

PHẦN PHỤ LỤC

PHỤ LỤC 3.1. Biểu đồ đường tần suất lưu lượng trung bình nước về theo tháng tại đập An Trạch

PHỤ LỤC 3.2. Biểu đồ đường tần suất lưu lượng trung bình nước về theo tháng tại cửa thu Cầu Đỏ

PHỤ LỤC 3.3. Kết quả Simapro hiện trạng hoạt động của các dây chuyền nhà máy nước cầu đỏ theo mùa (loại tác động – midpoint)

PHỤ LỤC 3.4. Kết quả simapro hiện trạng hoạt động của nhà máy nước Cầu Đỏ theo cụm xử lý – mùa khô (loại tác động – midpoint)

PHỤ LỤC 3.5. Kết quả simapro hiện trạng hoạt động của nhà máy nước Cầu Đỏ theo cụm xử lý – mùa mưa (loại tác động – midpoint)

PHỤ LỤC 3.6. Kết quả simapro hiện trạng hoạt động của nhà máy nước Cầu Đỏ theo tháng (loại tác động – midpoint)

PHỤ LỤC 4.1. Biểu đồ đường tần suất lưu lượng trung bình nước về theo tháng tại đập An Trạch theo kịch bản RCP 8.5

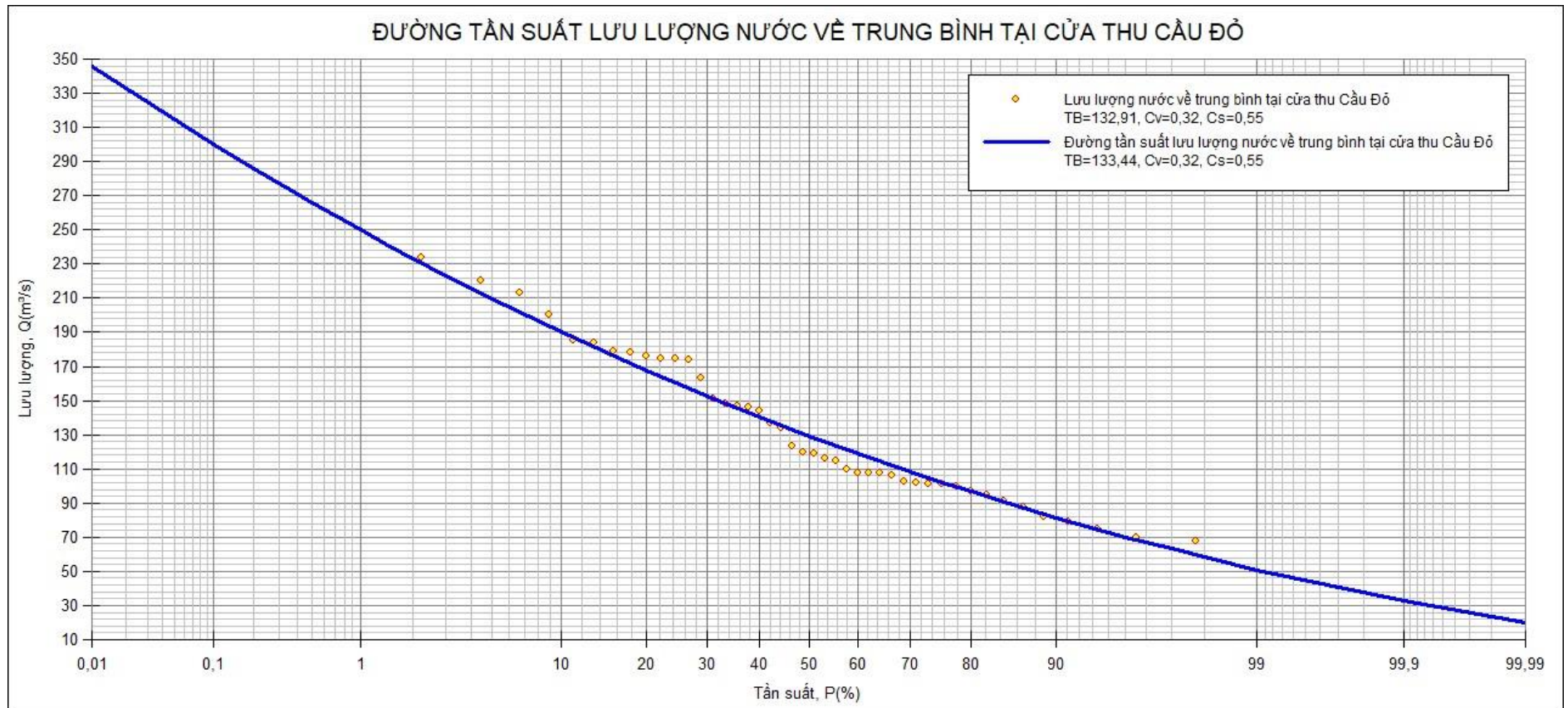
PHỤ LỤC 4.2. Biểu đồ đường tần suất lưu lượng trung bình nước về theo tháng tại cửa thu Cầu Đỏ theo kịch bản RCP 8.5

PHỤ LỤC 4.3. Kết quả Simapro trong mùa mưa của 5 kịch bản cấp nước tại Đà Nẵng (loại tác động – midpoint)

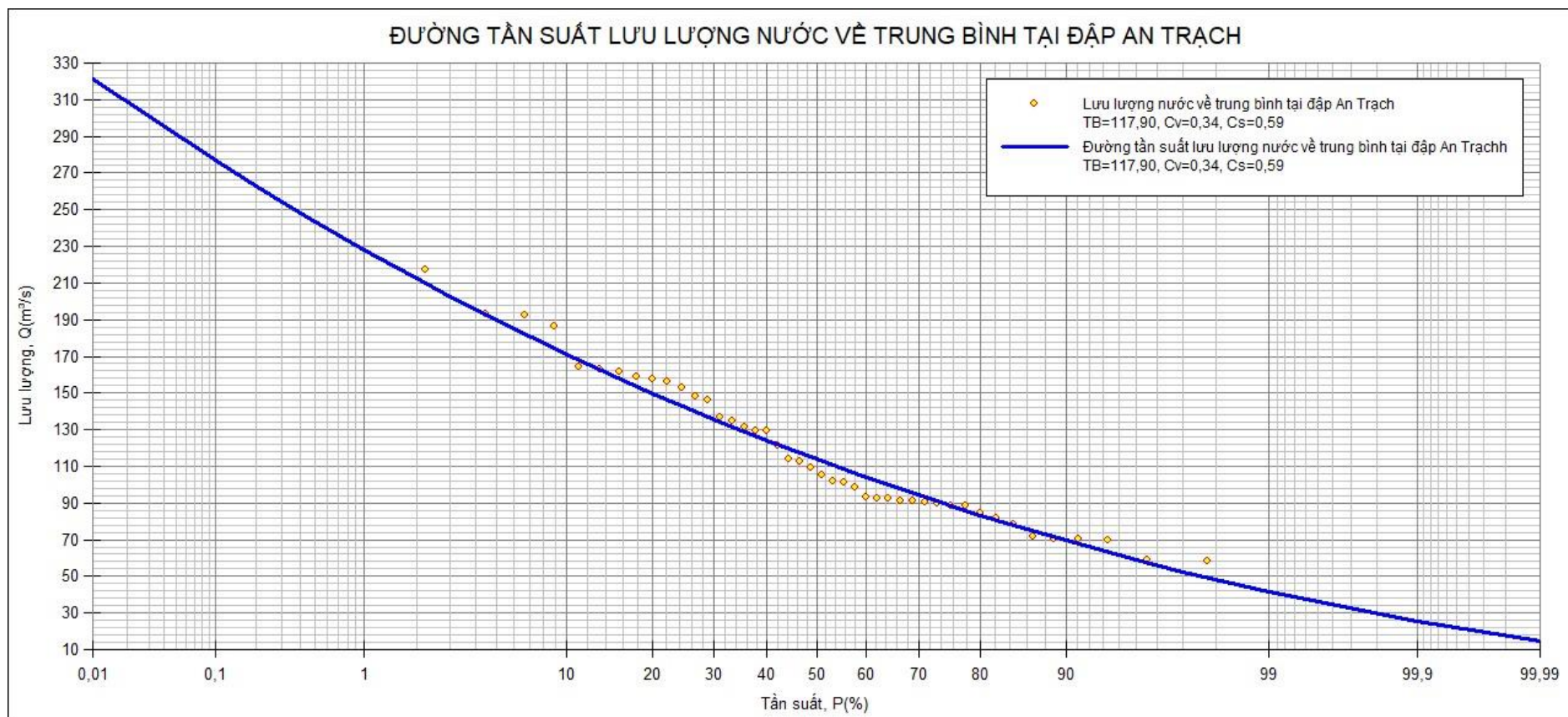
PHỤ LỤC 4.4. Kết quả Simapro trong mùa khô của 5 kịch bản cấp nước tại Đà Nẵng (loại tác động – midpoint)

