TABLE I. Ranking of the most affected concession areas in terms of the generated electricity from DG in (TWh) for the year 2030.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Alternative 0 | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | OL |
| AES Eletropaulo | 5.26 | 3.94 | 3.64 | 3.30 | 2.81 | 2.48 | 4.05 |
| LIGHT | 5.81 | 4.83 | 4.60 | 4.32 | 3.92 | 3.63 | 4.97 |
| CPFL Paulista | 6.10 | 4.98 | 4.72 | 4.42 | 3.97 | 3.66 | 5.45 |
| COPEL-DIS | 4.27 | 3.39 | 3.19 | 2.96 | 2.63 | 2.40 | 3.65 |
| CEMIG-D | 8.39 | 7.28 | 7.02 | 6.72 | 6.27 | 5.95 | 7.90 |
| CELESC-DIS | 2.95 | 2.35 | 2.22 | 2.06 | 1.83 | 1.68 | 2.47 |
| ENEL RJ | 3.76 | 3.12 | 2.96 | 2.77 | 2.50 | 2.30 | 3.39 |
| ELEKTRO | 3.21 | 2.61 | 2.47 | 2.31 | 2.07 | 1.90 | 2.85 |
| COELBA | 2.65 | 2.05 | 1.92 | 1.77 | 1.56 | 1.42 | 2.33 |
| RGE SUL | 3.35 | 2.81 | 2.69 | 2.55 | 2.35 | 2.22 | 3.13 |
| ENEL CE | 2.03 | 1.64 | 1.55 | 1.45 | 1.31 | 1.21 | 1.83 |
| CELPE | 1.69 | 1.32 | 1.24 | 1.15 | 1.02 | 0.93 | 1.51 |
| EDP ES | 1.35 | 1.08 | 1.02 | 0.95 | 0.85 | 0.78 | 1.17 |
| ENERGISA MS | 1.41 | 1.21 | 1.16 | 1.10 | 1.02 | 0.96 | 1.33 |
| ENERGISA MT | 2.24 | 1.95 | 1.89 | 1.81 | 1.70 | 1.62 | 2.15 |
| CEMAR | 0.93 | 0.71 | 0.67 | 0.62 | 0.55 | 0.50 | 0.84 |
| ENERGISA SE | 0.43 | 0.33 | 0.31 | 0.29 | 0.25 | 0.23 | 0.37 |
| ENERGISA PB | 0.58 | 0.48 | 0.46 | 0.43 | 0.40 | 0.37 | 0.54 |
| ENERGISA TO | 0.49 | 0.40 | 0.38 | 0.36 | 0.32 | 0.30 | 0.45 |
| ENERGISA MG | 0.32 | 0.27 | 0.26 | 0.25 | 0.23 | 0.22 | 0.30 |
| COSERN | 0.72 | 0.60 | 0.57 | 0.55 | 0.50 | 0.48 | 0.70 |
| ENERGISA NF | 0.07 | 0.06 | 0.06 | 0.05 | 0.05 | 0.04 | 0.06 |
| ELFSM | 0.10 | 0.08 | 0.08 | 0.07 | 0.06 | 0.06 | 0.09 |
| SULGIPE | 0.06 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.05 |
| COPERALIANÇA | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 | 0.03 | 0.05 |
| ENERGISA BO | 0.08 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.07 |
| COCEL | 0.05 | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 | 0.05 |
| DEMEI | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.03 |
| ELETROCAR | 0.05 | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 | 0.04 |
| UHENPAL | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.03 |
| HIDROPAN | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| MUX ENERGIA | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| EFLUL | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| FORCEL | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| EFLJC | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |

