction site to the ECF (LC Stage #3). The construction of equipment used to transport domestic crude oil includes pipelines, water carriers (tanker ships), trains, and semi-trucks (tanker-tractor). The transport distance can be adjusted via a series of adjustable parameters for RMT, as shown previously. The plan for RMT of domestic crude oil is provided in **Figure 2.**

Figure 2: Plan for RMT of Domestic Crude Oil, Including Construction and Operation Profiles for Transport



Construction of the water carriers, train, and tractor-trailer for RMT includes the materials required to construct the following pieces of equipment for transport:

- Water Carrier
  (DS/ DF DF_Stage2_C_Water_Carrier_300000DWT_2011.01.doc)
- Train
  (DS/ DF DF_Stage2_C_Tanker_Railcar_26470_Gal_Net_Capacity_ 2010.01.doc);
  (DS/ DF DF_Stage2_C_Coal_Railcar_244000_lbs_Net_Capacity_2009.01.doc);
  (DS/ DF DF_Stage2_C_Assembly_Tanker_Unit_Train_100_Railcars_2010 01.doc)
- Pipeline Transport

(DS/ DF DF_Stage2_O_Pipeline_Crude_Petroleum_Transport_2011.01.doc)

- Tractor-trailer

  (DS/ DF DF_Stage4_C_Tanker_Trailer_7500gal_2010.01.doc)

The profiles and processes included in RMT are provided in **Table 2**. Those shown in bold face were developed by NETL.

Table 2: Profiles and Processes Included in RMT for Domestic Crude Oil

Fuel Tanker-Tractor Transport
- Tanker Transport, Construction
  - DE: Lead (99,995%) PE
  - DE: Styrene-butadiene rubber mix (SBR) PE
  - RER: Aluminum sheet mix PE
  - RER: Nylon 6.6 granulate (PA 6.6) ELCD/PlasticsEurope <p-agg>
  - RER: Polyurethane flexible foam (PU) PlasticsEurope
  - **US: Fuels Tanker Trailer, 7,500 gallon, Construction NETL <u-so>**
  - **WOR: Steel Plate, BF, Manufacture NETL <u-so>**
- Tanker-Tractor Transport, Operation
  - **US: DIESEL, NATIONAL AVERAGE, 2009 NETL <u-so>**
  - **US: Tractor-Trailer Liquid Fuels Transport, Class 8B, Operation NETL <u-so>**
- **US: Tanker (Truck) Transport NETL**

Off-Shore Transportation (water carrier)
- Water Carrier Tanker (10000-30000 DWT) Transport
  - Water Carrier (300,000 DWT), Construction
    - DE: Lead (99,995%) PE
    - RER: Aluminum sheet mix PE
    - RER: Polyurethane flexible foam (PU) PlasticsEurope
    - **US: Fuels Tanker Trailer, 7,500 gallon, Construction NETL <u-so>**
    - US: Nylon 6 granulate (PA 6) PE
    - US: Styrene-butadiene rubber (SBR) PE
    - **WOR: Steel Plate, BF, Manufacture NETL <u-so>**
  - GLO: Tanker PE <u-so>
  - US: Fuel oil heavy at refinery PE
  - **US: Fuel tanker/10000 to 30000 dwt/ocean transport NETL**
- **US: Petroleum Water Carrier Loading/Unloading, Operation NETL <u-so>**

Off-Shore Transportation (water carrier)
- Water Carrier Tanker(10000-30000 DWT)Transport
  - Water Carrier (300,000 DWT), Construction
    - DE: Lead (99,995%) PE
    - RER: Aluminum sheet mix PE
    - RER: Polyurethane flexible foam (PU) PlasticsEurope

US: Fuels Tanker Trailer, 7,500 gallon, Construction NETL <u-so>
US: Nylon 6 granulate (PA 6) PE
US: Styrene-butadiene rubber (SBR) PE
WOR: Steel Plate, BF, Manufacture NETL <u-so>
GLO: Tanker PE <u-so>
US: Fuel oil heavy at refinery PE
US: Fuel tanker/10000 to 30000 dwt/ocean transport NETL
US: Petroleum Water Carrier Loading/Unloading, Operation NETL <u-so>

On-Shore Transport Pipeline
Transport Pipeline (Onshore), Construction
US: Fuel Transport Pipeline, Construction NETL <u-so>
WOR: Steel Pipe, Welded, BF, Manufacture NETL <u-so>
Transport Pipeline (Onshore), Operation
US: North American Average Electricity Mix, 2007 080811 NETL
us: Pipeline Transport of Diesel Fuel, Operation NETL <u-so>
US: OnShore Transport Pipeline NETL

On-Shore Transport Pipeline
Transport Pipeline (Onshore), Construction
US: Fuel Transport Pipeline, Construction NETL <u-so>
WOR: Steel Pipe, Welded, BF, Manufacture NETL <u-so>
Transport Pipeline (Onshore), Operation
US: North American Average Electricity Mix, 2007 080811 NETL
us: Pipeline Transport of Diesel Fuel, Operation NETL <u-so>
US: OnShore Transport Pipeline NETL

Railroad Transport Fuel (Crude oil)
Fuel Train Construction
RER: Aluminum sheet mix PE
US: Coal Railcar, 244000 lbs Net Capacity, Construction NETL <u-so>
US: Tanker Railcar, 26,470 Gal Net Capacity, Construction NETL <u-so>
US: Tanker Unit Train Assembly, 100 Railcars, Construction NETL <u-so>
WOR: Steel Plate, BF, Manufacture NETL <u-so>
Fuel Transport Train, Operation
US: DIESEL, NATIONAL AVERAGE, 2009 NETL <u-so>
US: Petroleum-Based Fuel, Train Transport NETL <u-so>
US: Assembly: Fuel Rail Transport (Construction & Operation) NETL

Parameters and Balances

The parameters for the highest level modeling plan for RMA and RMT of domestic crude oil are shown in **Table 3**. These parameters may or may not include the adjustable parameters shown previously, depending on how the model was created. **Table 4** presents the input and output balances for resources and emissions of interest for the cradle-to-gate plan as well as each of the RMA and RMT plans.

Table 3: Adjustable Parameters for RMA and RMT of Domestic Crude Oil

Plan	Parameter	Value	Comment
LC Stage #1			
Domestic Crude Oil RMA	Onshore_prod	0.669	[dimensionless] Portion of US petroleum extracted onshore, outside of California
Domestic Crude Oil RMA	Offshore_prod	0.331	[dimensionless] Portion of US petroleum extracted offshore, outside of California
LC Stage #2			
Domestic Crude Oil RMT	S2_F_TRAIN_DIS	644	[miles] User Defined parameter, default value is 200 miles one way
Domestic Crude Oil RMT	S2_TRK_TANK_DIS	46	[miles] adjustable parameter for distance from Origin to Destination
Domestic Crude Oil RMT	S2_WATDOMDISZ	546	[miles] Transportation via water carrier from US ports to US port (Domestic)
Domestic Crude Oil RMT	S2_WATFOREDISZ	0.0	[miles] Transportation via water carrier from foreign port to US port (Foreign)
Domestic Crude Oil RMT	S2D_PIPE_LENGTH	100	[mile] User Defined Value. Default is 100 mile
Domestic Crude Oil RMT	S2F_PIPE_LENGTH	0.0	[mile] User Defined Value. Default is 100 mile

Table 4: Inputs and Output Balances for Cradle-to-Gate, RMA, and RMT of Domestic Crude Oil (kg/kg delivered)

