

9. Supplementary material

Table S1: Mineral industry

| Sector | Postal code | Total emissions 2017 [kt] | Process related emissions 2017 [kt] | Scenario RFS 2050 [kt] | Scenario ATRES 2050 [kt] |
|--------|-------------|---------------------------|-------------------------------------|------------------------|--------------------------|
| Cement | 54579 | 178 | 109 | 165 | 109 |
| Cement | 65203 | 183 | 112 | 169 | 112 |
| Cement | 72359 | 208 | not determined | not determined | not determined |
| Cement | 36137 | 219 | 134 | 202 | 134 |
| Cement | 33106 | 240 | 147 | 222 | 147 |
| Cement | 59590 | 272 | 167 | 252 | 167 |
| Cement | 59269 | 317 | 194 | 293 | 194 |
| Cement | 59597 | 332 | 204 | 307 | 204 |
| Cement | 91807 | 348 | 214 | 322 | 214 |
| Cement | 59597 | 411 | 252 | 380 | 252 |
| Cement | 72359 | 505 | 310 | 467 | 310 |
| Cement | 69181 | 532 | 326 | 492 | 326 |
| Cement | 75045 | 539 | 331 | 499 | 331 |
| Cement | 59320 | 555 | 341 | 513 | 341 |
| Cement | 59597 | 566 | 347 | 523 | 347 |
| Cement | 89522 | 623 | 382 | 576 | 382 |
| Cement | 30559 | 629 | 386 | 582 | 386 |
| Cement | 59269 | 631 | 387 | 584 | 387 |
| Cement | 31319 | 632 | 388 | 585 | 388 |
| Cement | 86655 | 639 | 392 | 591 | 392 |
| Cement | 67307 | 683 | 419 | 632 | 419 |
| Cement | 97855 | 684 | 420 | 633 | 420 |
| Cement | 97753 | 704 | 432 | 651 | 432 |
| Cement | 89604 | 712 | 437 | 659 | 437 |
| Cement | 59590 | 744 | 456 | 688 | 456 |
| Cement | 59597 | 744 | 456 | 688 | 456 |
| Cement | 06406 | 794 | 487 | 734 | 487 |
| Cement | 83101 | 806 | 495 | 746 | 495 |
| Cement | 89601 | 876 | 537 | 810 | 537 |
| Cement | 93133 | 920 | 564 | 851 | 564 |
| Cement | 06638 | 936 | 574 | 866 | 574 |
| Cement | 25566 | 1,070 | 656 | 989 | 656 |

| | | | | | |
|--------------|-------|-------|-------|-------|-------|
| Cement | 49525 | 1,110 | 681 | 1,027 | 681 |
| Cement | 37355 | 1,160 | 712 | 1,073 | 712 |
| Cement | 15562 | 1,560 | 957 | 1,443 | 957 |
| Ceramic | 91352 | 55 | 30 | 55 | 30 |
| Ceramic | 84367 | 50 | 27 | 50 | 27 |
| Ceramic | 14827 | 50 | 27 | 50 | 27 |
| Ceramic | 39326 | 42 | 20 | 42 | 20 |
| Ceramic | 69254 | 40 | 22 | 40 | 22 |
| Conventional | 33790 | 11 | 7 | 9 | 7 |
| Conventional | 48432 | 22 | 15 | 20 | 15 |
| Conventional | 93351 | 25 | 17 | 22 | 17 |
| Conventional | 92283 | 41 | 27 | 36 | 27 |
| Conventional | 37290 | 41 | 27 | 37 | 27 |
| Conventional | 79291 | 42 | 27 | 37 | 27 |
| Conventional | 95359 | 54 | 35 | 48 | 35 |
| Conventional | 54579 | 59 | 38 | 52 | 38 |
| Conventional | 36137 | 67 | 44 | 59 | 44 |
| Conventional | 59929 | 88 | 57 | 77 | 57 |
| Conventional | 59597 | 139 | 91 | 123 | 91 |
| Conventional | 59581 | 140 | 91 | 123 | 91 |
| Conventional | 89134 | 148 | 96 | 130 | 96 |
| Conventional | 49536 | 150 | 98 | 132 | 98 |
| Conventional | 93055 | 169 | 110 | 149 | 110 |
| Conventional | 86655 | 169 | 110 | 149 | 110 |
| Conventional | 79588 | 181 | 118 | 159 | 118 |
| Conventional | 38875 | 192 | 125 | 169 | 125 |
| Conventional | 15562 | 231 | 150 | 203 | 150 |
| Conventional | 42327 | 240 | 156 | 211 | 156 |
| Conventional | 38889 | 256 | 166 | 225 | 166 |
| Conventional | 65623 | 301 | 196 | 265 | 196 |
| Conventional | 65594 | 308 | 200 | 271 | 200 |
| Conventional | 93342 | 315 | 205 | 277 | 205 |
| Conventional | 38723 | 350 | 228 | 308 | 228 |
| Conventional | 38875 | 448 | 291 | 394 | 291 |
| Conventional | 58710 | 783 | 509 | 689 | 509 |
| Conventional | 42489 | 1,980 | 1,287 | 1,743 | 1,287 |
| Dolomite | 31020 | 56 | 36 | 49 | 36 |

