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DAFTAR LAMPIRAN

Lampiran 1. Tabel Indikator Karakterisasi *Abiotic resource Depletion Potential* (ADP) (Guinee dkk., 2001)

Substansi	**Faktor Karakterisasi**	
Alumunium (Al)	1,00E-08	kg Sbeqv/kg
Iron (Fe)	8,43E-08	kg Sbeqv/kg
Silicon (Si)	2,99E-11	kg Sbeqv/kg
Uranium	2,87E-03	kg Sbeqv/kg
Crude Oil	2,01E-02	kg Sbeqv/kg
Natural Gas	1,87E-02	kg Sbeqv/kg
Hard Coal	1,34E-02	kg Sbeqv/kg
Soft Coal	6,71E-03	kg Sbeqv/kg
Foosil Energy	4,81E-04	kg Sbeqv/kg

Lampiran 2. Tabel Indikator Karakterisasi *Global Warming Potential* (CML, 2002)

Jenis Gas	**GWP 20 tahun** (kg CO2eqv/kg)	**GWP 100 tahun** (kg CO2eqv/kg)	**GWP 500 tahun** (kg CO2 eqv/kg)
CO2	1	1	1
CH4	56	21	6,5
1,1,1 trichloroethylene	360	110	35
CCl4	2000	1400	500
N2O	280	310	170
SF6	16300	23900	34900
CF4	4400	6500	10000
CFC-11	5000	4000	1400
CFC-12	7900	8500	4200
CFC-13	8100	11700	13600

Lampiran 2. Tabel Indikator Karakterisasi *Global Warming Potential* (CML, 2002) (Lanjutan)

Jenis Gas	**GWP 20 tahun** (kg CO2eqv/kg)	**GWP 100 tahun** (kg CO2eqv/kg)	**GWP 500 tahun** (kg CO2 eqv/kg)
CFC-113	5000	5000	2300
CFC-114	6900	9300	8300
HCFC-22	4300	1700	520
HCFC-123	300	93	29
HCFC-124	1500	480	150

Lampiran 3. Tabel Indikator Karakterisasi *Human Toxicity Potential* (CML, 2002)

Substansi	**HTP** kg 1,4-DCBeqv/kg	**HTP** kg 1,4-DCBeqv/kg	**HTP** kg 1,4-DCBeqv/kg
	Emisi ke udara	Emisi ke air	Emisi ke tanah
As	3,50E+05	950	3,20E+04
Cd	1,50E+05	23	2,00E+04
Cr III	650	2,1	5100
Cr VI	3,40E+06	3,4	8500
Co	1,70E+04	97	2400
Cu	4300	1,3	94
Pb	470	12	3300
Hg	6000	1400	5900
Ni	3,50E+04	330	2700
V	6200	3200	1,90E+04
Zn	100	0,58	64
NO2	1,2		
SO2	0,096		
HCl	0,5		
PAH, carcinogenic	5,70E+05	2,80E+05	7,10E+04

Substansi	**HTP** kg 1,4-DCBeqv/kg	**HTP** kg 1,4-DCBeqv/kg	**HTP** kg 1,4-DCBeqv/kg
	Emisi ke udara	Emisi ke air	Emisi ke tanah
Dust (PM10)	0,82		
Benzene	1900	1800	1,50E+04
Ethylene	0,64	0,65	0,78
Toluene	0,33	0,3	0,35
Azinphosmethyl	14	2,5	39
Benomyl	0,021	0,14	0,43
Captan	0,59	0,0053	0,097
Chlorpyriphos	21	44	14
DDT	110	37	270
Deltamethrine	1,6	2,8	0,16
Diazinon	59	66	120
Dimethoate	44	18	320
Diuron	210	53	1300
Glyphosate	0,0031	0,066	0,015
MCPA	15	15	100
Oxydemethonmethyl	120	74	610
Pirimicarb	3,4	1,7	26

Lampiran 4. Tabel Indikator Karakterisasi *Acidification Potential* (CML, 2002)