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Inputs			
Flows	2.129E+00	3.282E-01	1.801E+00
Resources	2.129E+00	3.282E-01	1.801E+00
Energy resources	1.072E+00	7.945E-03	1.064E+00
Non renewable energy resources	1.072E+00	7.945E-03	1.064E+00
Crude oil (resource)	1.015E+00	3.348E-04	1.015E+00
Crude oil Algeria	1.386E-04	2.207E-06	1.364E-04
Crude oil Angola	2.308E-04	6.505E-06	2.243E-04
Crude oil Argentina	4.291E-05	1.355E-06	4.156E-05
Crude oil Australia	4.006E-05	1.824E-06	3.824E-05
Crude oil Austria	6.969E-06	8.837E-08	6.881E-06
Crude oil Bolivia	2.108E-10	3.275E-13	2.105E-10

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Crude oil Brazil	5.040E-05	1.231E-06	4.917E-05
Crude oil Brunei	2.832E-11	1.742E-11	1.090E-11
Crude oil Bulgaria	3.262E-11	1.601E-11	1.660E-11
Crude oil Cameroon	3.502E-05	5.721E-07	3.445E-05
Crude oil Canada	7.996E-04	2.613E-05	7.735E-04
Crude oil Chile	2.099E-10	5.173E-11	1.581E-10
Crude oil China	1.062E-05	3.460E-07	1.027E-05
Crude oil CIS	1.105E-03	1.503E-05	1.090E-03
Crude oil Colombia	1.387E-04	4.415E-06	1.343E-04
Crude oil Czech Republic	4.694E-07	5.917E-09	4.634E-07
Crude oil Denmark	2.155E-04	2.864E-06	2.126E-04
Crude oil Ecuador	6.077E-05	1.964E-06	5.881E-05
Crude oil Egypt	2.873E-05	3.611E-07	2.837E-05
Crude oil France	1.025E-05	1.410E-07	1.011E-05
Crude oil Gabon	1.001E-04	3.168E-06	9.695E-05
Crude oil Germany	4.047E-05	5.009E-07	3.997E-05
Crude oil Greece	1.384E-06	1.767E-08	1.366E-06
Crude oil Hungary	6.676E-09	9.581E-11	6.580E-09
Crude oil India	1.272E-11	1.233E-11	3.901E-13
Crude oil Indonesia	3.202E-05	1.224E-06	3.080E-05
Crude oil Iran	1.981E-04	2.634E-06	1.955E-04
Crude oil Iraq	3.831E-04	1.017E-05	3.729E-04
Crude oil Ireland	5.364E-11	4.493E-13	5.319E-11
Crude oil Italy	4.503E-05	5.677E-07	4.446E-05
Crude oil Kuwait	1.668E-04	4.457E-06	1.623E-04
Crude oil Libya	3.274E-04	4.036E-06	3.234E-04
Crude oil Malaysia	1.485E-11	8.610E-12	6.236E-12
Crude oil Mexico	8.961E-04	2.761E-05	8.685E-04
Crude oil Netherlands	2.826E-05	3.783E-07	2.789E-05
Crude oil New Zealand	9.523E-07	6.072E-08	8.916E-07
Crude oil Nigeria	4.747E-04	1.249E-05	4.622E-04
Crude oil Norway	1.050E-03	1.837E-05	1.032E-03
Crude oil Oman	1.031E-05	3.069E-07	1.000E-05
Crude oil Poland	1.828E-06	2.428E-08	1.803E-06
Crude oil Qatar	5.418E-06	1.939E-07	5.224E-06
Crude oil Romania	2.789E-06	3.536E-08	2.754E-06

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Crude oil Saudi Arabia	1.244E-03	3.236E-05	1.212E-03
Crude oil Slovakia	1.589E-11	8.959E-13	1.499E-11
Crude oil South Africa	9.557E-11	3.539E-13	9.522E-11
Crude oil Spain	2.307E-06	2.942E-08	2.278E-06
Crude oil Syria	1.831E-10	9.090E-11	9.217E-11
Crude oil Trinidad and Tobago	3.740E-05	1.194E-06	3.620E-05
Crude oil Tunisia	1.315E-05	1.676E-07	1.298E-05
Crude oil Turkey	1.864E-15	3.755E-16	1.488E-15
Crude oil United Arab Emirates	6.812E-06	2.881E-07	6.524E-06
Crude oil United Kingdom	1.394E-03	2.422E-05	1.369E-03
Crude oil USA	1.005E+00	9.806E-05	1.005E+00
Crude oil Venezuela	8.853E-04	2.723E-05	8.581E-04
Hard coal (resource)	9.609E-03	6.021E-03	3.588E-03
Hard coal Australia	1.206E-04	6.779E-06	1.138E-04
Hard coal Belgium	1.744E-08	7.003E-09	1.043E-08
Hard coal Bosnia and Herzegovina	2.773E-09	1.387E-09	1.386E-09
Hard coal Brazil	4.777E-07	4.803E-09	4.729E-07
Hard coal Canada	1.283E-03	1.351E-05	1.269E-03
Hard coal Chile	2.189E-08	5.400E-09	1.649E-08
Hard coal China	1.472E-05	8.081E-07	1.392E-05
Hard coal CIS	2.850E-05	1.201E-06	2.730E-05
Hard coal Colombia	2.473E-04	5.516E-05	1.921E-04
Hard coal Czech Republic	1.147E-05	1.440E-07	1.133E-05
Hard coal France	3.605E-07	1.463E-07	2.142E-07
Hard coal Germany	2.454E-04	3.285E-06	2.421E-04
Hard coal India	8.878E-10	8.878E-10	7.378E-17
Hard coal Indonesia	2.126E-05	1.168E-05	9.578E-06
Hard coal Italy	6.102E-10	1.764E-10	4.339E-10
Hard coal Japan	4.083E-12	2.398E-13	3.843E-12
Hard coal Malaysia	5.567E-13	3.030E-13	2.537E-13
Hard coal Mexico	3.210E-08	2.530E-08	6.808E-09
Hard coal New Zealand	1.813E-08	4.429E-09	1.370E-08
Hard coal Poland	7.278E-05	1.658E-06	7.112E-05
Hard coal Portugal	3.452E-10	1.370E-12	3.438E-10
Hard coal South Africa	1.266E-04	4.542E-06	1.221E-04
Hard coal Spain	1.010E-05	2.037E-08	1.008E-05