| | | | | | |
|----------|-------|-----|----|-----|----|
| Dolomite | 07586 | 69 | 45 | 61 | 45 |
| Dolomite | 07570 | 119 | 77 | 105 | 77 |
| Glass | 92729 | 245 | 53 | 245 | 53 |
| Glass | 51143 | 157 | 34 | 157 | 34 |
| Glass | 45966 | 148 | 32 | 148 | 32 |
| Glass | 39171 | 143 | 31 | 143 | 31 |
| Glass | 39171 | 126 | 27 | 126 | 27 |
| Glass | 39340 | 122 | 26 | 122 | 26 |
| Glass | 04860 | 119 | 26 | 119 | 26 |
| Glass | 45329 | 110 | 12 | 110 | 12 |
| Glass | 52222 | 108 | 23 | 108 | 23 |
| Glass | 76726 | 107 | 18 | 107 | 18 |
| Glass | 95666 | 100 | 17 | 100 | 17 |
| Glass | 31582 | 99 | 11 | 99 | 11 |
| Glass | 45966 | 94 | 20 | 94 | 20 |
| Glass | 88410 | 94 | 10 | 94 | 10 |
| Glass | 40589 | 93 | 15 | 93 | 15 |
| Glass | 98724 | 89 | 10 | 89 | 10 |
| Glass | 96361 | 85 | 10 | 85 | 10 |
| Glass | 52134 | 77 | 17 | 77 | 17 |
| Glass | 06766 | 75 | 16 | 75 | 16 |
| Glass | 86633 | 67 | 8 | 67 | 8 |
| Glass | 31683 | 62 | 7 | 62 | 7 |
| Glass | 97816 | 61 | 7 | 61 | 7 |
| Glass | 56422 | 59 | 7 | 59 | 7 |
| Glass | 67346 | 55 | 9 | 55 | 9 |
| Glass | 44534 | 54 | 6 | 54 | 6 |
| Glass | 45279 | 50 | 6 | 50 | 6 |
| Glass | 98553 | 48 | 5 | 48 | 5 |
| Glass | 98701 | 47 | 5 | 47 | 5 |
| Glass | 03116 | 47 | 5 | 47 | 5 |
| Glass | 31737 | 47 | 5 | 47 | 5 |
| Glass | 96355 | 46 | 8 | 46 | 8 |
| Glass | 68305 | 45 | 10 | 45 | 10 |
| Glass | 04808 | 45 | 7 | 45 | 7 |
| Glass | 37603 | 45 | 5 | 45 | 5 |
| Glass | 51465 | 43 | 7 | 43 | 7 |