Substansi	**AP (g SO2eqv/g)**
SO2	1
HCl	0,88
HF	1,6
Nox	0,7
NH3	1,88

Lampiran 5. Matrik Inventori (A-Matrik) Proses Manufaktur Sepeda Motor

Matrik A_*ff* Proses Manufaktur Sepeda Motor

A_ ff	*Motorcycle Assembly*	*Frame*	*Fuel Tank*	*Engine*	*Suspension*	*Front Fork*	*Wheels*	*Steering Stem*	*Seat*	*Pedals*	*Brakes*	*Knalpot*	*Rubber*	*Vehicle Plant*
Motorcycle (unit)	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Frame (unit)	-1	1	0	0	0	0	0	0	0	0	0	0	0	0
Fuel Tank (unit)	-1	0	1	0	0	0	0	0	0	0	0	0	0	0
Engine (unit)	-1	0	0	1	0	0	0	0	0	0	0	0	0	0
Suspension (unit)	-1	0	0	0	1	0	0	0	0	0	0	0	0	0
Front Frok (unit)	-1	0	0	0	0	1	0	0	0	0	0	0	0	0
Wheels (unit)	-1	0	0	0	0	0	1	0	0	0	0	0	0	0
Steering Stem (unit)	-1	0	0	0	0	0	0	1	0	0	0	0	0	0
Seat (unit)	-1	0	0	0	0	0	0	0	1	0	0	0	0	0
Pedals (unit)	-1	0	0	0	0	0	0	0	0	1	0	0	0	0
Brakes (unit)	-1	0	0	0	0	0	0	0	0	0	1	0	0	0
Knalpot (unit)	-1	0	0	0	0	0	0	0	0	0	0	1	0	0
Rubber (Karet) (kg)	-1	0	0	0	-1,5	0	0	0	0	-0,9	0	0	1	0
Vehicle Plant (unit)	-1,1905E-08	0	0	0	0	0	0	0	0	0	0	0	0	1

Matrik A_*fb* Proses Manufaktur Sepeda Motor

A_ fb	*Electricity*	*Steel*	*Allumunium*	*Plastic*	*Platinum*	*Diesel*	*N. Gas*	*Transport*	*Concrete*	*Glass*
Motorcycle (unit)	0	0	0	0	0	0	0	0	0	0
Frame (unit)	0	0	0	0	0	0	0	0	0	0
Fuel Tank (unit)	0	0	0	0	0	0	0	0	0	0
Engine (unit)	0	0	0	0	0	0	0	0	0	0
Suspension (unit)	0	0	0	0	0	0	0	0	0	0
Front Frok (unit)	0	0	0	0	0	0	0	0	0	0
Wheels (unit)	0	0	0	0	0	0	0	0	0	0
Steering Stem (unit)	0	0	0	0	0	0	0	0	0	0
Seat (unit)	0	0	0	0	0	0	0	0	0	0
Pedals (unit)	0	0	0	0	0	0	0	0	0	0
Brakes (unit)	0	0	0	0	0	0	0	0	0	0
Knalpot (unit)	0	0	0	0	0	0	0	0	0	0
Rubber (Karet) (kg)	0	0	0	0	0	0	0	0	0	0
Vehicle Plant (unit)	0	0	0	0	0	0	0	0	0	0

Matrik A_*bf* Proses Manufaktur Sepeda Motor

A_*bf*	*Motorcycle Assembly*	*Frame*	*Fuel Tank*	*Engine*	*Suspension*	*Front Fork*	*Wheels*	*Steering Stem*	*Seat*	*Pedals*	*Brakes*	*Knalpot*	*Rubber*	*Vehicle Plant*
Electricity (N.Gas-kWh)	-36	0	0	0	0	0	0	0	0	0	0	0	-0,3595	-132000000
Steel (kg)	-6,32	-15	-0,9	-9,2	-9	-5	-11	-0,4	-0,52	-1,2	-0,9	-4,6	0	-14822717
Allumunium (kg)	-1,5	0	0	-7,6	-4,5	0	0	0	0	-0,9	-0,3	0	0	-400341,8
Plastic (kg)	-8,8	0	0	-1	0	0	0	0	-2,08	0	0	0	0	-2381908
Platinum (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel (MJ)	-4	0	0	0	0	0	0	0	0	0	0	0	0	-220000000
N. Gas (MJ)	-109	0	0	0	0	0	0	0	0	0	0	0	0	0
Transport (truck-tkm)	-7,04025	0	0	0	0	0	0	0	0	0	0	0	-0,3545	-6320635,51
Concrete (kg)	0	0	0	0	0	0	0	0	0	0	-0,8	0	0	-8,66E+08
Glass (kg)	-0,8	0	0	0	0	0	0	0	0	0	0	0	0	0