TABLE II. Ranking of the most affected concession areas in terms of the generated electricity from DG in (%) for the year 2030.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | OL |
| AES Eletropaulo | 74.81% | 69.18% | 62.64% | 53.43% | 47.12% | 76.91% |
| CELESC-DIS | 79.73% | 75.16% | 69.83% | 62.24% | 56.98% | 83.91% |
| ENERGISA NF | 80.32% | 75.72% | 70.28% | 62.38% | 56.79% | 83.94% |
| LIGHT | 83.09% | 79.12% | 74.39% | 67.47% | 62.53% | 85.51% |
| COPEL-DIS | 79.41% | 74.74% | 69.30% | 61.55% | 56.20% | 85.54% |
| ENERGISA SE | 77.29% | 72.34% | 66.66% | 58.76% | 53.42% | 86.18% |
| EDP ES | 79.91% | 75.40% | 70.14% | 62.67% | 57.51% | 87.04% |
| SULGIPE | 83.02% | 79.19% | 74.72% | 68.31% | 63.84% | 87.13% |
| COPERALIANÇA | 83.94% | 80.21% | 75.80% | 69.39% | 64.83% | 87.58% |
| COELBA | 77.37% | 72.45% | 66.80% | 58.96% | 53.67% | 87.83% |
| DEMEI | 81.76% | 77.62% | 72.78% | 65.90% | 61.14% | 88.48% |
| ELEKTRO | 81.42% | 77.10% | 71.99% | 64.59% | 59.37% | 88.79% |
| CELPE | 77.86% | 73.09% | 67.65% | 60.14% | 55.11% | 89.04% |
| CPFL Paulista | 81.76% | 77.51% | 72.47% | 65.16% | 59.99% | 89.46% |
| ELFSM | 80.75% | 76.43% | 71.41% | 64.30% | 59.41% | 89.56% |
| COCEL | 82.58% | 78.56% | 73.82% | 66.97% | 62.14% | 89.70% |
| ENEL RJ | 82.90% | 78.76% | 73.78% | 66.40% | 61.05% | 90.05% |
| MUX ENERGIA | 83.18% | 79.33% | 74.82% | 68.32% | 63.77% | 90.10% |
| ENEL CE | 80.74% | 76.46% | 71.49% | 64.49% | 59.70% | 90.59% |
| UHENPAL | 87.31% | 84.29% | 80.67% | 75.34% | 71.49% | 90.90% |
| CEMAR | 77.05% | 72.14% | 66.57% | 58.96% | 53.94% | 91.01% |
| EFLJC | 85.56% | 82.20% | 78.21% | 72.41% | 68.27% | 91.49% |
| ENERGISA TO | 81.78% | 77.68% | 72.91% | 66.15% | 61.51% | 91.87% |
| ENERGISA PB | 82.18% | 78.32% | 73.88% | 67.73% | 63.58% | 92.43% |
| ENERGISA BO | 83.47% | 79.88% | 75.77% | 70.05% | 66.18% | 92.89% |
| EFLUL | 87.94% | 85.12% | 81.77% | 76.87% | 73.38% | 92.90% |
| ENERGISA MG | 84.79% | 81.28% | 77.16% | 71.22% | 67.05% | 93.39% |
| ELETROCAR | 87.20% | 84.22% | 80.71% | 75.61% | 72.00% | 93.39% |
| RGE SUL | 84.12% | 80.53% | 76.32% | 70.35% | 66.21% | 93.50% |
| HIDROPAN | 86.89% | 83.81% | 80.15% | 74.81% | 71.01% | 93.55% |
| ENERGISA MS | 85.42% | 82.03% | 78.01% | 72.18% | 68.05% | 93.99% |
| CEMIG-D | 86.76% | 83.67% | 80.02% | 74.70% | 70.92% | 94.16% |
| FORCEL | 86.54% | 83.40% | 79.68% | 74.27% | 70.42% | 94.78% |
| ENERGISA MT | 87.28% | 84.34% | 80.88% | 75.89% | 72.39% | 96.26% |
| COSERN | 83.63% | 80.07% | 75.99% | 70.32% | 66.51% | 97.37% |