| | | | | | |
|----------------|-------|-----|-----|-----|-----|
| Iron&Steel | 15890 | 153 | 99 | 135 | 99 |
| Mineral wool | 09356 | 96 | 10 | 96 | 10 |
| Mineral wool | 86633 | 62 | 8 | 62 | 8 |
| Mineral wool | 45964 | 64 | 7 | 64 | 7 |
| Mineral wool | 39345 | 64 | 6 | 64 | 6 |
| Mineral wool | 68526 | 52 | 5 | 52 | 5 |
| Sugar refining | 34590 | 37 | 24 | 33 | 24 |
| Sugar refining | 47546 | 42 | 27 | 37 | 27 |
| Sugar refining | 32791 | 44 | 29 | 39 | 29 |
| Sugar refining | 31249 | 55 | 36 | 48 | 36 |
| Sugar refining | 38315 | 62 | 41 | 55 | 41 |
| Sugar refining | 86641 | 71 | 46 | 63 | 46 |
| Sugar refining | 74254 | 74 | 48 | 65 | 48 |
| Sugar refining | 17389 | 84 | 54 | 74 | 54 |
| Sugar refining | 94447 | 91 | 59 | 80 | 59 |
| Sugar refining | 39164 | 92 | 60 | 81 | 60 |
| Sugar refining | 06420 | 120 | 78 | 106 | 78 |
| Sugar refining | 31171 | 120 | 78 | 106 | 78 |
| Sugar refining | 53879 | 122 | 79 | 107 | 79 |
| Sugar refining | 97199 | 133 | 86 | 117 | 86 |
| Sugar refining | 67283 | 134 | 87 | 118 | 87 |
| Sugar refining | 29525 | 151 | 98 | 133 | 98 |
| Sugar refining | 52428 | 172 | 112 | 151 | 112 |
| Sugar refining | 06712 | 245 | 159 | 216 | 159 |

Table S2: Iron and steel industry

| Sector | Postal code | Total emissions [kt] | Process related | Scenario RFS | Scenario ATRES 2050 |
|--------------------------|-------------|----------------------|---------------------|--------------|---------------------|
| | | 2017 | emissions 2017 [kt] | 2050 [kt] | [kt] |
| Casting and rolling mill | 54293 | 17 | - | 17 | - |
| Casting and rolling mill | 47166 | 72 | - | 72 | - |
| Casting and rolling mill | 45476 | 53 | - | 53 | - |
| Casting and rolling mill | 40472 | 41 | - | 41 | - |
| Casting and rolling mill | 50321 | 109 | - | 80 | - |
| Casting and rolling mill | 45473 | 56 | - | 56 | - |
| Casting and rolling mill | 35260 | 227 | - | 167 | - |
| Casting and rolling mill | 47807 | 63 | - | 46 | - |
| Casting and rolling mill | 56626 | 169 | - | 67 | - |
| Casting and rolling mill | 58119 | 107 | - | 107 | - |