Matrik A_*bb* Proses Manufaktur Sepeda Motor

A_bb	*Electricity*	*Steel*	*Allumunium*	*Plastic*	*Platinum*	*Diesel*	*N. Gas*	*Transport*	*Concrete*	*Glass*
Electricity (N.Gas-kWh)	1	-2,19E-02	-1,58E+01	-1,89E-01	-2,13E+04	-2,45E-02	-7,58E-05	-1,50E-03	-2,00E-03	-1,11E-01
Steel (kg)	-3,68E-05	1	-2,00E-05	-5,10E-04	-8,82E-04	-1,15E-04	-1,30E-05	-9,80E-03	-4,10E-05	-1,37E-05
Allumunium (kg)	-5,02E-06	-5,32E-07	1	-1,30E-04	-6,12E-04	-9,90E-06	-6,90E-08	-6,60E-03	-2,30E-05	-4,05E-05
Plastic (kg)	-1,00E-05	-1,33E-07	-8,75E-06	1	-3,30E-06	-1,32E-06	-2,85E-06	-1,20E-03	-6,03E-10	-1,01E-04
Platinum (kg)	-2,88E-16	-1,50E-14	-3,40E-14	-1,80E-14	1	-4,56E-16	-2,88E-15	-6,70E-12	-8,70E-15	-8,16E-15
Diesel (MJ)	-7,77E-04	-2,40E-05	-3,75E-05	-1,07E-03	-1,89E+04	1	-9,78E-12	-2,14E+00	-1,04E-02	-3,04E-04
N. Gas (MJ)	-9,86E+00	-3,75E-02	-2,63E+00	-3,79E-01	-1,87E+04	-7,12E-07	1	-1,10E-02	-5,30E-04	-4,56E+00
Transport (truck-tkm)	-4,30E-05	-2,23E-02	-1,18E-01	-1,09E-01	-2,10E-01	-6,80E-04	-4,43E-03	1	-4,60E-04	-6,03E-02
Concrete (kg)	-1,22E-05	-4,25E-03	-7,90E-04	-7,20E-03	-9,14E-04	-2,75E-05	-4,38E-06	-6,20E-03	1	-2,30E-03
Glass (kg)	-8,70E-09	-5,32E-08	-5,00E-06	-1,30E-04	-6,61E-06	-6,34E-07	-6,70E-08	-1,10E-02	-3,00E-06	1

Lampiran 6. Matrik *Stressor* (Matrik S) Proses Manufaktur Sepeda Motor

Matrik S_*f* Proses Manufaktur Sepeda Motor

S_*f*	*Motorcycle Assembly*	*Frame*	*Fuel Tank*	*Engine*	*Suspension*	*Front Fork*	*Wheels*	*Steering Stem*	*Seat*	*Pedals*	*Brakes*	*Knalpot*	*Rubber*	*Vehicle Plant*
Bauxite (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SO2 (kg)	2,11E+00	1,14E+00	6,86E-02	1,36E+00	1,14E+00	3,81E-01	8,38E-01	3,05E-02	1,98E-01	2,29E-01	1,52E-01	3,50E-01	3,72E-14	0
NOx (kg)	2,03E+00	1,10E+00	6,60E-02	1,31E+00	1,10E+00	3,67E-01	8,07E-01	2,93E-02	1,91E-01	2,20E-01	1,47E-01	3,37E-01	1,08E-14	0
CH4 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crude Oil in Res. (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Iron Ore (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM10 (kg)	9,67E+00	5,24E+00	3,14E-01	6,22E+00	5,24E+00	1,75E+00	3,84E+00	1,40E-01	9,08E-01	1,05E+00	6,98E-01	1,61E+00	0	0
Pt (Platinum Ore Mix-Kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2 (kg)	8,62E+02	4,67E+02	2,80E+01	5,54E+02	4,67E+02	1,56E+02	3,42E+02	1,24E+01	8,09E+01	9,33E+01	6,22E+01	1,43E+02	5,50E-14	0
Natural Gas in Res. (m3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Matrik S_*bb* Proses Manufaktur Sepeda Motor