PHỤ LỤC 4.5. Kết quả Simapro trong mùa khô của 5 kịch bản cấp nước tại Đà Nẵng (điểm kết thúc tác động – endpoint)

PHỤ LỤC 3.1. BIỂU ĐỒ ĐƯỜNG TẦN SUẤT LƯU LƯỢNG TRUNG BÌNH NƯỚC VỀ THEO THÁNG TẠI ĐẬP AN TRẠCH



PHỤ LỤC 3.2. BIỂU ĐỒ ĐƯỜNG TẦN SUẤT LƯU LƯỢNG TRUNG BÌNH NƯỚC VỀ THEO THÁNG TẠI CỬA THU CẦU ĐỎ



PHỤ LỤC 3.3. KẾT QUẢ SIMAPRO HIỆN TRẠNG HOẠT ĐỘNG CỦA CÁC DÂY CHUYỀN NHÀ MÁY NƯỚC CẦU ĐỎ THEO MÙA (LOẠI TÁC ĐỘNG – MIDPOINT)

SimaPro 10.2.0.1

Date:

10/3/2025

Time:

9:03

Project

CURRENT STATUS

Calculation:

Analyze

Results:

Impact assessment

Product:

1 p CURRENT STATUS (of project HTCN)

Ecoinvent 3 - allocation, cut-off by classification - system

Current library:

[Cut-off, S]

Ecoinvent 3 - allocation, cut-off by classification - unit [Cut-

Replacing library:

off, U]

Method:

ReCiPe 2016 Midpoint (H) V1.09 / World (2010) H

Indicator:

Characterization

Skip categories:

Never

Exclude infrastructure processes:

Yes

Exclude long-term emissions:

Yes

Sorted on item:

Impact category

Sort order:

Ascending

IMPACT CATEGORY	UNIT	DRY- 50 000 m3/day	DRY- 120 000 m3/day old	DRY- 120 000 m3/day new	RAINY- 50 000 m3/day	RAINY - 120 000 m3/day old	RAINY- 120 000 m3/day new
Global warming	kg CO ₂ eq	0,18411626	0,1996696	0,17668095	0,14535978	0,14278071	0,12472917
Stratospheric ozone depletion	kg CFC11 eq	4,7892× 10 ⁻⁸	5,1812× 10 ⁻⁸	4,6024× 10 ⁻⁸	3,8362× 10 ⁻⁸	3,7648× 10 ⁻⁸	3,3104× 10 ⁻⁸

Ionizing radiation	kBq Co-60 eq	0,000130825	0,000138901	0,000127012	0,000115191	0,000112445	0,000103137
Ozone formation, Human health	kg NO _x eq	0,000545134	0,000591496	0,000522968	0,000429161	0,000421619	0,000367806
Fine particulate matter formation	kg PM2.5 eq	0,000404735	0,000439156	0,00038827	0,000318557	0,000312964	0,000273004
Ozone formation, Terrestrial ecosystems	kg NO _x eq	0,000551254	0,000598109	0,000528853	0,000434099	0,000426462	0,000372078
Terrestrial acidification	kg SO ₂ eq	0,001159113	0,001258602	0,001111527	0,000908826	0,000893072	0,000777569
Freshwater eutrophication	kg P eq	8,48118× 10 ⁻⁶	9,20077× 10 ⁻⁶	8,13626× 10 ⁻⁶	6,67415× 10 ⁻⁶	6,5572× 10 ⁻⁶	5,72118× 10 ⁻⁶
Marine eutrophication	kg N eq	5,13858× 10 ⁻⁷	5,47984× 10 ⁻⁷	4,97256× 10 ⁻⁷	4,38224× 10 ⁻⁷	4,28618× 10 ⁻⁷	3,88821× 10 ⁻⁷
Terrestrial ecotoxicity	kg 1,4-DCB	0,12690148	0,13600623	0,12267558	0,10771885	0,10534265	0,094901581
Freshwater ecotoxicity	kg 1,4-DCB	2,5385× 10 ⁻⁵	2,71131× 10 ⁻⁵	2,45909× 10 ⁻⁵	2,19753× 10 ⁻⁵	2,14661× 10 ⁻⁵	1,94923× 10 ⁻⁵

Marine ecotoxicity	kg 1,4-DCB	0,000117539	0,000125683	0,000113788	0,000101144	$9,88336 \times 10^{-5}$	$8,95231 \times 10^{-5}$
Human carcinogenic toxicity	kg 1,4-DCB	0,000276051	0,000291281	0,000269124	0,000252683	0,000246104	0,000228807
Human non-carcinogenic toxicity	kg 1,4-DCB	0,007238365	0,007788004	0,006980281	0,006001048	0,005876921	0,005243667
Land use	m ² a crop eq	0,001341123	0,001452202	0,001288051	0,001067611	0,001048151	0,000919273
Mineral resource scarcity	kg Cu eq	0,000318689	0,000321091	0,000320144	0,000373105	0,000358863	0,000358602
Fossil resource scarcity	kg oil eq	0,044335294	0,048074896	0,042547852	0,035027367	0,034404395	0,03006443
Water consumption	m ³	1,1138434	1,1138951	1,0546974	1,1421152	1,1326622	1,0626254

PHỤ LỤC 3.4. KẾT QUẢ SIMAPRO HIỆN TRẠNG HOẠT ĐỘNG CỦA NHÀ MÁY NƯỚC CẦU ĐỎ THEO CỤM XỬ LÝ – MÙA KHÔ (LOẠI TÁC ĐỘNG – MIDPOINT)

SimaPro 10.2.0.1 Date: 12/03/2025 Time: 13:01

Project HTCN

Calculation: Analyze

Results: Impact assessment

Product: 1 p 120 000 m3/ngày old (of project HTCN)

 Ecoinvent 3 - allocation, cut-off by classification - system

Current library: [Cut-off, S]

 Ecoinvent 3 - allocation, cut-off by classification - unit

Replacing library: [Cut-off, U]

Method: ReCiPe 2016 Midpoint (H) V1.09 / World (2010) H

Indicator: Characterization

Skip categories: Never

Exclude infrastructure

processes: Yes

Exclude long-term

emissions: Yes

Sorted on item: Impact category

Sort order: Ascending

IMPACT CATEGORY	UNIT	DRY- TRẠM BƠM 1	DRY- TRON-PHAN UNG- LANG	DRY- BỂ LỌC	DRY-BỂ CHỨA NƯỚC SẠCH	DRY- TRẠM BƠM 2
Global warming	kg CO ₂ eq	0,094630854	0,007839719	0,003336752	0,001072898	0,081379864