| | | | | | |
|--------------------------|-------|--------|----------------|-------|-----|
| Casting and rolling mill | 35236 | 50 | - | 37 | - |
| Casting and rolling mill | 66130 | 102 | - | 75 | - |
| Casting and rolling mill | 40822 | 106 | - | 78 | - |
| Casting and rolling mill | 58239 | 48 | - | 36 | - |
| Casting and rolling mill | 97318 | 50 | - | 37 | - |
| Casting and rolling mill | 78224 | 127 | - | 93 | - |
| Casting and rolling mill | 44793 | 241 | - | 241 | - |
| Coke plant | 50129 | 401 | - | - | - |
| Coke plant | 47166 | 2,110 | - | - | - |
| Coke plant | 46238 | 444 | - | - | - |
| Electro-steel plant | 21129 | 430 | 318 | 430 | 30 |
| Electro-steel plant | 49811 | 42 | 18 | 42 | 18 |
| Electro-steel plant | 16761 | 102 | 21 | 101 | 21 |
| Electro-steel plant | 49124 | 173 | 27 | 171 | 27 |
| Electro-steel plant | 66359 | 24 | 9 | 24 | 9 |
| Electro-steel plant | 01609 | 72 | 3 | 72 | 3 |
| Electro-steel plant | 31226 | 166 | 33 | 166 | 33 |
| Electro-steel plant | 14770 | 154 | 33 | 154 | 33 |
| Electro-steel plant | 01705 | 30 | 3 | 30 | 3 |
| Electro-steel plant | 57072 | 32 | 3 | 32 | 3 |
| Electro-steel plant | 01591 | 75 | 30 | 75 | 30 |
| Electro-steel plant | 07333 | 44 | 24 | 44 | 24 |
| Electro-steel plant | 58452 | 62 | 12 | 56 | 12 |
| Electro-steel plant | 57078 | 125 | 12 | 125 | 12 |
| Electro-steel plant | 35576 | 141 | 9 | 141 | 9 |
| Electro-steel plant | 77694 | 194 | 72 | 194 | 72 |
| Electro-steel plant | 86405 | 169 | 36 | 169 | 36 |
| Integrated steel mill | 28237 | 5,553 | 5,755 | 2,420 | 108 |
| Integrated steel mill | 15890 | 1,890 | 3,038 | 1,291 | 57 |
| Integrated steel mill | 47166 | 16,569 | 15,508 | 4,913 | 291 |
| Integrated steel mill | 47259 | 8,430 | 6,075 | 1,896 | 114 |
| Integrated steel mill | 38239 | 7,967 | 7,354 | 2,673 | 138 |
| Integrated steel mill | 66763 | 7,888 | 3,517 | 2,661 | 66 |
| Meltshop | 66333 | 691 | 500 | 491 | - |
| Meltshop | 47137 | 297 | 260 | 114 | 39 |
| Recycling plant | 47053 | 606 | not determined | 130 | 8 |

Table S3: NE-metal industry

| Sector | Postal code | Total emissions 2017 [kt] | Process related emissions 2017 [kt] | Scenario RFS 2050 [kt] | Scenario ATRES 2050 [kt] |
|---------------------|-------------|---------------------------|-------------------------------------|------------------------|--------------------------|
| Aluminium foundries | 66763 | 50 | - | 48 | - |
| Aluminium foundries | 41468 | 41 | - | 39 | - |
| Aluminium foundries | 41468 | 267 | - | 257 | - |
| Aluminium foundry | 06469 | 113 | - | 109 | - |
| Aluminium foundry | 84513 | 41 | - | 39 | - |
| Copper | 20539 | 158 | - | 149 | - |
| Copper | 44532 | 184 | - | 174 | - |
| Lead | 52224 | 55 | - | 52 | - |
| Lead | 38642 | 50 | - | 48 | - |
| Lead | 26954 | 46 | - | 43 | - |
| Primary aluminium | 21129 | 242 | 174 | 242 | - |
| Primary aluminium | 41468 | 315 | 302 | 315 | - |
| Primary aluminium | 45356 | 279 | 198 | 279 | - |
| Primary aluminium | 46562 | 166 | 125 | 166 | - |
| Silica | 94060 | 209 | - | 198 | - |
| Zinc | 09599 | 85 | - | 80 | - |
| Zinc | 47249 | 43 | - | 41 | - |

Table S4: Chemical industry

| Sector | Postal code | Total emissions 2017 [kt] | Process related emissions 2017 [kt] | Scenario RFS 2050 [kt] | Scenario ATRES 2050 [kt] |
|----------------|-------------|---------------------------|-------------------------------------|------------------------|--------------------------|
| Ammonia | 06886 | 2,322 | 1,660 | 1,660 | - |
| Ammonia | 67056 | 1,505 | 821 | 821 | - |
| Ammonia | 50769 | 628 | 429 | 429 | - |
| Ammonia | 25572 | 1,466 | 1,059 | 1,059 | - |
| Bulk chemicals | 84508 | 41 | - | - | - |
| Bulk chemicals | 50389 | 57 | - | - | - |
| Bulk chemicals | 59759 | 59 | - | - | - |
| Bulk chemicals | 45772 | 60 | - | - | - |
| Bulk chemicals | 06258 | 69 | - | - | - |
| Bulk chemicals | 45764 | 70 | - | - | - |
| Bulk chemicals | 84508 | 74 | - | - | - |