S_bb	*Electricity*	*Steel*	*Allumunium*	*Plastic*	*Platinum*	*Diesel*	*N. Gas*	*Transport*	*Concrete*	*Glass*
Bauxite (kg)	7,03E-06	7,45E-07	1,40E+00	1,82E-04	8,57E-04	1,40E-05	9,70E-08	9,24E-03	3,22E-05	5,67E-05
SO2 (kg)	4,93E-06	1,34E-04	9,60E-03	9,19E-05	1,85E+02	1,70E-04	2,10E-08	1,55E-03	8,01E-10	4,04E-03
NOx (kg)	4,93E-03	1,25E-03	2,50E-02	3,76E-05	9,74E+01	4,50E-04	3,00E-06	1,55E-03	3,51E-07	3,27E-03
CH4 (kg)	3,60E-05	7,61E-06	7,79E-04	2,20E-06	5,34E+01	3,86E-05	1,20E-09	3,72E-06	1,27E-10	5,81E-04
Crude Oil in Res. (kg)	8,43E-06	8,30E-02	1,45E+00	1,50E-01	4,40E+02	1,07E+00	9,20E-11	1,98E+00	6,80E-03	7,90E-02
Iron Ore (kg)	6,59E-06	1,79E+00	8,90E-04	9,13E-04	1,58E-03	2,06E-04	3,00E-08	1,75E-02	7,34E-05	3,00E-07
PM10 (kg)	8,68E-07	1,60E-06	1,30E-04	3,20E-07	5,14E+01	2,21E-05	9,10E-07	7,75E-05	2,14E-10	2,30E-05
Pt (Platinum Ore Mix-Kg)	4,75E-16	2,40E-14	5,61E-14	1,99E-14	1,11E+00	5,06E-16	3,19E-15	7,44E-12	9,66E-15	9,06E-15
CO2 (kg)	8,54E-01	9,30E-01	1,75E+00	9,51E-02	2,67E+02	1,12E-01	2,35E-07	1,57E-01	2,49E-06	6,93E-01
Natural Gas in Res. (m3)	3,33E-01	1,10E-03	7,00E-02	7,20E-02	5,09E+02	1,90E-09	2,40E-01	3,00E-04	1,43E-05	1,26E-01

Lampiran 7. Matrik Dpro Dampak dari Masing-masing Proses Manufaktur Sepeda Motor

D_*pro*	*Motorcycle Assembly*	*Frame*	*Fuel Tank*	*Engine*	*Suspension*	*Front Fork*	*Wheels*	*Steering Stem*	*Seat*	*Pedals*	*Brakes*	*Knalpot*	*Rubber*	*Vehicle Plant*
ADP (kg Sb-equiv.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GWP (kg CO2-equiv.)	861,77778	466,667	28	553,778	466,666667	155,5556	342,222	12,44444	80,8889	93,3333	62,2222	143,111	1,87E-13	0
HTP (kg 1.4-DCB-equiv.)	10,572079	5,72495	0,3435	6,79361	5,72495238	1,908317	4,1983	0,152665	0,99233	1,14499	0,76333	1,75565	5,62E-14	0
AP (kg SO2-equiv.)	3,5324095	1,91286	0,11477	2,26992	1,91285714	0,637619	1,40276	0,05101	0,33156	0,38257	0,25505	0,58661	1,52E-13	0

Matrik Dpro Dampak dari Masing-masing Proses Manufaktur Sepeda Motor (Lanjutan)

D_*pro*	*Electricity*	*Steel*	*Allumunium*	*Plastic*	*Platinum*	*Diesel*	*N. Gas*	*Transport*	*Concrete*	*Glass*
ADP (kg Sb-equiv.)	1,74571094	0,108993	0,456198283	0,052123	3,63772E-09	1,342573	13,12597	1,03138736	0,0015978	0,004287
GWP (kg CO2-equiv.)	239,616563	60,02582	26,45990229	1,137085	2,55378E-07	7,042192	0,000761	4,07019321	2,908E-05	0,766508
HTP (kg 1.4-DCB-equiv.)	1,65878396	0,097712	0,464799704	0,000648	3,25099E-08	0,035859	0,012717	0,05369853	4,917E-06	0,004707
AP (kg SO2-equiv.)	0,96881223	0,065088	0,405955614	0,001413	4,66396E-08	0,030276	0,006203	0,06827787	2,876E-06	0,006879