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Hard coal Turkey	8.488E-12	1.657E-12	6.831E-12
Hard coal United Kingdom	9.736E-06	1.681E-06	8.055E-06
Hard coal USA	7.341E-03	5.900E-03	1.441E-03
Hard coal Venezuela	7.426E-05	2.009E-05	5.417E-05
Hard coal Vietnam	1.152E-06	2.511E-08	1.127E-06
Lignite (resource)	1.862E-03	1.804E-04	1.682E-03
Lignite Australia	5.238E-05	8.479E-07	5.153E-05
Lignite Austria	1.713E-06	3.590E-09	1.709E-06
Lignite Bosnia and Herzegovina	6.263E-09	3.204E-09	3.060E-09
Lignite Bulgaria	1.184E-08	2.003E-09	9.836E-09
Lignite Canada	2.039E-05	7.811E-07	1.961E-05
Lignite CIS	1.244E-06	1.169E-08	1.233E-06
Lignite Czech Republic	6.590E-06	8.747E-08	6.502E-06
Lignite France	9.514E-08	3.868E-08	5.646E-08
Lignite Germany (Central Germany)	1.123E-03	5.066E-06	1.118E-03
Lignite Germany (Lausitz)	1.493E-04	4.416E-06	1.449E-04
Lignite Germany (Rheinisch)	2.704E-04	8.865E-06	2.615E-04
Lignite Greece	6.831E-07	4.893E-08	6.342E-07
Lignite Hungary	3.589E-08	9.161E-09	2.673E-08
Lignite India	1.776E-10	1.776E-10	1.476E-17
Lignite Macedonia	1.061E-08	4.264E-09	6.346E-09
Lignite Poland	2.381E-06	7.315E-08	2.307E-06
Lignite Romania	1.175E-09	5.560E-10	6.190E-10
Lignite Serbia and Montenegro	4.868E-08	2.439E-08	2.429E-08
Lignite Slovakia	3.789E-09	1.454E-09	2.335E-09
Lignite Slovenia	2.927E-08	8.408E-09	2.086E-08
Lignite Spain	2.126E-05	4.291E-08	2.121E-05
Lignite Turkey	2.310E-13	4.654E-14	1.844E-13
Lignite USA	2.129E-04	1.601E-04	5.276E-05
Natural gas (resource)	4.546E-02	1.409E-03	4.406E-02
Natural gas Algeria	3.034E-05	2.420E-06	2.792E-05
Natural gas Angola	2.937E-05	8.292E-07	2.854E-05
Natural gas Argentina	4.259E-06	1.607E-07	4.098E-06
Natural gas Australia	8.317E-06	2.088E-07	8.108E-06
Natural gas Austria	1.225E-06	8.616E-09	1.217E-06
Natural gas Bolivia	4.237E-07	6.581E-10	4.230E-07

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Natural gas Brazil	6.616E-06	1.423E-07	6.473E-06
Natural gas Brunei	2.509E-07	1.508E-07	1.001E-07
Natural gas Bulgaria	4.042E-12	1.370E-12	2.672E-12
Natural gas Cameroon	8.688E-06	1.429E-07	8.545E-06
Natural gas Canada	3.455E-04	2.278E-04	1.177E-04
Natural gas Chile	4.993E-08	1.231E-08	3.763E-08
Natural gas China	1.209E-06	3.939E-08	1.169E-06
Natural gas CIS	2.125E-04	3.897E-06	2.087E-04
Natural gas Colombia	1.512E-05	4.814E-07	1.463E-05
Natural gas Czech Republic	3.596E-08	4.540E-10	3.550E-08
Natural gas Denmark	2.209E-05	3.496E-07	2.174E-05
Natural gas Ecuador	6.770E-06	2.188E-07	6.551E-06
Natural gas Egypt	2.896E-06	3.653E-08	2.860E-06
Natural gas France	1.059E-06	5.378E-08	1.005E-06
Natural gas Gabon	1.478E-05	4.677E-07	1.431E-05
Natural gas Germany	1.037E-04	2.136E-06	1.015E-04
Natural gas Greece	9.479E-08	1.179E-09	9.361E-08
Natural gas Hungary	3.704E-09	4.549E-10	3.249E-09
Natural gas India	6.811E-11	6.807E-11	3.899E-14
Natural gas Indonesia	1.611E-06	6.871E-08	1.543E-06
Natural gas Iran	2.249E-05	3.032E-07	2.219E-05
Natural gas Iraq	3.865E-05	1.025E-06	3.763E-05
Natural gas Ireland	1.197E-07	1.007E-09	1.187E-07
Natural gas Italy	5.104E-06	9.857E-08	5.005E-06
Natural gas Japan	4.297E-13	7.591E-14	3.537E-13
Natural gas Kuwait	1.592E-05	4.307E-07	1.549E-05
Natural gas Libyan	9.120E-06	1.058E-07	9.014E-06
Natural gas Malaysia	2.300E-07	1.499E-07	8.015E-08
Natural gas Mexico	9.636E-05	3.159E-06	9.320E-05
Natural gas Netherlands	1.206E-04	4.121E-06	1.165E-04
Natural gas New Zealand	6.329E-08	4.027E-09	5.926E-08
Natural gas Nigeria	8.864E-05	2.966E-06	8.567E-05
Natural gas Norway	1.138E-04	2.898E-06	1.109E-04
Natural gas Oman	1.965E-06	1.841E-07	1.781E-06
Natural gas Poland	1.260E-07	1.822E-09	1.242E-07
Natural gas Qatar	4.715E-06	2.285E-06	2.431E-06

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Natural gas Romania	1.782E-07	2.286E-09	1.759E-07
Natural gas Saudi Arabia	1.152E-04	3.031E-06	1.121E-04
Natural gas Slovakia	1.515E-10	9.756E-12	1.417E-10
Natural gas South Africa	5.339E-09	1.417E-09	3.922E-09
Natural gas Spain	4.419E-07	2.814E-09	4.391E-07
Natural gas Syria	1.967E-11	9.768E-12	9.905E-12
Natural gas Trinidad and Tobago	1.800E-05	9.909E-06	8.087E-06
Natural gas Tunisia	1.722E-06	2.194E-08	1.700E-06
Natural gas Turkey	1.885E-16	3.798E-17	1.505E-16
Natural gas United Arab Emirates	1.043E-06	3.044E-08	1.012E-06
Natural gas United Kingdom	1.135E-04	4.000E-06	1.095E-04
Natural gas USA	4.376E-02	1.109E-03	4.265E-02
Natural gas Venezuela	8.362E-05	2.651E-06	8.097E-05
Pit Methane	3.903E-05	2.273E-05	1.630E-05
Uranium (resource)	1.892E-07	1.509E-07	3.825E-08
Uranium natural	1.892E-07	1.509E-07	3.825E-08
Renewable energy resources	2.106E-06	6.245E-08	2.044E-06
Primary energy from geothermics	0.000E+00	0.000E+00	0.000E+00
Primary energy from hydro power	0.000E+00	0.000E+00	0.000E+00
Primary energy from solar energy	0.000E+00	0.000E+00	0.000E+00
Primary energy from wind power	0.000E+00	0.000E+00	0.000E+00
Wood	2.106E-06	6.245E-08	2.044E-06
Land use	0.000E+00	0.000E+00	0.000E+00
Occupation	0.000E+00	0.000E+00	0.000E+00
Biotic Production	0.000E+00	0.000E+00	0.000E+00
Erosion Resistance	0.000E+00	0.000E+00	0.000E+00
Groundwater Replenishment	0.000E+00	0.000E+00	0.000E+00
Mechanical Filtration	0.000E+00	0.000E+00	0.000E+00
Physicochemical Filtration	0.000E+00	0.000E+00	0.000E+00
Transformation	0.000E+00	0.000E+00	0.000E+00
Biotic Production	0.000E+00	0.000E+00	0.000E+00
Erosion Resistance	0.000E+00	0.000E+00	0.000E+00
Groundwater Replenishment	0.000E+00	0.000E+00	0.000E+00
Mechanical Filtration	0.000E+00	0.000E+00	0.000E+00
Physicochemical Filtration	0.000E+00	0.000E+00	0.000E+00
Material resources	1.057E+00	3.202E-01	7.367E-01