| | | | | | |
|-------------------|-------|-------|---|-----|---|
| Bulk chemicals | 47829 | 78 | - | - | - |
| Bulk chemicals | 67547 | 87 | - | - | - |
| Bulk chemicals | 50389 | 93 | - | - | - |
| Bulk chemicals | 31595 | 98 | - | - | - |
| Bulk chemicals | 04564 | 99 | - | - | - |
| Bulk chemicals | 44623 | 112 | - | - | - |
| Bulk chemicals | 04561 | 129 | - | - | - |
| Bulk chemicals | 67056 | 129 | - | - | - |
| Bulk chemicals | 44579 | 131 | - | - | - |
| Bulk chemicals | 26388 | 155 | - | - | - |
| Bulk chemicals | 45772 | 160 | - | - | - |
| Bulk chemicals | 25541 | 169 | - | - | - |
| Bulk chemicals | 47443 | 188 | - | - | - |
| Bulk chemicals | 67056 | 287 | - | - | - |
| Bulk chemicals | 50389 | 390 | - | - | - |
| Bulk chemicals | 85126 | 406 | - | - | - |
| Bulk chemicals | 67056 | 563 | - | - | - |
| Bulk chemicals | 50769 | 734 | - | - | - |
| Bulk chemicals | 50769 | 850 | - | - | - |
| Bulk chemicals | 50389 | 920 | - | - | - |
| Bulk chemicals | 04561 | 1,143 | - | - | - |
| Carbon Black | 44147 | 300 | - | 300 | - |
| Carbon Black | 50997 | 308 | - | 308 | - |
| Hydrogen & syngas | 41538 | 42 | - | - | - |
| Hydrogen & syngas | 21107 | 52 | - | - | - |
| Hydrogen & syngas | 84489 | 54 | - | - | - |
| Hydrogen & syngas | 46147 | 66 | - | - | - |
| Hydrogen & syngas | 25541 | 123 | - | - | - |
| Hydrogen & syngas | 67056 | 193 | - | - | - |
| Hydrogen & syngas | 67056 | 200 | - | - | - |
| Hydrogen & syngas | 45771 | 219 | - | - | - |
| Hydrogen & syngas | 06237 | 245 | - | - | - |
| Hydrogen & syngas | 06237 | 414 | - | - | - |
| Refineries | 25770 | 985 | - | - | - |
| Refineries | 49808 | 1,020 | - | - | - |
| Refineries | 21079 | 765 | - | - | - |
| Refineries | 21107 | 160 | - | - | - |

| | | | | | |
|------------|-------|-------|---|-----|---|
| Refineries | 50997 | 1,420 | - | - | - |
| Refineries | 50389 | 2,180 | - | - | - |
| Refineries | 45896 | 3,320 | - | - | - |
| Refineries | 45899 | 1,120 | - | - | - |
| Refineries | 76187 | 2,050 | - | - | - |
| Refineries | 76187 | 788 | - | - | - |
| Refineries | 84489 | 1,110 | - | - | - |
| Refineries | 85092 | 632 | - | - | - |
| Refineries | 85088 | 659 | - | - | - |
| Refineries | 93333 | 1,170 | - | - | - |
| Refineries | 16303 | 3,850 | - | - | - |
| Refineries | 06237 | 1,780 | - | - | - |
| Refineries | 06137 | 463 | - | - | - |
| Refineries | 48499 | 44 | - | - | - |
| Refineries | 21107 | 74 | - | - | - |
| Refineries | 31311 | 34 | - | - | - |
| Soda | 06406 | 203 | - | 203 | - |
| Soda | 67056 | 78 | - | 78 | - |
| Soda | 67056 | 1 | - | 1 | - |
| Soda | 47495 | 167 | - | 167 | - |
| Soda | 39418 | 155 | - | 155 | - |