Lampiran 8. Matrik Dstr Dampak dari Masing-masing *Stressor* pada Proses Manufaktur Sepeda Motor

D_*Str*	*Bauxite*	*SO2*	*NOx*	*CH4*	*Crude Oil*	*Iron Ore*	*PM10*	*Platinum Ore*	*CO2*	*N. Gas*
ADP (kg Sb-equiv.)	4,4556E-08	0	0	0	2,9574644	5,568E-06	0	5,279E-10	0	14,91137
GWP (kg CO2-equiv.)	0	0	0	0,533815	0	0	0	0	3605,252	0
HTP (kg 1.4-DCB-equiv.)	0	0,788173	11,54189	0	0	0	30,07353	0	0	0
AP (kg SO2-equiv.)	0	8,210137	6,73277	0	0	0	0	0	0	0

Lampiran 9. Matrik Inventroi (Matrik A) Sepeda Motor: Satu Unit Fungsional

Matrik A_*ff* Sepeda Motor Satu Unit Fungsional

A_ff	*Operation*	*Motorcycle Assembly*	*Frame*	*Fuel Tank*	*Engine*	*Suspension*	*Front Fork*	*Wheels*	*Steering Stem*	*Seat*	*Pedals*	*Brakes*	*Knalpot*	*Rubber*	*Vehicle Plant*	*Maintenance*	*Disposal*	*Gasoline*
Operation (pkm)	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Motorcycle (unit)	-1,54E-05	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Frame (unit)	0	-1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fuel Tank (unit)	0	-1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Engine (unit)	0	-1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Suspension (unit)	0	-1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Front Frok (unit)	0	-1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Wheels (unit)	0	-1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Steering Stem (unit)	0	-1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Seat (unit)	0	-1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Pedals (unit)	0	-1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Brakes (unit)	0	-1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Knalpot (unit)	0	-1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Rubber (kg)	0	-1	0	0	0	-1,5	0	0	0	0	-0,9	0	0	1	0	-5,51E+00	-2,8	0
Vehicle Plant (unit)	0	-1,19E-08	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Maintenance (times)	0	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Disposal (times)	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Gasoline (liter)	-0,037326	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Matrik A_*fb* Sepeda Motor Satu Unit Fungsional

A_fb	*Electricity*	*Steel*	*Allumunium*	*Plastic*	*Platinum*	*Diesel*	*N. Gas*	*Transport*	*Concrete*	*Glass*
Operation (pkm)	0	0	0	0	0	0	0	0	0	0
Motorcycle (unit)	0	0	0	0	0	0	0	0	0	0
Frame (unit)	0	0	0	0	0	0	0	0	0	0
Fuel Tank (unit)	0	0	0	0	0	0	0	0	0	0
Engine (unit)	0	0	0	0	0	0	0	0	0	0
Suspension (unit)	0	0	0	0	0	0	0	0	0	0
Front Frok (unit)	0	0	0	0	0	0	0	0	0	0
Wheels (unit)	0	0	0	0	0	0	0	0	0	0
Steering Stem (unit)	0	0	0	0	0	0	0	0	0	0
Seat (unit)	0	0	0	0	0	0	0	0	0	0
Pedals (unit)	0	0	0	0	0	0	0	0	0	0
Brakes (unit)	0	0	0	0	0	0	0	0	0	0
Knalpot (unit)	0	0	0	0	0	0	0	0	0	0
Rubber (kg)	0	0	0	0	0	0	0	0	0	0
Vehicle Plant (unit)	0	0	0	0	0	0	0	0	0	0
Maintenance (times)	0	0	0	0	0	0	0	0	0	0
Disposal (times)	0	0	0	0	0	0	0	0	0	0
Gasoline (liter)	0	0	0	0	0	0	0	0	0	0