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Non renewable elements	3.483E-11	8.355E-13	3.399E-11
Iron	7.694E-13	1.992E-14	7.495E-13
Lead	4.731E-18	8.358E-19	3.895E-18
Sulphur	3.406E-11	8.155E-13	3.324E-11
Non renewable resources	5.106E-01	3.265E-02	4.780E-01
Barium sulphate	4.849E-16	8.567E-17	3.992E-16
Basalt	5.862E-06	2.135E-07	5.649E-06
Bauxite	1.137E-05	6.655E-08	1.130E-05
Bentonite	8.680E-03	1.175E-05	8.668E-03
Calcium chloride	4.965E-14	8.771E-15	4.087E-14
Chromium ore (39%)	4.149E-08	2.190E-08	1.959E-08
Clay	4.778E-04	1.305E-06	4.765E-04
Colemanite ore	5.593E-09	2.699E-09	2.894E-09
Copper - Gold - Silver - ore (1,0% Cu; 0,4 g/t Au; 66 g/t Ag)	9.563E-08	9.563E-08	0.000E+00
Copper - Gold - Silver - ore (1,1% Cu; 0,01 g/t Au; 2,86 g/t Ag)	5.826E-08	5.826E-08	0.000E+00
Copper - Gold - Silver - ore (1,16% Cu; 0,002 g/t Au; 1,06 g/t Ag)	3.288E-08	3.288E-08	0.000E+00
Copper - Molybdenum - Gold - Silver - ore (1,13% Cu; 0,02% Mo; 0,01 g/t Au; 2,86 g/t Ag)	8.011E-08	8.011E-08	0.000E+00
Copper ore (0.14%)	1.089E-06	5.170E-07	5.719E-07
Copper ore (1.2%)	9.917E-09	9.917E-09	0.000E+00
Copper ore (4%)	3.155E-15	1.113E-17	3.144E-15
Copper ore (sulphidic, 1.1%)	3.743E-12	1.321E-14	3.730E-12
Dolomite	8.820E-09	1.996E-10	8.621E-09
Ferro manganese	2.365E-18	4.179E-19	1.947E-18
Fluorspar (calcium fluoride; fluorite)	1.398E-08	3.350E-10	1.365E-08
Gypsum (natural gypsum)	3.107E-04	8.497E-07	3.098E-04
Heavy spar (BaSO4)	2.099E-02	2.838E-05	2.097E-02
Inert rock	4.551E-01	3.223E-02	4.229E-01
Iron ore (56,86%)	6.370E-03	1.128E-05	6.359E-03
Iron ore (65%)	2.384E-07	2.264E-09	2.361E-07
Kaolin ore	7.859E-09	4.838E-09	3.021E-09
Lead - zinc ore (4.6%-0.6%)	1.693E-03	2.281E-06	1.690E-03
Limestone (calcium carbonate)	1.511E-02	2.572E-04	1.486E-02
Magnesit (Magnesium carbonate)	6.132E-09	1.821E-11	6.114E-09
Magnesium chloride leach (40%)	9.049E-05	4.232E-07	9.007E-05
Manganese ore	8.218E-09	4.472E-09	3.746E-09

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Manganese ore (R.O.M.)	6.640E-05	9.132E-08	6.630E-05
Molybdenite (Mo 0,24%)	4.910E-08	4.895E-08	1.570E-10
Natural Aggregate	5.830E-04	8.630E-05	4.967E-04
Nickel ore (1,5%)	1.586E-11	7.472E-12	8.390E-12
Nickel ore (1.6%)	2.341E-04	3.412E-07	2.337E-04
Olivine	2.602E-17	4.597E-18	2.142E-17
Peat	1.128E-05	1.729E-08	1.126E-05
Phosphate ore	2.235E-09	4.883E-12	2.230E-09
Phosphorus minerals	5.665E-09	2.556E-11	5.640E-09
Potassium chloride	2.779E-09	8.170E-12	2.771E-09
Precious metal ore (R.O.M)	2.831E-09	2.022E-09	8.091E-10
Quartz sand (silica sand; silicon dioxide)	1.054E-04	2.223E-07	1.052E-04
Raw pumice	7.634E-10	4.699E-10	2.935E-10
Slate	4.376E-17	7.731E-18	3.603E-17
Sodium chloride (rock salt)	4.542E-06	6.865E-08	4.473E-06
Sodium sulphate	1.077E-11	4.464E-13	1.032E-11
Soil	3.326E-04	1.614E-05	3.164E-04
Sulphur (bonded)	1.634E-11	4.137E-13	1.593E-11
Talc	2.655E-09	8.811E-11	2.566E-09
Tin ore	4.205E-17	7.429E-18	3.462E-17
Titanium ore	2.155E-05	6.133E-08	2.149E-05
Zinc - copper ore (4.07%-2.59%)	2.810E-04	4.467E-07	2.806E-04
Zinc - lead - copper ore (12%-3%-2%)	1.172E-04	1.913E-07	1.170E-04
Zinc - lead ore (4.21%-4.96%)	1.077E-15	3.802E-18	1.074E-15
Zinc ore (sulphidic, 4%)	2.815E-15	2.592E-17	2.789E-15
Renewable resources	5.463E-01	2.876E-01	2.587E-01
Water	2.981E-01	1.803E-01	1.178E-01
Water	4.536E-05	4.536E-05	0.000E+00
Water (ground water)	1.795E-02	6.818E-03	1.113E-02
Water (river water)	0.000E+00	0.000E+00	0.000E+00
Water (sea water)	1.446E-02	0.000E+00	1.447E-02
Water (surface water)	2.657E-01	1.734E-01	9.224E-02
Air	2.480E-01	1.072E-01	1.407E-01
Carbon dioxide	2.056E-04	1.973E-05	1.859E-04
Nitrogen	6.856E-11	1.931E-13	6.836E-11
Oxygen	2.029E-07	2.029E-07	0.000E+00

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Output			
Flows	6.435E-01	3.045E-01	3.390E-01
Resources	1.971E-01	1.349E-01	6.221E-02
Material resources	1.971E-01	1.349E-01	6.221E-02
Renewable resources	1.971E-01	1.349E-01	6.221E-02
Water	1.971E-01	1.349E-01	6.221E-02
Water (river water)	1.971E-01	1.349E-01	6.221E-02
Water (sea water)	0.000E+00	1.412E-05	0.000E+00
Emissions to air	4.068E-01	1.695E-01	2.374E-01
Heavy metals to air	1.019E-07	1.829E-08	8.364E-08
Antimony	3.016E-10	1.714E-10	1.301E-10
Arsenic (+V)	2.943E-09	2.010E-09	9.326E-10
Arsenic trioxide	1.164E-12	1.589E-15	1.163E-12
Cadmium (+II)	3.693E-10	1.080E-10	2.613E-10
Chromium (+III)	2.416E-10	6.603E-13	2.410E-10
Chromium (unspecified)	9.043E-10	1.749E-10	7.294E-10
Cobalt	4.450E-10	9.001E-11	3.550E-10
Copper (+II)	1.739E-09	2.118E-10	1.527E-09
Heavy metals to air (unspecified)	1.128E-11	1.076E-12	1.020E-11
Hydrogen arsenic (arsine)	9.664E-11	1.319E-13	9.651E-11
Iron	1.913E-09	5.466E-11	1.859E-09
Lanthanides	3.051E-13	5.775E-15	2.993E-13
Lead (+II)	1.733E-08	9.561E-10	1.637E-08
Manganese (+II)	7.201E-09	4.426E-10	6.758E-09
Mercury (+II)	6.640E-10	1.942E-10	4.698E-10
Molybdenum	1.215E-10	3.046E-12	1.185E-10
Nickel (+II)	3.850E-09	5.568E-10	3.293E-09
Palladium	1.374E-18	2.428E-19	1.131E-18
Rhodium	1.327E-18	2.344E-19	1.092E-18
Selenium	6.181E-09	5.011E-09	1.170E-09
Silver	5.510E-19	3.942E-19	1.567E-19
Tellurium	3.222E-11	8.804E-14	3.213E-11
Thallium	2.370E-10	6.133E-13	2.364E-10
Tin (+IV)	2.566E-09	1.897E-09	6.697E-10
Titanium	1.812E-11	5.645E-13	1.756E-11
Vanadium (+III)	4.313E-08	4.013E-09	3.912E-08