Stratospheric ozone depletion	kg CFC11 eq	$2,3824 \times 10^{-8}$	$0,323611 \times 10^{-8}$	$0,084 \times 10^{-8}$	$0,04271 \times 10^{-8}$	$2,0488 \times 10^{-8}$
Ionizing radiation	kBq Co-60 eq	$4,8868 \times 10^{-5}$	$3,02728 \times 10^{-5}$	$0,17231 \times 10^{-5}$	$0,715631 \times 10^{-5}$	$4,20251 \times 10^{-5}$
Ozone formation, Human health	kg NO _x eq	$28,2096 \times 10^{-5}$	$2,18503 \times 10^{-5}$	$0,99469 \times 10^{-5}$	$0,245807 \times 10^{-5}$	$24,2594 \times 10^{-5}$
Fine particulate matter formation	kg PM2.5 eq	$20,9471 \times 10^{-5}$	$1,51295 \times 10^{-5}$	$0,7386 \times 10^{-5}$	$0,199551 \times 10^{-5}$	$18,0139 \times 10^{-5}$
Ozone formation, Terrestrial ecosystems	kg NO _x eq	$28,5092 \times 10^{-5}$	$2,23732 \times 10^{-5}$	$1,0053 \times 10^{-5}$	$0,251059 \times 10^{-5}$	$24,5171 \times 10^{-5}$
Terrestrial acidification	kg SO ₂ eq	$60,5459 \times 10^{-5}$	$3,61293 \times 10^{-5}$	$2,1349 \times 10^{-5}$	$0,339465 \times 10^{-5}$	$52,0678 \times 10^{-5}$
Freshwater eutrophication	kg P eq	$43,8206 \times 10^{-7}$	$3,01416 \times 10^{-7}$	$1,54514 \times 10^{-7}$	$0,64001 \times 10^{-7}$	$37,6844 \times 10^{-7}$
Marine eutrophication	kg N eq	$20,8606 \times 10^{-8}$	$8,7844 \times 10^{-8}$	$0,73556 \times 10^{-8}$	$3,3576 \times 10^{-8}$	$17,9395 \times 10^{-8}$
Terrestrial ecotoxicity	kg 1,4-DCB	0,05483392	0,024041508	0,001933483	0,001733369	0,047155624
Freshwater ecotoxicity	kg 1,4-DCB	$10,372 \times 10^{-6}$	$5,89724 \times 10^{-6}$	$0,3657 \times 10^{-6}$	$0,4203 \times 10^{-6}$	$8,91963 \times 10^{-6}$
Marine ecotoxicity	kg 1,4-DCB	$4,89193 \times 10^{-5}$	$2,48617 \times 10^{-5}$	$0,17249 \times 10^{-5}$	$0,172516 \times 10^{-5}$	$4,20692 \times 10^{-5}$
Human carcinogenic toxicity	kg 1,4-DCB	$9,10088 \times 10^{-5}$	$8,55361 \times 10^{-5}$	$0,3209 \times 10^{-5}$	$1,34741 \times 10^{-5}$	$7,8265 \times 10^{-5}$

Human non-carcinogenic toxicity	kg 1,4-DCB	$332,3376 \times 10^{-5}$	$95,7868 \times 10^{-5}$	$11,7185 \times 10^{-5}$	$8,45171 \times 10^{-5}$	$285,801 \times 10^{-5}$
Land use	m ₂ a crop eq	$67,566 \times 10^{-5}$	$7,4566 \times 10^{-5}$	$2,38242 \times 10^{-5}$	$1,27107 \times 10^{-5}$	0,000581048
Mineral resource scarcity	kg Cu eq	$3,26826 \times 10^{-6}$	$282,239 \times 10^{-6}$	$0,11524 \times 10^{-6}$	$0,269805 \times 10^{-6}$	$2,81061 \times 10^{-6}$
Fossil resource scarcity	kg oil eq	0,02275147	0,001951032	0,000802233	0,000265751	0,019565622
Water consumption	m ₃	1,0001493	1,0000564	1,1135238	1,000014	1,0001284

**PHỤ LỤC 3.5. KẾT QUẢ SIMAPRO HIỆN TRẠNG HOẠT ĐỘNG CỦA NHÀ MÁY NƯỚC CẦU ĐỎ THEO CỤM XỬ LÝ
– MÙA MƯA (LOẠI TÁC ĐỘNG – MIDPOINT)**

SimaPro 10.2.0.1	Date:	13/03/2025	Time:	20:11
Project	HTCN			
Calculation:	Analyze			
Results:	Impact assessment			
Product:	1 p 120 000 m3/ngày old (of project HTCN)			
	Ecoinvent 3 - allocation, cut-off by classification - system			
Current library:	[Cut-off, S]			
	Ecoinvent 3 - allocation, cut-off by classification - unit [Cut-off, U]			
Replacing library:	ReCiPe 2016 Midpoint (H) V1.09 / World			
Method:	(2010) H			
Indicator:	Characterization			
Skip categories:	Never			
Exclude infrastructure processes:	Yes			
Exclude long-term emissions:	Yes			
Sorted on item:	Impact category			
Sort order:	Ascending			

IMPACT CATEGORY	UNIT	RAINY-TRẠM BƠM 1	RAINY- TRỘN – PHẢN ỨNG – LẮNG	RAINY – BỂ LỘC	RAINY- BỂ CHỨA NƯỚC SẠCH	RAINY-TRẠM BƠM
Global warming	kg CO ₂ eq	0,050837429	0,00868559	0,003755741	0,000946975	0,070921505

Stratospheric ozone depletion	kg CFC11 eq	$12,798 \times 10^{-9}$	$3,58527 \times 10^{-9}$	$0,94552 \times 10^{-9}$	$0,376978 \times 10^{-9}$	$17,855 \times 10^{-9}$
Ionizing radiation	kBq Co-60 eq	$2,62528 \times 10^{-5}$	$3,35391 \times 10^{-5}$	$0,19396 \times 10^{-5}$	$0,631639 \times 10^{-5}$	$3,66244 \times 10^{-5}$
Ozone formation, Human health	kg NO _x eq	$15,1547 \times 10^{-5}$	$2,42079 \times 10^{-5}$	$1,1196 \times 10^{-5}$	$0,216957 \times 10^{-5}$	$21,1418 \times 10^{-5}$
Fine particulate matter formation	kg PM2.5 eq	$11,2532 \times 10^{-5}$	$1,67619 \times 10^{-5}$	$0,83136 \times 10^{-5}$	$0,17613 \times 10^{-5}$	$15,6989 \times 10^{-5}$
Ozone formation, Terrestrial ecosystems	kg NO _x eq	0,000153157	$2,47872 \times 10^{-5}$	$1,13148 \times 10^{-5}$	$0,221593 \times 10^{-5}$	0,000213664
Terrestrial acidification	kg SO ₂ eq	$32,5264 \times 10^{-5}$	$4,00274 \times 10^{-5}$	$2,40297 \times 10^{-5}$	$0,299623 \times 10^{-5}$	$45,3764 \times 10^{-5}$
Freshwater eutrophication	kg P eq	$23,5412 \times 10^{-7}$	$3,33938 \times 10^{-7}$	$1,73916 \times 10^{-7}$	$0,56489 \times 10^{-7}$	$32,8415 \times 10^{-7}$
Marine eutrophication	kg N eq	$11,2067 \times 10^{-8}$	$9,7322 \times 10^{-8}$	$0,82792 \times 10^{-8}$	$2,9635 \times 10^{-8}$	$15,6341 \times 10^{-8}$
Terrestrial ecotoxicity	kg 1,4-DCB	0,029457787	0,026635481	0,002176267	0,001529928	0,04109552