Matrik A_*bf* Sepeda Motor Satu Unit Fungsional

A_*bf*	*Operation*	*Motorcycle Assembly*	*Frame*	*Fuel Tank*	*Engine*	*Suspension*	*Front Fork*	*Wheels*	*Steering Stem*	*Seat*	*Pedals*	*Brakes*	*Knalpot*	*Rubber*	*Vehicle Plant*	*Maintenance*	*Disposal*	*Gasoline*
Electricity (N.Gas-kWh)	0	-36	0	0	0	0	0	0	0	0	0	0	0	-0,3595	-1,32E+08	-6,00E+00	0	-5,35E-04
Steel (kg)	0	-6,32	-15	-0,9	-9,2	-9	-5	-11	-0,4	-0,52	-1,2	-0,9	-4,6	0	-14822717	-0,6404	0	0
Allumunium (kg)	0	-1,5	0	0	-7,6	-4,5	0	0	0	0	-0,9	-0,3	0	0	-400341,8	-0,148	0	0
Plastic (kg)	0	-8,8	0	0	-1	0	0	0	0	-2,08	0	0	0	0	-2381908	-0,218166667	-2,59E+01	0
Platinum (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel (MJ)	0	-4	0	0	0	0	0	0	0	0	0	0	0	0	-2,20E+08	0	0	-5,89E-03
N. Gas (MJ)	0	-109	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2,18E-07
Transport (truck-tkm)	0	-7,04025	0	0	0	0	0	0	0	0	0	0	0	-0,3545	-6320635,5	-6,02E+00	-1,69E+01	0
Concrete (kg)	0	0	0	0	0	0	0	0	0	0	0	-0,8	0	0	-866400000	0	0	0
Glass (kg)	0	-0,8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Matrik A_ *bb* Sepeda Motor Satu Unit Fungsional

A_bb	*Electricity*	*Steel*	*Allumunium*	*Plastic*	*Platinum*	*Diesel*	*N. Gas*	*Transport*	*Concrete*	*Glass*
Electricity (N.Gas-kWh)	1	-2,19E-02	-1,58E+01	-1,89E-01	-2,13E+04	-2,45E-02	-7,58E-05	-1,50E-03	-2,00E-03	-1,11E-01
Steel (kg)	-3,68E-05	1	-2,00E-05	-5,10E-04	-8,82E-04	-1,15E-04	-1,30E-05	-9,80E-03	-4,10E-05	-1,37E-05
Allumunium (kg)	-5,02E-06	-5,32E-07	1	-1,30E-04	-6,12E-04	-9,90E-06	-6,90E-08	-6,60E-03	-2,30E-05	-4,05E-05
Plastic (kg)	-1,00E-05	-1,33E-07	-8,75E-06	1	-3,30E-06	-1,32E-06	-2,85E-06	-1,20E-03	-6,03E-10	-1,01E-04
Platinum (kg)	-2,88E-16	-1,50E-14	-3,40E-14	-1,80E-14	1	-4,56E-16	-2,88E-15	-6,70E-12	-8,70E-15	-8,16E-15
Diesel (MJ)	-7,77E-04	-2,40E-05	-3,75E-05	-1,07E-03	-1,89E+04	1	-9,78E-12	-2,14E+00	-1,04E-02	-3,04E-04
N. Gas (MJ)	-9,86E+00	-3,75E-02	-2,63E+00	-3,79E-01	-1,87E+04	-7,12E-07	1	-1,10E-02	-5,30E-04	-4,56E+00
Transport (truck-tkm)	-4,30E-05	-2,23E-02	-1,18E-01	-1,09E-01	-2,10E-01	-6,80E-04	-4,43E-03	1	-4,60E-04	-6,03E-02
Concrete (kg)	-1,22E-05	-4,25E-03	-7,90E-04	-7,20E-03	-9,14E-04	-2,75E-05	-4,38E-06	-6,20E-03	1	-2,30E-03
Glass (kg)	-8,70E-09	-5,32E-08	-5,00E-06	-1,30E-04	-6,61E-06	-6,34E-07	-6,70E-08	-1,10E-02	-3,00E-06	1