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Zinc (+II)	1.163E-08	2.389E-09	9.243E-09
Inorganic emissions to air	2.515E-01	7.987E-02	1.716E-01
Ammonia	6.153E-07	4.057E-07	2.096E-07
Ammonium	1.092E-13	6.520E-14	4.400E-14
Ammonium nitrate	9.582E-14	2.428E-15	9.339E-14
Barium	1.322E-05	2.101E-08	1.320E-05
Beryllium	1.007E-10	2.371E-11	7.703E-11
Boron compounds (unspecified)	4.452E-08	3.460E-08	9.920E-09
Bromine	1.911E-08	1.483E-08	4.274E-09
Carbon dioxide	1.867E-01	2.947E-02	1.573E-01
Carbon dioxide (biotic)	1.103E-05	1.103E-05	0.000E+00
Carbon disulphide	1.110E-12	7.558E-14	1.034E-12
Carbon monoxide	4.383E-04	1.699E-05	4.213E-04
Chloride (unspecified)	2.005E-08	3.121E-10	1.974E-08
Chlorine	5.449E-12	9.541E-14	5.354E-12
Cyanide (unspecified)	7.560E-10	2.183E-11	7.342E-10
Fluoride	4.920E-09	3.941E-09	9.793E-10
Fluorides	8.156E-09	0.000E+00	8.156E-09
Fluorine	1.044E-11	3.139E-13	1.013E-11
Helium	3.264E-09	2.380E-11	3.240E-09
Hydrogen	7.644E-07	1.164E-09	7.632E-07
Hydrogen bromine (hydrobromic acid)	2.461E-10	1.244E-12	2.449E-10
Hydrogen chloride	4.917E-07	1.115E-07	3.802E-07
Hydrogen cyanide (prussic acid)	9.706E-11	8.806E-13	9.618E-11
Hydrogen fluoride	8.505E-08	1.972E-08	6.533E-08
Hydrogen iodide	1.059E-14	9.989E-16	9.596E-15
Hydrogen phosphorous	4.441E-14	3.361E-15	4.105E-14
Hydrogen sulphide	1.111E-06	1.882E-08	1.092E-06
Lead dioxide	5.753E-15	4.117E-15	1.637E-15
Nitrogen (atmospheric nitrogen)	1.551E-05	4.247E-06	1.126E-05
Nitrogen dioxide	6.217E-15	4.978E-15	1.238E-15
Nitrogen monoxide	4.009E-11	1.621E-13	3.993E-11
Nitrogen oxides	7.548E-04	5.625E-05	6.986E-04
Nitrous oxide (laughing gas)	5.242E-06	4.963E-07	4.745E-06
Oxygen	1.475E-04	8.889E-06	1.386E-04
Scandium	1.528E-13	1.946E-15	1.509E-13

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Steam	6.284E-02	5.002E-02	1.281E-02
Strontium	5.840E-12	9.464E-14	5.745E-12
Sulphur dioxide	3.739E-04	1.100E-04	2.639E-04
Sulphur hexafluoride	3.973E-13	2.812E-13	1.161E-13
sulphur oxide	1.735E-04	1.735E-04	0.000E+00
Sulphuric acid	6.218E-09	9.541E-12	6.208E-09
Tin oxide	5.006E-16	3.582E-16	1.424E-16
Zinc oxide	1.001E-15	7.164E-16	2.848E-16
Zinc sulphate	2.436E-09	3.303E-12	2.432E-09
Organic emissions to air (group VOC)	1.910E-03	8.807E-04	1.029E-03
Group NMVOC to air	1.037E-03	8.539E-04	1.828E-04
Group PAH to air	5.068E-08	4.310E-10	5.025E-08
Anthracene	2.155E-10	3.191E-13	2.152E-10
Benzo{a}anthracene	1.084E-10	1.605E-13	1.083E-10
Benzo{a}pyrene	4.943E-11	1.877E-12	4.755E-11
Benzo{ghi}perylene	9.672E-11	1.432E-13	9.658E-11
Benzofluoranthene	1.934E-10	2.864E-13	1.932E-10
Chrysene	2.663E-10	3.944E-13	2.659E-10
Dibenz(a)anthracene	6.028E-11	8.927E-14	6.019E-11
Indeno[1,2,3-cd]pyrene	7.198E-11	1.066E-13	7.187E-11
Naphthalene	2.263E-08	3.351E-11	2.260E-08
Phenanthrene	7.108E-09	1.053E-11	7.097E-09
Polycyclic aromatic hydrocarbons (PAH)	1.988E-08	3.836E-10	1.950E-08
Halogenated organic emissions to air	4.695E-09	2.897E-09	1.798E-09
Dichloromethane (methylene chloride)	1.920E-17	3.392E-18	1.581E-17
Dioxins (unspec.)	9.538E-15	1.251E-17	9.526E-15
Halogenated hydrocarbons (unspecified)	9.522E-18	1.674E-18	7.847E-18
Polychlorinated biphenyls (PCB unspecified)	2.124E-10	2.893E-13	2.121E-10
Polychlorinated dibenzo-p-dioxins (2,3,7,8 - TCDD)	8.473E-15	9.667E-16	7.507E-15
R 11 (trichlorofluoromethane)	1.348E-09	1.109E-09	2.390E-10
R 114 (dichlorotetrafluoroethane)	1.380E-09	1.135E-09	2.447E-10
R 12 (dichlorodifluoromethane)	2.897E-10	2.384E-10	5.138E-11
R 13 (chlorotrifluoromethane)	1.819E-10	1.497E-10	3.226E-11
R 22 (chlorodifluoromethane)	3.167E-10	2.605E-10	5.615E-11
Tetrafluoromethane	1.303E-10	1.830E-12	1.284E-10
Vinyl chloride (VCM; chloroethene)	8.360E-10	2.150E-12	8.339E-10