Freshwater ecotoxicity	kg 1,4-DCB	$5,57203 \times 10^{-6}$	$6,53352 \times 10^{-6}$	$4,1165 \times 10^{-6}$	$0,37099 \times 10^{-6}$	$7,77335 \times 10^{-6}$
Marine ecotoxicity	kg 1,4-DCB	$2,62804 \times 10^{-5}$	$2,75441 \times 10^{-5}$	$0,19415 \times 10^{-5}$	$0,152268 \times 10^{-5}$	$3,66628 \times 10^{-5}$
Human carcinogenic toxicity	kg 1,4-DCB	$4,88916 \times 10^{-5}$	$9,47651 \times 10^{-5}$	$0,3612 \times 10^{-5}$	$1,18927 \times 10^{-5}$	$6,82069 \times 10^{-5}$
Human non-carcinogenic toxicity	kg 1,4-DCB	$17,85379 \times 10^{-4}$	$10,61218 \times 10^{-4}$	$1,31899 \times 10^{-4}$	$0,745976 \times 10^{-4}$	$24,90719 \times 10^{-4}$
Land use	m ₂ a crop eq	$36,2977 \times 10^{-5}$	$8,26113 \times 10^{-5}$	$2,68158 \times 10^{-5}$	$1,12188 \times 10^{-5}$	$50,6376 \times 10^{-5}$
Mineral resource scarcity	kg Cu eq	$1,75577 \times 10^{-6}$	$312,692 \times 10^{-6}$	$0,1297 \times 10^{-6}$	$0,238138 \times 10^{-6}$	$2,44941 \times 10^{-6}$
Fossil resource scarcity	kg oil eq	0,012222507	0,00216154	0,000902968	0,00023456	0,017051188
Water consumption	m ₃	1,0000802	1,0000624	1,1323766	1,0000124	1,0001119

**PHỤ LỤC 3.6. KẾT QUẢ SIMAPRO HIỆN TRẠNG HOẠT ĐỘNG CỦA NHÀ MÁY NƯỚC CẦU ĐỎ
THEO THÁNG (LOẠI TÁC ĐỘNG – MIDPOINT)**

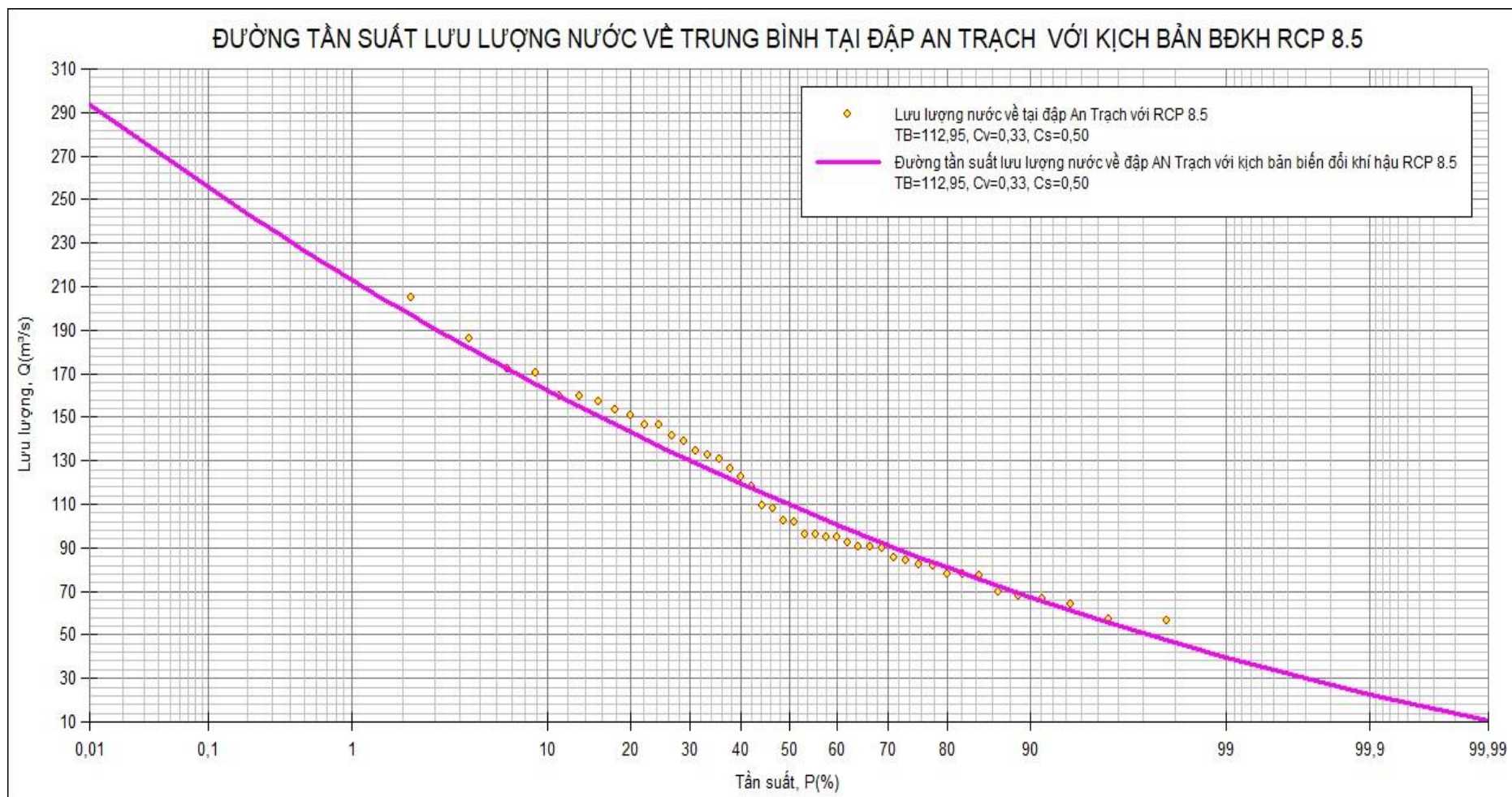
SimaPro 10.2.0.1	Date:	16/03/2025	Time:	13:39
Project	HTCN			
Calculation:	Analyze			
Results:	Impact assessment			
Product:	1 p [12 THÁNG] 120 000 m3/ngày (of project HTCN)			
Current library:	Ecoinvent 3 - allocation, cut-off by classification - system [Cut-off, S] Ecoinvent 3 - allocation, cut-off by classification - unit [Cut-off, U]			
Replacing library:	U]			
Method:	ReCiPe 2016 Midpoint (H) V1.09 / World (2010) H			
Indicator:	Characterization			
Skip categories:	Never			
Exclude infrastructure processes:	Yes			
Exclude long-term emissions:	Yes			
Sorted on item:	Impact category			
Sort order:	Ascending			

IMPACT CATEGORY	UNIT	THÁNG 1	THÁNG 2	THÁNG 3	THÁNG 4	THÁNG 5	THÁNG 6	THÁNG 7	THÁNG 8	THÁNG 9	THÁNG 10	THÁNG 11	THÁNG 12
Global warming	kg CO ₂ eq	1,45 × 10 ⁻¹	1,40 × 10 ⁻¹	1,55 × 10 ⁻¹	1,55× 10 ⁻¹	2,47× 10 ⁻¹	1,92 × 10 ⁻¹	1,78× 10 ⁻¹	2,15 × 10 ⁻¹	2,14× 10 ⁻¹	1,47 × 10 ⁻¹	1,43 × 10 ⁻¹	1,28 × 10 ⁻¹
Stratospheric ozone depletion	kg CFC11 eq	3,81 × 10 ⁻⁸	3,69 × 10 ⁻⁸	4,03 × 10 ⁻⁸	4,00× 10 ⁻⁸	6,35 × 10 ⁻⁸	5,04 × 10 ⁻⁸	4,64 × 10 ⁻⁸	5,58 × 10 ⁻⁸	5,54 × 10 ⁻⁸	3,94× 10 ⁻⁸	3,79 × 10 ⁻⁸	3,38 × 10 ⁻⁸