Lampiran 10. Matrik *Stressor* (Matrik S) Sepeda Motor: Satu Unit Fungsional

Matrik S_*f* Sepeda Motor Satu Unit Fungsional

S_f	Operation	Motorcycle Assembly	Frame	Fuel Tank	Engine	Suspension	Front Fork	Wheels	Steering Stem	Seat	Pedals	Brakes	Knalpot	Rubber	Vehicle Plant	Maintenance	Disposal	Gasoline
Bauxite (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SO2 (kg)	4,7966E-07	2,11E+00	1,14E+00	6,86E-02	1,36E+00	1,14E+00	3,81E-01	8,38E-01	3,05E-02	1,98E-01	2,29E-01	1,52E-01	3,50E-01	3,72E-14	0	0,143333333	0	7,98E-04
NOx (kg)	3,19E-04	2,03E+00	1,10E+00	6,60E-02	1,31E+00	1,10E+00	3,67E-01	8,07E-01	2,93E-02	1,91E-01	2,20E-01	1,47E-01	3,37E-01	1,08E-14	0	0,13	0	4,41E-04
CH4 (kg)	1,18E-05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,26E-05
Crude Oil in Res. (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Iron Ore (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM10 (kg)	1,0739E-06	9,67E+00	5,24E+00	3,14E-01	6,22E+00	5,24E+00	1,75E+00	3,84E+00	1,40E-01	9,08E-01	1,05E+00	6,98E-01	1,61E+00	0	0	0,000366667	0	0,00E+00
Pt (Platinum Ore Mix-Kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2 (kg)	0,10071134	8,62E+02	4,67E+02	2,80E+01	5,54E+02	4,67E+02	1,56E+02	3,42E+02	1,24E+01	8,09E+01	9,33E+01	6,22E+01	1,43E+02	5,50E-14	0	5,67E+01	0	2,10E-01
Natural Gas in Res. (m3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,6335E-10

Matrik S_*bb* Sepeda Motor Satu Unit Fungsional

S_bb	Electricity	Steel	Allumunium	Plastic	Platinum	Diesel	N. Gas	Transport	Concrete	Glass
Bauxite (kg)	7,03E-06	7,45E-07	1,40E+00	1,82E-04	8,57E-04	1,40E-05	9,70E-08	9,24E-03	3,22E-05	5,67E-05
SO2 (kg)	4,93E-06	1,34E-04	9,60E-03	9,19E-05	1,85E+02	1,70E-04	2,10E-08	1,55E-03	8,01E-10	4,04E-03
NOx (kg)	4,93E-03	1,25E-03	2,50E-02	3,76E-05	9,74E+01	4,50E-04	3,00E-06	1,55E-03	3,51E-07	3,27E-03
CH4 (kg)	3,60E-05	7,61E-06	7,79E-04	2,20E-06	5,34E+01	3,86E-05	1,20E-09	3,72E-06	1,27E-10	5,81E-04
Crude Oil in Res. (kg)	8,43E-06	8,30E-02	1,45E+00	1,50E-01	4,40E+02	1,07E+00	9,20E-11	1,98E+00	6,80E-03	7,90E-02
Iron Ore (kg)	6,59E-06	1,79E+00	8,90E-04	9,13E-04	1,58E-03	2,06E-04	3,00E-08	1,75E-02	7,34E-05	3,00E-07
PM10 (kg)	8,68E-07	1,60E-06	1,30E-04	3,20E-07	5,14E+01	2,21E-05	9,10E-07	7,75E-05	2,14E-10	2,30E-05
Pt (Platinum Ore Mix-Kg)	4,75E-16	2,40E-14	5,61E-14	1,99E-14	1,11E+00	5,06E-16	3,19E-15	7,44E-12	9,66E-15	9,06E-15
CO2 (kg)	8,54E-01	9,30E-01	1,75E+00	9,51E-02	2,67E+02	1,12E-01	2,35E-07	1,57E-01	2,49E-06	6,93E-01
Natural Gas in Res. (m3)	3,33E-01	1,10E-03	7,00E-02	7,20E-02	5,09E+02	1,90E-09	2,40E-01	3,00E-04	1,43E-05	1,26E-01

Lampiran 11. Matrik Dpro Dampak dari Masing-masing Proses Siklus Hidup Sepeda Motor: Satu Unit Fungsional