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Acetaldehyde (Ethanal)	1.362E-08	1.421E-09	1.220E-08
Acetic acid	1.838E-08	7.841E-09	1.054E-08
Acetone (dimethylcetone)	1.240E-08	1.403E-09	1.100E-08
Acrolein	1.521E-09	2.252E-12	1.518E-09
Aldehyde (unspecified)	6.731E-10	1.519E-10	5.212E-10
Alkane (unspecified)	1.081E-07	8.468E-08	2.346E-08
Alkene (unspecified)	9.389E-08	7.943E-08	1.447E-08
Aromatic hydrocarbons (unspecified)	1.496E-09	5.526E-10	9.433E-10
Benzene	1.998E-07	7.100E-09	1.927E-07
Butadiene	1.045E-13	6.436E-14	4.019E-14
Butane	1.666E-05	9.347E-08	1.657E-05
Butane (n-butane)	3.445E-08	2.490E-08	9.551E-09
Cyclohexane (hexahydro benzene)	2.544E-11	1.733E-12	2.371E-11
Diethylamine	2.730E-18	1.630E-18	1.100E-18
Ethane	4.441E-05	3.422E-07	4.406E-05
Ethanol	8.391E-09	3.486E-09	4.906E-09
Ethene (ethylene)	2.761E-09	1.090E-11	2.750E-09
Ethyl benzene	9.475E-08	7.915E-08	1.559E-08
Fluoranthene	7.018E-10	1.039E-12	7.008E-10
Fluorene	2.227E-09	3.297E-12	2.224E-09
Formaldehyde (methanal)	7.562E-08	4.192E-08	3.370E-08
Heptane (isomers)	5.905E-07	7.317E-10	5.897E-07
Hexamethylene diamine (HMDA)	6.150E-15	3.786E-15	2.364E-15
Hexane (isomers)	8.763E-07	1.378E-09	8.749E-07
Mercaptan (unspecified)	1.110E-08	2.625E-11	1.108E-08
Methanol	7.499E-09	2.766E-09	4.733E-09
NMVOC (unspecified)	8.858E-04	8.523E-04	3.348E-05
Octane	3.248E-07	4.025E-10	3.244E-07
Pentane (n-pentane)	5.666E-06	1.163E-07	5.549E-06
Phenol (hydroxy benzene)	1.768E-13	4.511E-14	1.317E-13
Propane	8.110E-05	3.294E-07	8.077E-05
Propene (propylene)	8.468E-09	7.195E-09	1.272E-09
Propionic acid (propane acid)	1.474E-12	3.709E-13	1.103E-12
Styrene	2.817E-14	1.919E-15	2.625E-14
Toluene (methyl benzene)	9.844E-08	3.607E-08	6.237E-08
Trimethylbenzene	4.876E-15	3.489E-15	1.387E-15

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Xylene (dimethyl benzene)	4.288E-07	3.311E-07	9.773E-08
Methane	8.672E-04	2.436E-05	8.428E-04
Organic chlorine compounds	4.792E-14	1.217E-15	4.671E-14
VOC (unspecified)	5.658E-06	2.494E-06	3.164E-06
Other emissions to air	1.534E-01	8.869E-02	6.469E-02
Exhaust	1.518E-01	8.863E-02	6.316E-02
non used primary energy from wind power	0.000E+00	0.000E+00	0.000E+00
Unused primary energy from solar energy	0.000E+00	0.000E+00	0.000E+00
Used air	1.589E-03	6.523E-05	1.524E-03
Waste heat	0.000E+00	0.000E+00	0.000E+00
Particles to air	4.377E-05	1.435E-05	2.942E-05
Dust (PM10)	4.055E-06	1.483E-07	3.907E-06
Dust (PM2,5 - PM10)	1.110E-05	1.110E-05	0.000E+00
Dust (PM2.5)	1.528E-05	1.033E-06	1.425E-05
Dust (unspecified)	1.333E-05	2.062E-06	1.127E-05
Metals (unspecified)	5.634E-14	3.505E-15	5.283E-14
Wood (dust)	1.848E-13	1.322E-13	5.256E-14
Radioactive emissions to air	1.626E-09	1.297E-09	3.293E-10
Antimony (Sb124)	0.000E+00	0.000E+00	0.000E+00
Argon (Ar41)	0.000E+00	0.000E+00	0.000E+00
Carbon (C14)	0.000E+00	0.000E+00	0.000E+00
Cesium (Cs134)	0.000E+00	0.000E+00	0.000E+00
Cesium (Cs137)	0.000E+00	0.000E+00	0.000E+00
Cobalt (Co58)	0.000E+00	0.000E+00	0.000E+00
Cobalt (Co60)	0.000E+00	0.000E+00	0.000E+00
Hydrogen (H3)	0.000E+00	0.000E+00	0.000E+00
Iodine (I129)	0.000E+00	0.000E+00	0.000E+00
Iodine (I131)	0.000E+00	0.000E+00	0.000E+00
Krypton (Kr85)	0.000E+00	0.000E+00	0.000E+00
Krypton (Kr85m)	0.000E+00	0.000E+00	0.000E+00
Plutonium (Pu alpha)	0.000E+00	0.000E+00	0.000E+00
Radon (Rn222)	0.000E+00	0.000E+00	0.000E+00
Uranium (total)	1.626E-09	1.297E-09	3.293E-10
Uranium (U234)	0.000E+00	0.000E+00	0.000E+00
Uranium (U235)	0.000E+00	0.000E+00	0.000E+00
Uranium (U238)	0.000E+00	0.000E+00	0.000E+00

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Xenon (Xe131m)	0.000E+00	0.000E+00	0.000E+00
Xenon (Xe133)	0.000E+00	0.000E+00	0.000E+00
Xenon (Xe133m)	0.000E+00	0.000E+00	0.000E+00
Xenon (Xe135)	0.000E+00	0.000E+00	0.000E+00
Xenon (Xe135m)	0.000E+00	0.000E+00	0.000E+00
Xenon (Xe137)	0.000E+00	0.000E+00	0.000E+00
Xenon (Xe138)	0.000E+00	0.000E+00	0.000E+00
Emissions to fresh water	3.968E-04	1.489E-04	2.479E-04
Analytical measures to fresh water	1.562E-05	7.134E-06	8.489E-06
Adsorbable organic halogen compounds (AOX)	8.320E-08	3.079E-10	8.289E-08
Biological oxygen demand (BOD)	2.058E-07	3.233E-08	1.735E-07
Chemical oxygen demand (COD)	1.430E-05	6.877E-06	7.420E-06
Solids (dissolved)	2.366E-07	1.893E-07	4.733E-08
Total dissolved organic bounded carbon	2.823E-13	2.607E-13	2.166E-14
Total organic bounded carbon	8.020E-07	3.591E-08	7.661E-07
Heavy metals to fresh water	8.979E-06	4.384E-06	4.596E-06
Antimony	9.510E-16	6.804E-16	2.705E-16
Arsenic (+V)	2.465E-09	6.761E-10	1.789E-09
Cadmium (+II)	7.748E-08	8.455E-10	7.663E-08
Chromium (+III)	3.716E-10	2.916E-10	8.000E-11
Chromium (+VI)	1.332E-16	4.501E-19	1.328E-16
Chromium (unspecified)	3.226E-09	3.883E-10	2.838E-09
Cobalt	3.063E-11	5.649E-13	3.007E-11
Copper (+II)	9.896E-09	2.178E-09	7.718E-09
Heavy metals to water (unspecified)	1.191E-10	1.221E-11	1.068E-10
Iron	8.665E-06	4.318E-06	4.347E-06
Lead (+II)	8.534E-09	3.263E-09	5.271E-09
Manganese (+II)	2.431E-08	1.678E-08	7.527E-09
Mercury (+II)	2.139E-10	4.364E-11	1.703E-10
Molybdenum	4.114E-09	3.218E-09	8.964E-10
Nickel (+II)	4.297E-09	1.470E-09	2.827E-09
Selenium	7.951E-10	5.499E-10	2.452E-10
Silver	5.362E-11	4.526E-12	4.910E-11
Strontium	1.557E-07	3.254E-08	1.232E-07
Thallium	4.081E-11	5.573E-14	4.076E-11
Tin (+IV)	5.610E-11	2.039E-12	5.406E-11