Table S5: Pulp and paper industry

| Sector | Postal code | Total emissions 2017 [kt] | Scenario RFS 2050 [kt] | Scenario ATRES 2050 [kt] |
|------------------------------|-------------|---------------------------|------------------------|--------------------------|
| Paper, carton and paperboard | 73432 | 135 | 93 | - |
| Paper, carton and paperboard | 31061 | 312 | 274 | 192 |
| Paper, carton and paperboard | 59821 | 183 | 125 | - |
| Paper, carton and paperboard | 51465 | 137 | 94 | - |
| Paper, carton and paperboard | 26892 | 263 | 180 | - |
| Paper, carton and paperboard | 52355 | 182 | 129 | 15 |
| Paper, carton and paperboard | 04838 | 201 | 150 | 39 |
| Paper, carton and paperboard | 36039 | 179 | 126 | 11 |
| Paper, carton and paperboard | 27318 | 144 | 101 | 6 |
| Paper, carton and paperboard | 76187 | 443 | 411 | 340 |
| Paper, carton and paperboard | 56727 | 269 | 200 | 51 |
| Paper, carton and paperboard | 41460 | 121 | 83 | - |
| Paper, carton and paperboard | 77704 | 149 | 106 | 12 |

| | | | | |
|---|-------|-------|-------|-------|
| Paper, carton and paperboard | 86956 | 365 | 280 | 96 |
| Paper, carton and paperboard | 16303 | 413 | 283 | - |
| Paper, carton and paperboard | 63811 | 516 | 409 | 177 |
| Paper, carton and paperboard | 26316 | 289 | 198 | - |
| Paper, carton and paperboard | 53909 | 265 | 189 | 22 |
| Paper, carton and paperboard | 89584 | 45 | 31 | - |
| Paper, carton and paperboard | 68305 | 157 | 107 | - |
| Paper, carton and paperboard | 09648 | 63 | 43 | - |
| Paper, carton and paperboard | 25436 | 63 | 43 | - |
| Paper, carton and paperboard | 76855 | 88 | 60 | - |
| Paper, carton and paperboard | 37412 | 96 | 66 | - |
| Paper, carton and paperboard | 73432 | 54 | 37 | - |
| Paper, carton and paperboard | 58099 | 102 | 70 | - |
| Paper, carton and paperboard | 52372 | 121 | 83 | - |
| Paper, carton and paperboard | 34474 | 83 | 57 | - |
| Paper, carton and paperboard | 76593 | 72 | 50 | - |
| Paper, carton and paperboard | 83308 | 49 | 34 | - |
| Paper, carton and paperboard | 55246 | 78 | 54 | - |
| Paper, carton and paperboard | 76593 | 69 | 47 | - |
| Paper, carton and paperboard | 76593 | 61 | 42 | - |
| Paper, carton and paperboard | 86529 | 83 | 57 | - |
| Paper, carton and paperboard | 86153 | 68 | 47 | - |
| Paper, carton and paperboard | 52372 | 90 | 62 | - |
| Paper, carton and paperboard | 04687 | 49 | 34 | - |
| Paper, carton and paperboard | 86833 | 98 | 67 | - |
| Veneer, plywood, wood fibre and chipboard | 59929 | 489 | 486 | 478 |
| Veneer, plywood, wood fibre and chipboard | 33332 | 189 | 184 | 174 |
| Veneer, plywood, wood fibre and chipboard | 86556 | 137 | 137 | 137 |
| Veneer, plywood, wood fibre and chipboard | 92318 | 423 | 416 | 402 |
| Wood pulp and cellulose | 39596 | 2,020 | 1,997 | 1,947 |
| Wood pulp and cellulose | 07366 | 52 | 36 | - |