D_Str	Operation	Motorcycle Assembly	Frame	Fuel Tank	Engine	Suspension	Front Fork	Wheels	Steering Stem	Seat	Pedals	Brakes	Knalpot	Rubber	Vehicle Plant	Maintenance	Disposal	Gasoline
ADP (kg Sb-equiv.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,84E-13
GWP (kg CO2-equiv.)	0,1009582	0,01325812	0,00718	0,000431	0,00852	0,00717949	0,00239	0,00526496	0,00019	0,00124	0,00144	0,00096	0,0022	5,1841E-17	0	0,008717949	0	0,007903
HTP (kg 1.4-DCB-equiv.)	0,0003833	0,00016265	8,8E-05	5,28E-06	0,000105	8,8076E-05	2,9E-05	6,4589E-05	2,3E-06	1,5E-05	1,8E-05	1,2E-05	2,7E-05	1,5582E-17	0	2,61632E-05	0	2,26E-05
AP (kg SO2-equiv.)	0,0002235	5,4345E-05	2,9E-05	1,77E-06	3,49E-05	2,9429E-05	9,8E-06	2,1581E-05	7,8E-07	5,1E-06	5,9E-06	3,9E-06	9E-06	4,2189E-17	0	3,60513E-05	0	4,13E-05

Matrik Dpro Dampak dari Masing-masing Proses Siklus Hidup Sepeda Motor: Satu Unit Fungsional (Lanjutan)

D_Str	Electricity	Steel	Allumunium	Plastic	Platinum	Diesel	N. Gas	Transport	Concrete	Glass
ADP (kg Sb-equiv.)	3,9169E-05	1,87E-06	8,04623E-06	2,6951E-06	2,7566E-13	0,000101	0,000291	8,1447E-05	2,652E-08	1,377E-07
GWP (kg CO2-equiv.)	0,00537631	0,001031	0,000466688	5,8795E-05	1,93521E-11	0,000531	1,69E-08	0,00032141	4,826E-10	2,462E-05
HTP (kg 1.4-DCB-equiv.)	3,7218E-05	1,68E-06	8,19794E-06	3,3496E-08	2,46355E-12	2,7E-06	2,82E-07	4,2405E-06	8,16E-11	1,512E-07
AP (kg SO2-equiv.)	2,1737E-05	1,12E-06	7,16007E-06	7,3054E-08	3,53427E-12	2,28E-06	1,38E-07	5,3918E-06	4,773E-11	2,209E-07

Lampiran 12. Matrik Dstr Sepeda Motor Satu Unit Fungsional

D_Str	Bauxite	SO2	NOx	CH4	Crude Oil	Iron Ore	PM10	Platinum Ore	CO2	N. Gas
ADP (kg Sb-equiv.)	8,17E-13	0	0	0	0,0001942	9,70459E-11	0	3,99439E-14	0	0,000331
GWP (kg CO2-equiv.)	0	0	0	0,0003253	0	0	0	0	0,17532	0
HTP (kg 1.4-DCB-equiv.)	0	1,75E-05	0,000622	0	0	0	0,000464	0	0	0
AP (kg SO2-equiv.)	0	0,000182	0,000363	0	0	0	0	0	0	0

Lampiran 13. Rumus Perhitungan dengan Menggunakan *Software Matlab*

Addition, menggunakan +

Multiplication, menggunakan *

Inversion, menggunakan inv(matrix) atau matrik^{-1}

Transpose, menggunakan transp(matrix) atau matrik'

Diagonalization, menggunakan diag(matrik)

Perhitungan matrik dapat dilakukan dengan model sebagai berikut:

Matrik A

A_*ff*	A_*fb*	y_*f*
A_*bf*	A_*bb*	

Matrik S

S_*f*	S_*bb*

Matrik C

C

Persamaan yang dapat digunakan sebagai berikut:

Matrik A=inv(IA)

x=L*y_*f*

d=C*S*x

Dpro=C*S*diag(x)

Dstr=C*diag(S*x)

dengan,

Matrik A = Matrik Inventori

x = total *output*

y_*f* = matrik aliran referensi, *final demand*

C = matrik karakterisasi

d = dampak lingkungan

S = matrik *stressor*

Dpro = matrik dampak lingkungan dari masing-masing proses

Dstr = matrik dampak lingkungan dari masing-masing *stressor*