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Titanium	9.324E-10	3.348E-10	5.976E-10
Vanadium (+III)	1.620E-09	9.787E-10	6.409E-10
Zinc (+II)	2.005E-08	1.865E-09	1.818E-08
Inorganic emissions to fresh water	2.311E-04	1.099E-04	1.212E-04
Acid (calculated as H+)	1.035E-09	3.081E-10	7.272E-10
Aluminum (+III)	1.334E-07	1.046E-07	2.883E-08
Ammonia	1.007E-08	2.068E-10	9.868E-09
Ammonium / ammonia	6.500E-07	8.094E-08	5.690E-07
Barium	1.001E-08	5.115E-10	9.502E-09
Beryllium	4.859E-12	3.887E-12	9.718E-13
Boron	4.624E-08	3.754E-08	8.693E-09
Bromine	2.640E-11	6.552E-14	2.633E-11
Calcium (+II)	7.462E-06	5.841E-06	1.621E-06
Carbonate	6.140E-07	1.964E-08	5.944E-07
Chloride	1.530E-04	6.198E-05	9.106E-05
Chlorine (dissolved)	2.672E-07	1.389E-07	1.282E-07
Cyanide	1.059E-10	1.416E-12	1.045E-10
Fluoride	1.970E-05	1.704E-05	2.657E-06
Fluorine	1.270E-08	2.577E-11	1.268E-08
Hydrogen chloride	2.434E-10	6.897E-13	2.427E-10
Hydrogen fluoride (hydrofluoric acid)	3.818E-11	9.425E-14	3.808E-11
Hydroxide	6.700E-09	3.119E-11	6.669E-09
Magnesium (+III)	1.435E-06	1.160E-06	2.744E-07
Magnesium chloride	3.738E-13	6.604E-14	3.078E-13
Neutral salts	1.006E-17	1.006E-17	0.000E+00
Nitrate	7.059E-07	5.991E-07	1.068E-07
Nitrogen	4.273E-09	1.195E-11	4.261E-09
Nitrogen organic bounded	1.435E-07	2.637E-09	1.409E-07
Phosphate	1.485E-08	1.337E-09	1.351E-08
Phosphorus	5.928E-08	1.232E-10	5.915E-08
Potassium	1.138E-08	3.279E-10	1.105E-08
Silicate particles	5.303E-11	7.914E-14	5.295E-11
Sodium (+I)	9.723E-06	2.828E-06	6.895E-06
Sodium chloride (rock salt)	1.920E-12	1.920E-12	0.000E+00
Sodium hypochlorite	1.522E-12	1.102E-13	1.412E-12
Sulphate	3.688E-05	2.009E-05	1.679E-05

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Sulphide	1.245E-07	2.652E-09	1.219E-07
Sulphite	1.311E-08	1.135E-08	1.757E-09
Sulphur	1.588E-09	5.486E-11	1.533E-09
Sulphuric acid	3.137E-08	8.891E-11	3.129E-08
Organic emissions to fresh water	2.662E-05	5.694E-08	2.656E-05
Halogenated organic emissions to fresh water	1.322E-10	9.638E-13	1.312E-10
1,2-Dibromoethane	5.976E-15	4.070E-16	5.569E-15
Chlorinated hydrocarbons (unspecified)	1.488E-17	9.340E-19	1.394E-17
Chloromethane (methyl chloride)	1.322E-10	9.605E-13	1.312E-10
Dichloropropane	4.936E-18	3.039E-18	1.898E-18
Polychlorinated dibenzo-p-dioxins (2,3,7,8 - TCDD)	4.601E-23	8.129E-24	3.788E-23
Vinyl chloride (VCM; chloroethene)	2.876E-15	2.876E-15	0.000E+00
Hydrocarbons to fresh water	1.226E-07	2.219E-08	1.004E-07
Acenaphthene	1.979E-12	4.981E-14	1.929E-12
Acenaphthylene	8.143E-13	2.018E-14	7.941E-13
Acetic acid	2.943E-09	3.609E-11	2.907E-09
Acrylonitrile	3.610E-13	2.222E-13	1.388E-13
Anthracene	2.547E-12	5.825E-14	2.489E-12
Aromatic hydrocarbons (unspecified)	2.050E-09	3.321E-10	1.718E-09
Benzene	4.407E-09	9.378E-11	4.314E-09
Benzo{a}anthracene	3.048E-13	8.019E-15	2.968E-13
Benzofluoranthene	1.962E-13	5.822E-15	1.904E-13
Chrysene	1.437E-12	3.910E-14	1.398E-12
Cresol (methyl phenol)	4.113E-11	1.421E-12	3.971E-11
Ethyl benzene	3.119E-10	5.064E-12	3.069E-10
Fluoranthene	3.567E-13	9.908E-15	3.468E-13
Hexane (isomers)	4.491E-12	1.554E-13	4.335E-12
Hydrocarbons (unspecified)	2.673E-09	1.148E-09	1.524E-09
Methanol	6.494E-08	1.761E-08	4.733E-08
Oil (unspecified)	2.855E-08	1.619E-09	2.693E-08
Phenol (hydroxy benzene)	5.350E-09	1.013E-10	5.249E-09
Polycyclic aromatic hydrocarbons (PAH, unspec.)	2.324E-09	1.129E-09	1.195E-09
Toluene (methyl benzene)	2.998E-09	6.330E-11	2.935E-09
Xylene (isomers; dimethyl benzene)	5.955E-09	5.670E-11	5.899E-09
Carbon, organically bound	2.650E-05	3.474E-08	2.646E-05

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Naphthalene	1.178E-10	2.845E-12	1.150E-10
Organic chlorine compounds (unspecified)	4.799E-14	1.229E-15	4.677E-14
Organic compounds (dissolved)	1.599E-14	1.599E-14	0.000E+00
Organic compounds (unspecified)	6.509E-24	1.732E-26	6.492E-24
Other emissions to fresh water	0.000E+00	0.000E+00	0.000E+00
non used primary energy from water power	0.000E+00	0.000E+00	0.000E+00
Unused primary energy from geothermal	0.000E+00	0.000E+00	0.000E+00
Waste heat	0.000E+00	0.000E+00	0.000E+00
Particles to fresh water	1.145E-04	2.736E-05	8.712E-05
Metals (unspecified)	4.440E-12	2.550E-14	4.414E-12
Soil loss by erosion into water	6.027E-10	1.317E-12	6.014E-10
Solids (suspended)	1.145E-04	2.736E-05	8.712E-05
Radioactive emissions to fresh water	0.000E+00	0.000E+00	0.000E+00
Americium (Am241)	0.000E+00	0.000E+00	0.000E+00
Antimony (Sb124)	0.000E+00	0.000E+00	0.000E+00
Antimony (Sb125)	0.000E+00	0.000E+00	0.000E+00
Carbon (C14)	0.000E+00	0.000E+00	0.000E+00
Cesium (Cs134)	0.000E+00	0.000E+00	0.000E+00
Cesium (Cs137)	0.000E+00	0.000E+00	0.000E+00
Cobalt (Co58)	0.000E+00	0.000E+00	0.000E+00
Cobalt (Co60)	0.000E+00	0.000E+00	0.000E+00
Curium (Cm alpha)	0.000E+00	0.000E+00	0.000E+00
Hydrogen (H3)	0.000E+00	0.000E+00	0.000E+00
Iodine (I129)	0.000E+00	0.000E+00	0.000E+00
Iodine (I131)	0.000E+00	0.000E+00	0.000E+00
Manganese (Mn54)	0.000E+00	0.000E+00	0.000E+00
Plutonium (Pu alpha)	0.000E+00	0.000E+00	0.000E+00
Radium (Ra226)	0.000E+00	0.000E+00	0.000E+00
Ruthenium (Ru106)	0.000E+00	0.000E+00	0.000E+00
Silver (Ag110m)	0.000E+00	0.000E+00	0.000E+00
Strontium (Sr90)	0.000E+00	0.000E+00	0.000E+00
Uranium	0.000E+00	0.000E+00	0.000E+00
Emissions to sea water	3.917E-02	1.014E-05	3.916E-02
Analytical measures to sea water	3.327E-04	5.831E-08	3.326E-04
Adsorbable organic halogen compounds (AOX)	2.401E-11	3.946E-15	2.400E-11
Biological oxygen demand (BOD)	2.648E-05	4.353E-09	2.648E-05