TABLE III. Ranking of the most affected concession areas in terms of the PEI in (MBRL) for the year 2030.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Alternative 0 | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | OL |
| CPFL Paulista | 1646.4 | 1108.1 | 996.2 | 869.9 | 697.7 | 583.6 | 1375.6 |
| CEMIG-D | 1890.2 | 1274.3 | 1144.8 | 997.4 | 794.4 | 658.0 | 1668.8 |
| ENEL RJ | 1171.4 | 809.6 | 733.3 | 646.5 | 527.0 | 446.9 | 978.2 |
| AES Eletropaulo | 649.8 | 419.2 | 373.5 | 323.0 | 256.5 | 214.0 | 457.6 |
| COPEL-DIS | 877.8 | 541.5 | 473.6 | 397.9 | 296.7 | 231.1 | 691.9 |
| LIGHT | 894.7 | 644.1 | 591.7 | 532.2 | 450.6 | 396.1 | 710.0 |
| ELEKTRO | 810.0 | 545.3 | 490.4 | 428.4 | 344.0 | 288.2 | 671.7 |
| COELBA | 740.8 | 453.1 | 396.2 | 333.3 | 250.3 | 197.1 | 608.4 |
| CELESC-DIS | 487.4 | 317.4 | 282.9 | 244.3 | 192.4 | 158.4 | 380.7 |
| RGE SUL | 783.5 | 459.6 | 393.4 | 319.0 | 218.5 | 152.5 | 682.0 |
| ENERGISA MT | 658.7 | 387.1 | 330.4 | 266.1 | 178.1 | 119.4 | 596.9 |
| EDP ES | 327.8 | 214.7 | 191.7 | 165.9 | 131.3 | 108.7 | 266.9 |
| ENEL CE | 387.4 | 241.1 | 211.5 | 178.6 | 134.4 | 105.7 | 327.9 |
| CELPE | 329.2 | 194.5 | 168.0 | 138.9 | 100.7 | 76.2 | 273.2 |
| ENERGISA MS | 313.9 | 202.2 | 178.9 | 152.5 | 116.3 | 92.1 | 275.9 |
| CEMAR | 175.9 | 94.5 | 78.7 | 61.4 | 38.9 | 24.8 | 148.7 |
| ENERGISA PB | 121.6 | 69.4 | 59.0 | 47.5 | 32.1 | 22.1 | 104.5 |
| ENERGISA SE | 85.6 | 52.0 | 45.4 | 38.1 | 28.5 | 22.3 | 68.5 |
| ENERGISA TO | 112.9 | 65.8 | 56.3 | 45.7 | 31.4 | 22.2 | 96.0 |
| ENERGISA MG | 83.8 | 51.9 | 45.3 | 37.9 | 27.7 | 21.0 | 72.7 |
| COSERN | 167.7 | 94.1 | 79.4 | 62.9 | 41.0 | 26.8 | 158.1 |
| ELFSM | 26.3 | 16.2 | 14.2 | 12.0 | 8.9 | 7.0 | 21.8 |
| ENERGISA NF | 16.3 | 11.0 | 9.9 | 8.7 | 7.0 | 5.9 | 12.6 |
| COCEL | 15.2 | 10.7 | 9.8 | 8.8 | 7.3 | 6.4 | 12.8 |
| ENERGISA BO | 13.1 | 7.6 | 6.6 | 5.3 | 3.7 | 2.6 | 11.3 |
| SULGIPE | 9.4 | 6.8 | 6.3 | 5.7 | 4.9 | 4.3 | 7.7 |
| COPERALIANÇA | 7.9 | 5.7 | 5.3 | 4.8 | 4.1 | 3.6 | 6.5 |
| ELETROCAR | 9.9 | 6.2 | 5.4 | 4.5 | 3.3 | 2.5 | 8.6 |
| DEMEI | 5.4 | 3.4 | 3.0 | 2.6 | 1.9 | 1.5 | 4.5 |
| HIDROPAN | 6.9 | 4.5 | 4.0 | 3.4 | 2.7 | 2.1 | 6.0 |
| UHENPAL | 4.6 | 3.4 | 3.1 | 2.8 | 2.3 | 2.1 | 3.9 |
| MUX ENERGIA | 3.4 | 2.3 | 2.1 | 1.8 | 1.5 | 1.3 | 2.9 |
| EFLUL | 3.8 | 2.7 | 2.5 | 2.2 | 1.9 | 1.6 | 3.3 |
| FORCEL | 3.4 | 2.3 | 2.0 | 1.8 | 1.4 | 1.2 | 3.0 |
| EFLJC | 1.4 | 1.0 | 0.9 | 0.9 | 0.7 | 0.7 | 1.2 |

TABLE IV. Ranking of the most affected concession areas in terms of the regulated tariff in (MBRL/TWh) for the year 2030.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Alternative 0 | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | OL |