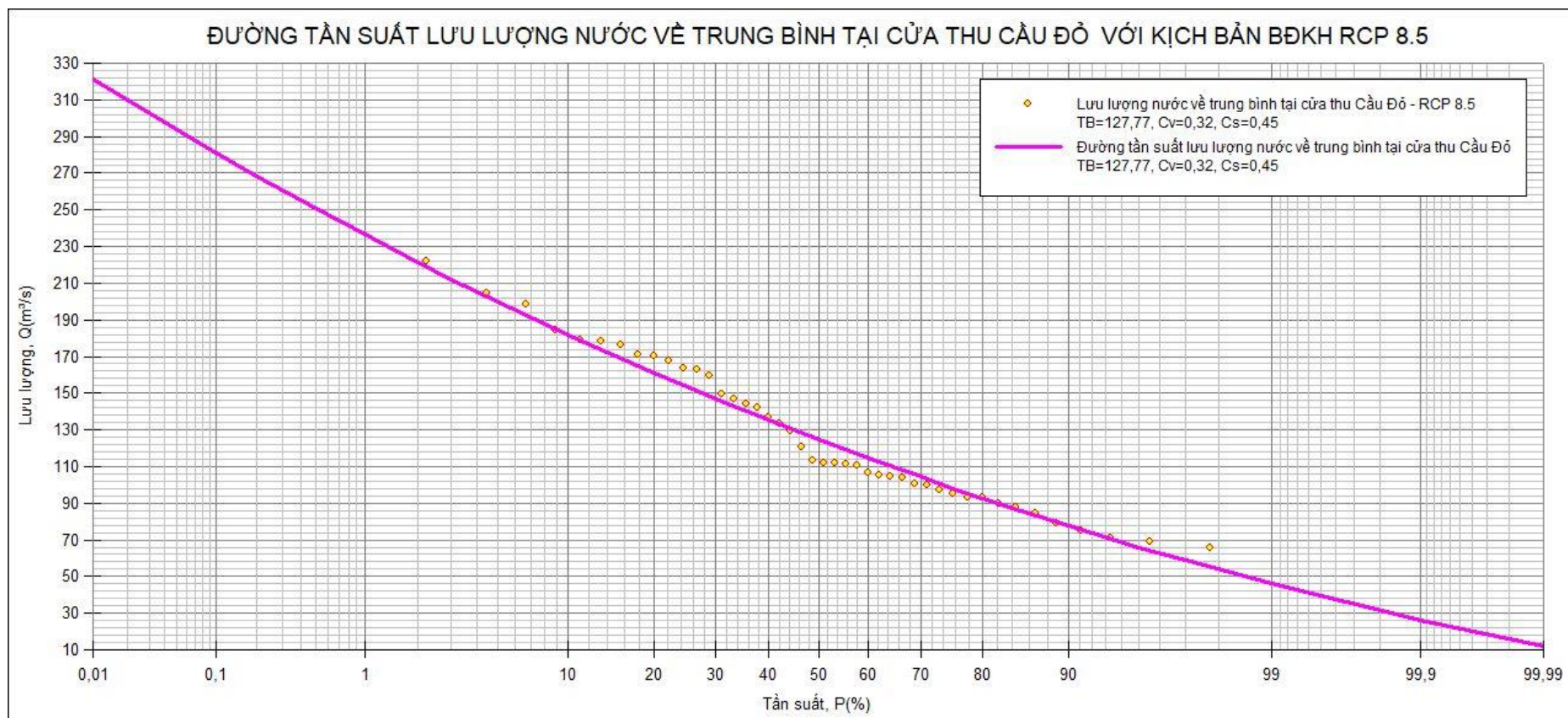
Ionizing radiation	kBq Co-60 eq	$1,11 \times 10^{-4}$	$1,09 \times 10^{-4}$	$1,10 \times 10^{-4}$	$1,05 \times 10^{-4}$	$1,58 \times 10^{-4}$	$1,46 \times 10^{-4}$	$1,29 \times 10^{-4}$	$1,49 \times 10^{-4}$	$1,48 \times 10^{-4}$	$1,29 \times 10^{-4}$	$1,15 \times 10^{-4}$	$1,03 \times 10^{-4}$
Ozone formation, Human health	kg NO _x eq	$4,30 \times 10^{-4}$	$4,15 \times 10^{-4}$	$4,60 \times 10^{-4}$	$4,60 \times 10^{-4}$	$7,35 \times 10^{-4}$	$5,68 \times 10^{-4}$	$5,27 \times 10^{-4}$	$6,38 \times 10^{-4}$	$6,35 \times 10^{-4}$	$4,36 \times 10^{-4}$	$4,24 \times 10^{-4}$	$3,79 \times 10^{-4}$
Fine particulate matter formation	kg PM2.5 eq	$3,18 \times 10^{-4}$	$3,07 \times 10^{-4}$	$3,41 \times 10^{-4}$	$3,41 \times 10^{-4}$	$5,45 \times 10^{-4}$	$4,20 \times 10^{-4}$	$3,90 \times 10^{-4}$	$4,73 \times 10^{-4}$	$4,70 \times 10^{-4}$	$3,22 \times 10^{-4}$	$3,14 \times 10^{-4}$	$2,80 \times 10^{-4}$
Ozone formation, Terrestrial ecosystems	kg NO _x eq	$4,35 \times 10^{-4}$	$4,20 \times 10^{-4}$	$4,65 \times 10^{-4}$	$4,65 \times 10^{-4}$	$7,43 \times 10^{-4}$	$5,75 \times 10^{-4}$	$5,33 \times 10^{-4}$	$6,46 \times 10^{-4}$	$6,42 \times 10^{-4}$	$4,41 \times 10^{-4}$	$4,29 \times 10^{-4}$	$3,83 \times 10^{-4}$
Terrestrial acidification	kg SO ₂ eq	$9,09 \times 10^{-4}$	$8,76 \times 10^{-4}$	$9,76 \times 10^{-4}$	$9,77 \times 10^{-4}$	$1,57 \times 10^{-3}$	$1,20 \times 10^{-3}$	$1,12 \times 10^{-3}$	$1,36 \times 10^{-3}$	$1,35 \times 10^{-3}$	$9,14 \times 10^{-4}$	$8,95 \times 10^{-4}$	$7,99 \times 10^{-4}$
Freshwater eutrophication	kg P eq	$6,65 \times 10^{-6}$	$6,42 \times 10^{-6}$	$7,13 \times 10^{-6}$	$7,13 \times 10^{-6}$	$1,14 \times 10^{-5}$	$8,79 \times 10^{-6}$	$8,16 \times 10^{-6}$	$9,90 \times 10^{-6}$	$9,85 \times 10^{-6}$	$6,73 \times 10^{-6}$	$6,57 \times 10^{-6}$	$5,87 \times 10^{-6}$
Marine eutrophication	kg N eq	$4,26 \times 10^{-7}$	$4,17 \times 10^{-7}$	$4,32 \times 10^{-7}$	$4,19 \times 10^{-7}$	$6,46 \times 10^{-7}$	$5,60 \times 10^{-7}$	$5,04 \times 10^{-7}$	$5,90 \times 10^{-7}$	$5,87 \times 10^{-7}$	$4,81 \times 10^{-7}$	$4,37 \times 10^{-7}$	$3,97 \times 10^{-7}$
Terrestrial ecotoxicity	kg 1,4-DCB	$1,08 \times 10^{-1}$	$1,05 \times 10^{-1}$	$1,09 \times 10^{-1}$	$1,06 \times 10^{-1}$	$1,61 \times 10^{-1}$	$1,43 \times 10^{-1}$	$1,27 \times 10^{-1}$	$1,49 \times 10^{-1}$	$1,47 \times 10^{-1}$	$1,20 \times 10^{-1}$	$1,10 \times 10^{-1}$	$9,76 \times 10^{-2}$
Freshwater ecotoxicity	kg 1,4-DCB	$2,21 \times 10^{-5}$	$2,16 \times 10^{-5}$	$2,20 \times 10^{-5}$	$2,11 \times 10^{-5}$	$3,16 \times 10^{-5}$	$2,93 \times 10^{-5}$	$2,58 \times 10^{-5}$	$2,98 \times 10^{-5}$	$2,95 \times 10^{-5}$	$2,52 \times 10^{-5}$	$2,26 \times 10^{-5}$	$2,01 \times 10^{-5}$