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Chemical oxygen demand (COD)	2.797E-04	4.961E-08	2.797E-04
Total organic bounded carbon	2.648E-05	4.353E-09	2.648E-05
Heavy metals to sea water	8.299E-05	2.843E-09	8.298E-05
Arsenic (+V)	4.221E-08	5.275E-11	4.216E-08
Cadmium (+II)	3.918E-08	1.345E-10	3.905E-08
Chromium (unspecified)	4.963E-08	1.280E-10	4.950E-08
Cobalt	3.168E-08	2.478E-11	3.166E-08
Copper (+II)	1.529E-06	3.079E-10	1.529E-06
Iron	4.416E-06	3.577E-10	4.415E-06
Lead (+II)	5.096E-07	6.898E-11	5.095E-07
Manganese (+II)	4.365E-07	3.710E-11	4.364E-07
Mercury (+II)	7.846E-09	1.519E-12	7.845E-09
Molybdenum	3.131E-08	4.142E-13	3.131E-08
Nickel (+II)	4.159E-07	9.692E-11	4.158E-07
Silver	9.288E-08	1.229E-12	9.288E-08
Strontium	7.480E-05	1.078E-09	7.480E-05
Tin (+IV)	1.113E-07	1.472E-12	1.113E-07
Titanium	1.133E-08	1.499E-13	1.133E-08
Vanadium (+III)	3.590E-08	1.718E-11	3.588E-08
Zinc (+II)	4.227E-07	5.344E-10	4.222E-07
Inorganic emissions to sea water	1.767E-02	6.609E-06	1.766E-02
Aluminum (+III)	3.648E-07	4.827E-12	3.648E-07
Ammonia	1.084E-05	1.434E-10	1.084E-05
Barium	3.090E-06	1.258E-09	3.089E-06
Beryllium	8.059E-11	1.393E-12	7.920E-11
Boron	5.899E-06	7.805E-11	5.899E-06
Calcium (+II)	6.442E-04	8.524E-09	6.442E-04
Carbonate	1.944E-04	7.915E-08	1.943E-04
Chloride	1.600E-02	6.382E-06	1.599E-02
Magnesium	1.601E-04	2.817E-09	1.601E-04
Nitrate	2.520E-07	1.026E-10	2.519E-07
Sodium (+I)	5.289E-04	8.693E-08	5.288E-04
Sulphate	8.259E-05	3.349E-08	8.256E-05
Sulphide	3.539E-05	1.440E-08	3.538E-05
Sulphur	3.156E-06	4.176E-11	3.156E-06
Organic emissions to sea water	1.121E-05	3.891E-09	1.120E-05

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Hydrocarbons to sea water	1.116E-05	3.853E-09	1.116E-05
Acenaphthene	1.198E-09	1.106E-12	1.196E-09
Acenaphthylene	4.557E-10	4.225E-13	4.552E-10
Acetic acid	1.548E-10	2.090E-12	1.527E-10
Anthracene	2.657E-10	3.624E-13	2.654E-10
Aromatic hydrocarbons (unspecified)	2.648E-07	4.353E-11	2.648E-07
Benzene	1.360E-06	3.082E-10	1.359E-06
Benzo{a}anthracene	2.719E-10	2.426E-13	2.717E-10
Benzofluoranthene	3.049E-10	2.650E-13	3.046E-10
Chrysene	1.544E-09	1.361E-12	1.543E-09
Cresol (methyl phenol)	8.176E-08	1.082E-12	8.176E-08
Ethyl benzene	2.996E-08	2.861E-11	2.993E-08
Fluoranthene	3.161E-10	2.871E-13	3.158E-10
Hexane (isomers)	8.926E-09	1.181E-13	8.926E-09
Oil (unspecified)	7.959E-06	2.608E-09	7.956E-06
Phenol (hydroxy benzene)	2.531E-07	5.310E-10	2.526E-07
Toluene (methyl benzene)	1.123E-06	1.807E-10	1.123E-06
Xylene (isomers; dimethyl benzene)	7.447E-08	1.459E-10	7.433E-08
Naphthalene	4.968E-08	3.800E-11	4.964E-08
Particles to sea water	2.108E-02	3.464E-06	2.107E-02
Solids (suspended)	2.108E-02	3.464E-06	2.107E-02
Emissions to industrial soil	2.583E-05	6.246E-08	2.577E-05
Heavy metals to industrial soil	7.581E-06	1.502E-08	7.566E-06
Arsenic (+V)	6.710E-12	2.049E-14	6.690E-12
Cadmium (+II)	8.871E-11	2.455E-13	8.846E-11
Chromium (+III)	2.271E-12	8.059E-15	2.263E-12
Chromium (unspecified)	1.428E-08	3.959E-11	1.424E-08
Cobalt	2.548E-10	5.888E-13	2.542E-10
Copper (+II)	1.124E-10	3.065E-13	1.121E-10
Iron	1.799E-08	4.771E-11	1.795E-08
Lead (+II)	6.379E-12	2.110E-14	6.358E-12
Manganese (+II)	2.989E-09	1.636E-11	2.973E-09
Mercury (+II)	2.372E-13	6.431E-16	2.365E-13
Nickel (+II)	3.526E-09	4.099E-11	3.485E-09
Strontium	7.541E-06	1.486E-08	7.526E-06
Zinc (+II)	1.312E-09	4.956E-12	1.307E-09

Process or Category	Cradle to Gate	Cradle to Gate (RMA)	Gate to Gate (RMT)
Inorganic emissions to industrial soil	1.824E-05	4.676E-08	1.819E-05
Aluminum (+III)	1.337E-08	4.903E-11	1.332E-08
Ammonia	1.107E-05	2.243E-08	1.105E-05
Bromide	2.183E-09	5.046E-12	2.178E-09
Calcium (+II)	5.992E-09	4.233E-09	1.759E-09
Chloride	2.548E-06	6.131E-09	2.542E-06
Fluoride	7.278E-08	1.682E-10	7.262E-08
Magnesium (+III)	8.663E-10	5.850E-10	2.813E-10
Phosphorus	1.226E-06	2.420E-09	1.224E-06
Potassium (+I)	1.348E-06	4.790E-09	1.343E-06
Sodium (+I)	5.177E-10	3.703E-10	1.474E-10
Sulphate	2.780E-07	7.976E-10	2.773E-07
Sulphide	1.668E-06	4.786E-09	1.664E-06
Organic emissions to industrial soil	1.243E-08	6.869E-10	1.174E-08
Oil (unspecified)	1.243E-08	6.869E-10	1.174E-08

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None.

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