| ENEL RJ | 1124.6 | 992.5 | 971.9 | 951.0 | 926.4 | 912.5 | 1021.8 |
| EFLUL | 1272.3 | 1188.5 | 1173.9 | 1158.3 | 1138.7 | 1126.7 | 1215.8 |
| UHENPAL | 788.3 | 726.4 | 715.8 | 704.6 | 690.6 | 682.1 | 737.9 |
| ENERGISA NF | 900.6 | 851.1 | 843.2 | 835.1 | 825.7 | 820.5 | 856.2 |
| CPFL Paulista | 811.0 | 754.2 | 745.0 | 735.4 | 724.1 | 717.5 | 769.8 |
| EFLJC | 811.7 | 761.6 | 752.9 | 743.8 | 732.4 | 725.6 | 771.8 |
| COCEL | 873.8 | 823.2 | 814.7 | 805.8 | 794.9 | 788.5 | 834.4 |
| ELEKTRO | 783.0 | 731.6 | 723.3 | 714.8 | 704.7 | 699.0 | 744.5 |
| LIGHT | 733.5 | 692.9 | 685.9 | 678.7 | 669.9 | 664.8 | 695.8 |
| HIDROPAN | 948.7 | 884.3 | 873.2 | 861.7 | 847.3 | 838.7 | 911.4 |
| FORCEL | 980.8 | 915.7 | 904.5 | 892.6 | 877.8 | 868.7 | 945.8 |
| CEMIG-D | 822.8 | 768.3 | 758.8 | 748.7 | 736.0 | 728.2 | 792.3 |
| COPERALIANÇA | 636.2 | 602.3 | 596.5 | 590.4 | 582.9 | 578.5 | 606.5 |
| ELETROCAR | 837.3 | 786.9 | 778.1 | 768.7 | 756.8 | 749.5 | 809.8 |
| ENERGISA MS | 771.4 | 720.3 | 711.5 | 702.3 | 690.9 | 684.0 | 744.1 |
| COPEL-DIS | 757.9 | 722.5 | 716.6 | 710.6 | 703.6 | 699.5 | 730.7 |
| ENERGISA MG | 862.8 | 813.9 | 805.4 | 796.5 | 785.5 | 778.9 | 836.5 |
| EDP ES | 753.8 | 722.7 | 717.6 | 712.2 | 705.8 | 702.2 | 730.5 |
| MUX ENERGIA | 678.3 | 646.8 | 641.5 | 635.9 | 629.1 | 625.1 | 656.0 |
| DEMEI | 734.7 | 701.4 | 695.8 | 690.0 | 683.0 | 678.9 | 712.6 |
| AES Eletropaulo | 664.1 | 641.4 | 637.8 | 634.2 | 630.1 | 628.0 | 642.3 |
| ENERGISA MT | 1016.5 | 957.6 | 947.2 | 936.1 | 922.1 | 913.5 | 995.3 |
| SULGIPE | 683.3 | 658.6 | 654.3 | 649.6 | 643.8 | 640.2 | 662.2 |
| ENERGISA TO | 764.3 | 727.9 | 721.7 | 715.2 | 707.3 | 702.6 | 744.5 |
| ELFSM | 751.0 | 720.4 | 715.2 | 709.9 | 703.4 | 699.6 | 731.5 |
| CELESC-DIS | 676.9 | 653.8 | 649.9 | 645.9 | 641.1 | 638.4 | 657.5 |
| RGE SUL | 751.8 | 717.8 | 711.9 | 705.8 | 698.3 | 693.8 | 736.0 |
| COELBA | 738.3 | 716.0 | 712.3 | 708.5 | 704.0 | 701.4 | 723.8 |
| ENERGISA SE | 628.4 | 609.3 | 606.1 | 602.8 | 599.0 | 596.7 | 614.9 |
| ENEL CE | 597.0 | 575.7 | 572.2 | 568.5 | 564.1 | 561.6 | 584.0 |
| CEMAR | 621.5 | 603.8 | 600.9 | 598.0 | 594.5 | 592.6 | 612.5 |
| CELPE | 577.3 | 563.2 | 560.8 | 558.5 | 555.6 | 554.1 | 568.9 |
| ENERGISA PB | 674.9 | 657.0 | 653.9 | 650.7 | 646.6 | 644.2 | 666.6 |
| ENERGISA BO | 632.0 | 617.3 | 614.7 | 611.9 | 608.4 | 606.2 | 625.2 |
| COSERN | 694.6 | 676.2 | 672.9 | 669.5 | 665.2 | 662.6 | 691.0 |