Marine ecotoxicity	kg 1,4-DCB	$1,00 \times 10^{-4}$	$9,82 \times 10^{-5}$	$1,01 \times 10^{-4}$	$9,69 \times 10^{-5}$	$1,46 \times 10^{-4}$	$1,33 \times 10^{-4}$	$1,18 \times 10^{-4}$	$1,37 \times 10^{-4}$	$1,36 \times 10^{-4}$	$1,14 \times 10^{-4}$	$1,03 \times 10^{-4}$	$9,11 \times 10^{-5}$
Human carcinogenic toxicity	kg 1,4-DCB	$2,41 \times 10^{-4}$	$2,38 \times 10^{-4}$	$2,33 \times 10^{-4}$	$2,18 \times 10^{-4}$	$3,18 \times 10^{-4}$	$3,19 \times 10^{-4}$	$2,75 \times 10^{-4}$	$3,11 \times 10^{-4}$	$3,09 \times 10^{-4}$	$2,91 \times 10^{-4}$	$2,52 \times 10^{-4}$	$2,26 \times 10^{-4}$
Human non-carcinogenic toxicity	kg 1,4-DCB	$5,93 \times 10^{-3}$	$5,77 \times 10^{-3}$	$6,13 \times 10^{-3}$	$6,00 \times 10^{-3}$	$9,30 \times 10^{-3}$	$7,86 \times 10^{-3}$	$7,10 \times 10^{-3}$	$8,40 \times 10^{-3}$	$8,34 \times 10^{-3}$	$6,41 \times 10^{-3}$	$5,98 \times 10^{-3}$	$5,32 \times 10^{-3}$
Land use	m ₂ a crop eq	$1,06 \times 10^{-3}$	$1,03 \times 10^{-3}$	$1,13 \times 10^{-3}$	$1,12 \times 10^{-3}$	$1,79 \times 10^{-3}$	$1,40 \times 10^{-3}$	$1,29 \times 10^{-3}$	$1,56 \times 10^{-3}$	$1,55 \times 10^{-3}$	$1,09 \times 10^{-3}$	$1,05 \times 10^{-3}$	$9,41 \times 10^{-4}$
Mineral resource scarcity	kg Cu eq	$3,38 \times 10^{-4}$	$3,44 \times 10^{-4}$	$2,75 \times 10^{-4}$	$2,23 \times 10^{-4}$	$2,35 \times 10^{-4}$	$4,58 \times 10^{-4}$	$3,44 \times 10^{-4}$	$3,38 \times 10^{-4}$	$3,30 \times 10^{-4}$	$4,96 \times 10^{-4}$	$3,78 \times 10^{-4}$	$3,25 \times 10^{-4}$
Fossil resource scarcity	kg oil eq	$3,50 \times 10^{-2}$	$3,37 \times 10^{-2}$	$3,73 \times 10^{-2}$	$3,73 \times 10^{-2}$	$5,96 \times 10^{-2}$	$4,62 \times 10^{-2}$	$4,28 \times 10^{-2}$	$5,18 \times 10^{-2}$	$5,15 \times 10^{-2}$	$3,55 \times 10^{-2}$	$3,45 \times 10^{-2}$	$3,09 \times 10^{-2}$
Water consumption	m ₃	1,100	1,101	1,117	1,125	1,095	1,087	1,091	1,149	1,141	1,149	1,199	1,136

PHỤ LỤC 4.1. BIỂU ĐỒ ĐƯỜNG TẦN SUẤT LƯU LƯỢNG TRUNG BÌNH NƯỚC VỀ THEO THÁNG TẠI ĐẬP AN TRẠCH THEO KỊCH BẢN RCP 8.5



PHỤ LỤC 4.2. BIỂU ĐỒ ĐƯỜNG TẦN SUẤT LƯU LƯỢNG TRUNG BÌNH NƯỚC VỀ THEO THÁNG TẠI CỬA THU CẦU ĐỒ THEO KỊCH BẢN RCP 8.5



PHỤ LỤC 4.3. KẾT QUẢ SIMAPRO TRONG MÙA MƯA CỦA 5 KỊCH BẢN CẤP NƯỚC TẠI ĐÀ NẴNG

(LOẠI TÁC ĐỘNG – MIDPOINT)

SimaPro 10.2.0.1
Project

Date: 11/10/2025 Time: 18:07
SCENARIO 1-5 RAINY

Calculation: Analyze
Results: Impact assessment
Product: 1 p SCENARIO 1-5
Current library: Ecoinvent 3 - allocation, cut-off by classification - system [Cut-off, S]
Replacing library: Ecoinvent 3 - allocation, cut-off by classification - unit [Cut-off, U]
Method: ReCiPe 2016 Midpoint (H) V1.09 / World (2010) H
Indicator: Characterization
Skip categories: Never
Exclude infrastructure processes: Yes
Exclude long-term emissions: Yes
Sorted on item: Impact category
Sort order: Ascending

IMPACT CATEGORY	UNIT	S1	S2	S3		S4		S5
				KB3 REUSE 100 000 m ³	KB3 RAINY SEASON	KB4 RAINY SEASON [ANTRACH]	KB4 RAINY SEASON	
Global warming	kg CO2 eq	0,144914	0,150711	0,086250478	0,15071108	0,17389304	0,15071129	0,15071217

Stratospheric ozone depletion	kg CFC11 eq	$3,81 \times 10^{-8}$	$3,96 \times 10^{-8}$	$2,1714 \times 10^{-8}$	$3,9641 \times 10^{-8}$	$4,5477 \times 10^{-8}$	$3,9641 \times 10^{-8}$	$3,9544 \times 10^{-8}$
Ionizing radiation	kBq Co-60 eq	0,000112	0,000116	$4,45403 \times 10^{-5}$	0,00011613	0,000128103	0,000116131	0,000112664
Ozone formation, Human health	kg NOx eq	0,00043	0,000447	0,000257114	0,00044673	0,000515835	0,00044673	0,000447088
Fine particulate matter formation	kg PM2.5 eq	0,000318	0,000331	0,000190921	0,000330522	0,000381837	0,000330522	0,000330741
Ozone formation, Terrestrial ecosystems	kg NOx eq	0,000434	0,000452	0,000259845	0,000451858	0,000521698	0,000451859	0,000452201
Terrestrial acidification	kg SO2 eq	0,000908	0,000944	0,00055184	0,000943831	0,001092151	0,000943832	0,000945666
Freshwater eutrophication	kg P eq	$6,65 \times 10^{-6}$	$6,92 \times 10^{-6}$	$3,99399 \times 10^{-6}$	$6,91578 \times 10^{-6}$	$7,98926 \times 10^{-6}$	$6,91579 \times 10^{-6}$	$6,91117 \times 10^{-6}$
Marine eutrophication	kg N eq	$4,3 \times 10^{-7}$	$4,47 \times 10^{-7}$	$1,90132 \times 10^{-7}$	$4,47381 \times 10^{-7}$	$4,98485 \times 10^{-7}$	$4,47386 \times 10^{-7}$	$4,32295 \times 10^{-7}$
Terrestrial ecotoxicity	kg 1,4-DCB	0,108071	0,112394	0,049977905	0,11239404	0,1258283	0,11239456	0,11144946

Freshwater ecotoxicity	kg 1,4-DCB	$2,21 \times 10^{-5}$	$2,3 \times 10^{-5}$	$9,45348 \times 10^{-6}$	$2,30086 \times 10^{-5}$	$2,55498 \times 10^{-5}$	$2,30087 \times 10^{-5}$	$2,27579 \times 10^{-5}$
Marine ecotoxicity	kg 1,4-DCB	0,000101	0,000105	$4,45871 \times 10^{-5}$	0,000104644	0,00011663	0,000104645	0,000103643
Human carcinogenic toxicity	kg 1,4-DCB	0,000243	0,000252	$8,29491 \times 10^{-5}$	0,000252392	0,000274691	0,000252394	0,000245175
Human non-carcinogenic toxicity	kg 1,4-DCB	0,00594	0,006177	0,003029063	0,006177367	0,006991552	0,006177389	0,006140917
Land use	m2a crop eq	0,001061	0,001104	0,000615824	0,001103555	0,001269074	0,001103557	0,001100947
Mineral resource scarcity	kg Cu eq	0,00034	0,000353	$2,97882 \times 10^{-6}$	0,00035341	0,000354234	0,000353415	0,000346552
Fossil resource scarcity	kg oil eq	0,034926	0,036323	0,020736632	0,036323159	0,041896651	0,036323213	0,036318484
Water consumption	m3	1,040292	1,040303	1,0001361	1,0403032	1,0403398	1,0403032	1,0202969

PHỤ LỤC 4.4. KẾT QUẢ SIMAPRO TRONG MÙA KHÔ CỦA 5 KỊCH BẢN CẤP NƯỚC TẠI ĐÀ NẴNG
(LOẠI TÁC ĐỘNG – MIDPOINT)

SimaPro 10.2.0.1
Project

Date: 12/10/2025 Time: 15:27
SCENARIO 1-5 DRY

Calculation: Analyze
 Results: Impact assessment
 Product: 1 p SCENARIO 1-5
 Current library: Ecoinvent 3 - allocation, cut-off by classification - system [Cut-off, S]
 Replacing library: Ecoinvent 3 - allocation, cut-off by classification - unit [Cut-off, U]
 Method: ReCiPe 2016 Midpoint (H) V1.09 / World (2010) H
 Indicator: Characterization
 Skip categories: Never
 Exclude infrastructure processes: Yes
 Exclude long-term emissions: Yes
 Sorted on item: Impact category
 Sort order: Ascending

IMPACT	UNIT	S1	S2		S3		S4		S5
			KB2 DRY SEASON	KB2 DRY SEASON (RO)	KB3 REUSE 100 000	KB3 DRY SEASON	KB4 DRY SEASON [ANTRACH]	KB4 DRY SEASON	
Global warming	kg CO ₂ eq	0,21745	0,21712588	1,7940149	0,086250478	0,2171259	0,17406727	0,21747087	0,19549722

Stratospheric ozone depletion	kg CFC11 eq	$5,65 \times 10^{-8}$	$5,6386 \times 10^{-8}$	$4,51648 \times 10^{-7}$	$2,1714 \times 10^{-8}$	$5,639 \times 10^{-8}$	$4,5546 \times 10^{-8}$	$5,6473 \times 10^{-8}$	$5,0813 \times 10^{-8}$
Ionizing radiation	kBq Co-60 eq	0,000152	0,000151599	0,000926477	$4,45403 \times 10^{-5}$	0,0001516	0,000129364	0,000151777	0,000135685
Ozone formation, Human health	kg NO _x eq	0,000646	0,000644575	0,005347973	0,000257114	0,0006446	0,000516217	0,000645604	0,000580599
Fine particulate matter formation	kg PM2.5 eq	0,000478	0,000477471	0,003971161	0,000190921	0,0004775	0,000382158	0,000478235	0,000429884
Ozone formation, Terrestrial ecosystems	kg NO _x eq	0,000653	0,000651809	0,005404785	0,000259845	0,0006518	0,000522087	0,000652848	0,000587129
Terrestrial acidification	kg SO ₂ eq	0,00137	0,001368146	0,011478294	0,00055184	0,0013681	0,001092651	0,001370353	0,001232263
Freshwater eutrophication	kg P eq	1×10^{-5}	$9,9943 \times 10^{-6}$	$8,30752 \times 10^{-5}$	$3,99399 \times 10^{-6}$	$9,994 \times 10^{-6}$	$8,0004 \times 10^{-6}$	$1,00103 \times 10^{-5}$	$8,98528 \times 10^{-6}$
Marine eutrophication	kg N eq	6×10^{-7}	$5,9956 \times 10^{-7}$	$3,95487 \times 10^{-6}$	$1,90132 \times 10^{-7}$	$5,996 \times 10^{-7}$	$5,04647 \times 10^{-7}$	$6,00326 \times 10^{-7}$	$5,30738 \times 10^{-7}$
Terrestrial ecotoxicity	kg 1,4-DCB	0,151196	0,15100994	1,0395454	0,049977905	0,1510082	0,12605854	0,15120786	0,13732054

Freshwater ecotoxicity	kg 1,4-DCB	$3,04 \times 10^{-5}$	$3,0325 \times 10^{-5}$	0,000196634	$9,45348 \times 10^{-6}$	$3,032 \times 10^{-5}$	$2,56053 \times 10^{-5}$	$3,03624 \times 10^{-5}$	$2,7646 \times 10^{-5}$
Marine ecotoxicity	kg 1,4-DCB	0,000139	0,000139115	0,000927417	$4,45871 \times 10^{-5}$	0,0001391	0,000116855	0,000139291	0,00012671
Human carcinogenic toxicity	kg 1,4-DCB	0,000319	0,000318348	0,001725357	$8,29491 \times 10^{-5}$	0,0003183	0,000276937	0,000318677	0,000287927
Human non-carcinogenic toxicity	kg 1,4-DCB	0,008527	0,008515969	0,063005025	0,003029063	0,0085159	0,007003744	0,00852802	0,007710954
Land use	m ² a crop eq	0,001581	0,001578656	0,012809215	0,000615824	0,0015787	0,001271221	0,00158112	0,001420634
Mineral resource scarcity	kg Cu eq	$35,5 \times 10^{-5}$	$35,453 \times 10^{-5}$	$6,19618 \times 10^{-5}$	$0,297882 \times 10^{-5}$	$35,45 \times 10^{-5}$	$35,3016 \times 10^{-5}$	$35,45 \times 10^{-5}$	$34,695 \times 10^{-5}$
Fossil resource scarcity	kg oil eq	0,05237	0,052292064	0,43132327	0,020736632	0,0522921	0,041939763	0,052375001	0,047085586
Water consumption	m ³	1,040411	1,0404102	1,0428312	1,0001361	1,0404102	1,0403423	1,0404108	1,0203674

**PHỤ LỤC 4.5. KẾT QUẢ SIMAPRO TRONG MÙA KHÔ CỦA 5 KỊCH BẢN CẤP NƯỚC TẠI ĐÀ NẴNG
(ĐIỂM KẾT THÚC TÁC ĐỘNG – ENDPOINT)**

SimaPro 10.2.0.1	Date:	12/10/2025	Time:	16:42
Project	HTCN			
Calculation:	Analyze			
Results:	Impact assessment			
Product:	1 p SCENARIO 4 (of project HTCN)			
Current library:	Ecoinvent 3 - allocation, cut-off by classification - system [Cut-off, S]			
Replacing library:	Ecoinvent 3 - allocation, cut-off by classification - unit [Cut-off, U]			
Method:	ReCiPe 2016 Endpoint (H) V1.09 / World (2010) H/A			
Indicator:	Characterization			
Skip categories:	Never			
Exclude infrastructure processes:	Yes			
Exclude long-term emissions:	Yes			
Sorted on item:	Impact category			
Sort order:	Ascending			

Impact category	Unit	S1	S2		S3		S4		S5
		KB1 DRY SEASON	KB2 DRY SEASON	KB2 DRY SEASON (RO)	KB3 REUSE	KB3 DRY SEASON	KB4 DRY SEASON [ANTRACH	KB 4 DRY SEASON	KB5 DRY SEASON
Global warming, Human health	DALY	$2,0179 \times 10^{-7}$	$2,0149 \times 10^{-7}$	$16,6482 \times 10^{-7}$	$0,80039 \times 10^{-7}$	$2,0149 \times 10^{-7}$	$1,61532 \times 10^{-7}$	$2,0181 \times 10^{-7}$	$1,8142 \times 10^{-7}$

Global warming, Terrestrial ecosystems	species.yr	$6,0896 \times 10^{-10}$	$6,0806 \times 10^{-10}$	$50,241 \times 10^{-10}$	$2,4154 \times 10^{-10}$	$6,0806 \times 10^{-10}$	$4,8747 \times 10^{-10}$	$6,090 \times 10^{-10}$	$5,4748 \times 10^{-10}$
Global warming, Freshwater ecosystems	species.yr	$1,6633 \times 10^{-14}$	$1,6608 \times 10^{-14}$	$13,723 \times 10^{-14}$	$0,6597 \times 10^{-14}$	$1,661 \times 10^{-14}$	$1,3315 \times 10^{-14}$	$1,6635 \times 10^{-14}$	$1,495 \times 10^{-14}$
Stratospheric ozone depletion	DALY	$2,9979 \times 10^{-11}$	$2,99354 \times 10^{-11}$	$23,978 \times 10^{-11}$	$1,1528 \times 10^{-11}$	$2,994 \times 10^{-11}$	$2,4180 \times 10^{-11}$	$2,9982 \times 10^{-11}$	$2,6977 \times 10^{-11}$
Ionizing radiation	DALY	$1,289 \times 10^{-12}$	$1,28753 \times 10^{-12}$	$7,86719 \times 10^{-12}$	$0,37822 \times 10^{-12}$	$1,288 \times 10^{-12}$	$1,0987 \times 10^{-12}$	$1,289 \times 10^{-12}$	$1,1524 \times 10^{-12}$
Ozone formation, Human health	DALY	$5,8746 \times 10^{-10}$	$5,8658 \times 10^{-10}$	$48,668 \times 10^{-10}$	$2,3398 \times 10^{-10}$	$5,8658 \times 10^{-10}$	$4,6977 \times 10^{-10}$	$5,875 \times 10^{-10}$	$5,2836 \times 10^{-10}$
Fine particulate matter formation	DALY	$3,00322 \times 10^{-7}$	$2,99871 \times 10^{-7}$	$24,94 \times 10^{-7}$	$1,19904 \times 10^{-7}$	$2,9987 \times 10^{-7}$	$2,40012 \times 10^{-7}$	$3,0035 \times 10^{-7}$	$2,6998 \times 10^{-7}$
Ozone formation, Terrestrial ecosystems	species.yr	$8,4209 \times 10^{-11}$	$8,40829 \times 10^{-11}$	$69,7213 \times 10^{-11}$	$3,35198 \times 10^{-11}$	$8,4083 \times 10^{-11}$	$6,7349 \times 10^{-11}$	$8,4217 \times 10^{-11}$	$7,5739 \times 10^{-11}$
Terrestrial acidification	species.yr	$2,9048 \times 10^{-10}$	$2,9004 \times 10^{-10}$	$24,3331 \times 10^{-10}$	$1,1699 \times 10^{-10}$	$2,900 \times 10^{-10}$	$2,316 \times 10^{-10}$	$2,905 \times 10^{-10}$	$2,61 \times 10^{-10}$
Freshwater eutrophication	species.yr	$6,7037 \times 10^{-12}$	$6,69361 \times 10^{-12}$	$55,6384 \times 10^{-12}$	$2,67491 \times 10^{-12}$	$6,6936 \times 10^{-12}$	$5,3582 \times 10^{-12}$	$6,704 \times 10^{-12}$	$6,0178 \times 10^{-12}$

Marine eutrophication	species.yr	$1,0206 \times 10^{-15}$	$1,0194 \times 10^{-15}$	$6,72403 \times 10^{-15}$	$0,3233 \times 10^{-15}$	$1,0194 \times 10^{-15}$	$0,8580 \times 10^{-15}$	$1,021 \times 10^{-15}$	$0,9024 \times 10^{-15}$
Terrestrial ecotoxicity	species.yr	$1,7237 \times 10^{-12}$	$1,72162 \times 10^{-12}$	$11,8517 \times 10^{-12}$	$0,56979 \times 10^{-12}$	$1,7216 \times 10^{-12}$	$1,4372 \times 10^{-12}$	$1,724 \times 10^{-12}$	$1,5655 \times 10^{-12}$
Freshwater ecotoxicity	species.yr	$2,1079 \times 10^{-14}$	$2,10541 \times 10^{-14}$	$13,6502 \times 10^{-14}$	$0,65626 \times 10^{-14}$	$2,1054 \times 10^{-14}$	$1,7778 \times 10^{-14}$	$2,108 \times 10^{-14}$	$1,9194 \times 10^{-14}$
Marine ecotoxicity	species.yr	$1,4631 \times 10^{-14}$	$1,46136 \times 10^{-14}$	$9,74201 \times 10^{-14}$	$0,46836 \times 10^{-14}$	$1,4613 \times 10^{-14}$	$1,228 \times 10^{-14}$	$1,463 \times 10^{-14}$	$1,3311 \times 10^{-14}$
Human carcinogenic toxicity	DALY	$1,0583 \times 10^{-9}$	$1,05729 \times 10^{-9}$	$5,7307 \times 10^{-9}$	$0,275512 \times 10^{-9}$	$1,05728 \times 10^{-9}$	$0,919747 \times 10^{-9}$	$1,05838 \times 10^{-9}$	$0,5624 \times 10^{-9}$
Human non-carcinogenic toxicity	DALY	$1,94252 \times 10^{-9}$	$1,93994 \times 10^{-9}$	$14,353 \times 10^{-9}$	$0,690029 \times 10^{-9}$	$1,93992 \times 10^{-9}$	$1,59545 \times 10^{-9}$	$1,94268 \times 10^{-9}$	$1,7566 \times 10^{-9}$
Land use	species.yr	$1,4031 \times 10^{-11}$	$1,40101 \times 10^{-11}$	$11,368 \times 10^{-11}$	$0,54654 \times 10^{-11}$	$1,40101 \times 10^{-11}$	$1,12817 \times 10^{-11}$	$1,4032 \times 10^{-11}$	$1,2608 \times 10^{-11}$
Mineral resource scarcity	USD2013	$8,20209 \times 10^{-5}$	$8,20262 \times 10^{-5}$	$1,4316 \times 10^{-5}$	$0,06882 \times 10^{-5}$	$8,20189 \times 10^{-5}$	$8,16774 \times 10^{-5}$	$8,20203 \times 10^{-5}$	$8,0273 \times 10^{-5}$
Fossil resource scarcity	USD2013	0,008343288	0,008331214	0,06688927	0,003215817	0,008331198	0,006725781	0,008344061	0,00751139

Water consumption, Human health	DALY	$2,2477 \times 10^{-7}$	$2,2477 \times 10^{-7}$	$2,24544 \times 10^{-7}$	$2,15995 \times 10^{-7}$	$2,2477 \times 10^{-7}$	$2,24772 \times 10^{-7}$	$2,2477 \times 10^{-7}$	$2,2043 \times 10^{-7}$
Water consumption, Terrestrial ecosystem	species.yr	$2,08661 \times 10^{-9}$	$2,0866 \times 10^{-9}$	$2,12966 \times 10^{-9}$	$2,00239 \times 10^{-9}$	$2,0866 \times 10^{-9}$	$2,08541 \times 10^{-9}$	$2,08661 \times 10^{-9}$	$2,0459 \times 10^{-9}$
Water consumption, Aquatic ecosystems	species.yr	$3,52658 \times 10^{-12}$	$3,52658 \times 10^{-12}$	$3,53334 \times 10^{-12}$	$3,39037 \times 10^{-12}$	$3,52658 \times 10^{-12}$	$3,52639 \times 10^{-12}$	$3,5266 \times 10^{-12}$	$3,4587 \times 10^{-12}$