TABLE V. Ranking of the most affected concession areas in terms of the GWP in (Mt CO2eq/year) for the year 2030.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Alternative 0 | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5 | OL |
| AES Eletropaulo | 0.355 | 0.418 | 0.432 | 0.449 | 0.472 | 0.488 | 0.413 |
| LIGHT | 0.365 | 0.416 | 0.428 | 0.443 | 0.464 | 0.479 | 0.409 |
| CPFL Paulista | 0.353 | 0.417 | 0.432 | 0.449 | 0.475 | 0.493 | 0.390 |
| COPEL-DIS | 0.266 | 0.313 | 0.323 | 0.336 | 0.353 | 0.365 | 0.299 |
| CEMIG-D | 0.504 | 0.566 | 0.580 | 0.597 | 0.622 | 0.639 | 0.532 |
| CELESC-DIS | 0.194 | 0.224 | 0.230 | 0.238 | 0.249 | 0.257 | 0.218 |
| ENEL RJ | 0.235 | 0.269 | 0.277 | 0.287 | 0.302 | 0.312 | 0.255 |
| ELEKTRO | 0.195 | 0.228 | 0.235 | 0.244 | 0.257 | 0.266 | 0.215 |
| COELBA | 0.163 | 0.195 | 0.202 | 0.210 | 0.221 | 0.229 | 0.180 |
| RGE SUL | 0.211 | 0.238 | 0.245 | 0.252 | 0.263 | 0.270 | 0.222 |
| ENEL CE | 0.122 | 0.144 | 0.149 | 0.154 | 0.162 | 0.167 | 0.133 |
| CELPE | 0.105 | 0.125 | 0.130 | 0.134 | 0.141 | 0.146 | 0.115 |
| EDP ES | 0.086 | 0.100 | 0.103 | 0.107 | 0.112 | 0.116 | 0.095 |
| ENERGISA MS | 0.084 | 0.095 | 0.098 | 0.101 | 0.106 | 0.109 | 0.089 |
| ENERGISA MT | 0.139 | 0.154 | 0.158 | 0.162 | 0.168 | 0.172 | 0.143 |
| CEMAR | 0.057 | 0.069 | 0.071 | 0.074 | 0.078 | 0.080 | 0.062 |
| ENERGISA SE | 0.027 | 0.032 | 0.033 | 0.035 | 0.036 | 0.038 | 0.030 |
| ENERGISA PB | 0.036 | 0.041 | 0.043 | 0.044 | 0.046 | 0.047 | 0.038 |
| ENERGISA TO | 0.030 | 0.035 | 0.036 | 0.037 | 0.039 | 0.040 | 0.032 |
| ENERGISA MG | 0.020 | 0.023 | 0.023 | 0.024 | 0.025 | 0.026 | 0.021 |
| COSERN | 0.044 | 0.050 | 0.052 | 0.053 | 0.055 | 0.057 | 0.045 |
| ELFSM | 0.007 | 0.007 | 0.008 | 0.008 | 0.008 | 0.009 | 0.007 |
| ENERGISA NF | 0.006 | 0.006 | 0.006 | 0.006 | 0.007 | 0.007 | 0.006 |
| SULGIPE | 0.004 | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.004 |
| COPERALIANÇA | 0.003 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 |
| ENERGISA BO | 0.005 | 0.006 | 0.006 | 0.006 | 0.006 | 0.006 | 0.005 |
| COCEL | 0.003 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 |
| DEMEI | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 |
| ELETROCAR | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.004 | 0.003 |
| UHENPAL | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 |
| HIDROPAN | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 |
| MUX ENERGIA | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| EFLUL | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| FORCEL | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| EFLJC | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |