

Net-Zero America - maryland state report v2

Larson et al. 2020

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Reading guide

IN DRAFT

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Table 1: *E- scenario - PILLAR 1: Efficiency/Electrification - Residential*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|-------|-------|-------|-------|-------|-------|
| Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr | 0 | 4.803 | 4.708 | 0 | 0 | 0 | 0 |
| Sale of space heating units by type - Electric Heat Pump | 0.174 | 0.356 | 0.797 | 0.897 | 0.901 | 0.901 | 0.901 |
| Sale of space heating units by type - Electric Resistance | 0.132 | 0.138 | 0.058 | 0.04 | 0.039 | 0.039 | 0.04 |
| Sale of space heating units by type - Fossil | 0.143 | 0.189 | 0.055 | 0.025 | 0.024 | 0.024 | 0.024 |
| Sale of space heating units by type - Gas | 0.551 | 0.316 | 0.09 | 0.038 | 0.036 | 0.036 | 0.036 |
| Sales of cooking units - Electric Resistance | 0.592 | 0.679 | 0.945 | 0.997 | 1 | 1 | 1 |
| Sales of cooking units - Gas | 0.408 | 0.321 | 0.055 | 0.003 | 0 | 0 | 0 |
| Sales of water heating units by type - Electric Heat Pump | 0 | 0.092 | 0.487 | 0.576 | 0.58 | 0.58 | 0.58 |
| Sales of water heating units by type - Electric Resistance | 0.357 | 0.51 | 0.422 | 0.403 | 0.402 | 0.402 | 0.402 |
| Sales of water heating units by type - Gas Furnace | 0.595 | 0.365 | 0.07 | 0.003 | 0 | 0 | 0 |
| Sales of water heating units by type - Other | 0.048 | 0.033 | 0.021 | 0.018 | 0.018 | 0.018 | 0.018 |

Table 2: *E- scenario - PILLAR 1: Efficiency/Electrification - Transportation*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|-----------|------------|------------|------------|------------|------------|
| End-use technology sales by technology - HDV - diesel | 0.972 | 0.921 | 0.67 | 0.233 | 0.042 | 0.006 | 0 |
| End-use technology sales by technology - HDV - EV | 0.006 | 0.038 | 0.19 | 0.456 | 0.574 | 0.596 | 0.6 |
| End-use technology sales by technology - HDV - gasoline | 0.002 | 0.002 | 0.002 | 0.001 | 0 | 0 | 0 |
| End-use technology sales by technology - HDV - hybrid | 0.001 | 0.001 | 0.001 | 0 | 0 | 0 | 0 |
| End-use technology sales by technology - HDV - hydrogen FC | 0.004 | 0.025 | 0.127 | 0.304 | 0.382 | 0.397 | 0.4 |
| End-use technology sales by technology - HDV - other | 0.015 | 0.012 | 0.011 | 0.006 | 0.002 | 0 | 0 |
| End-use technology sales by technology - LDV - diesel | 0.013 | 0.016 | 0.012 | 0.004 | 0.001 | 0 | 0 |
| End-use technology sales by technology - LDV - EV | 0.048 | 0.179 | 0.504 | 0.834 | 0.965 | 0.993 | 1 |
| End-use technology sales by technology - LDV - gasoline | 0.885 | 0.75 | 0.447 | 0.149 | 0.031 | 0.006 | 0 |
| End-use technology sales by technology - LDV - hybrid | 0.053 | 0.052 | 0.035 | 0.013 | 0.003 | 0.001 | 0 |
| End-use technology sales by technology - LDV - hydrogen FC | 0.001 | 0.003 | 0.002 | 0.001 | 0 | 0 | 0 |
| End-use technology sales by technology - LDV - other | 0.001 | 0.001 | 0.001 | 0 | 0 | 0 | 0 |
| End-use technology sales by technology - MDV - diesel | 0.647 | 0.597 | 0.423 | 0.144 | 0.026 | 0.004 | 0 |
| End-use technology sales by technology - MDV - EV | 0.008 | 0.051 | 0.253 | 0.608 | 0.765 | 0.795 | 0.8 |
| End-use technology sales by technology - MDV - gasoline | 0.337 | 0.333 | 0.255 | 0.093 | 0.018 | 0.003 | 0 |
| End-use technology sales by technology - MDV - hybrid | 0.004 | 0.004 | 0.003 | 0.001 | 0 | 0 | 0 |
| End-use technology sales by technology - MDV - hydrogen FC | 0.002 | 0.013 | 0.063 | 0.152 | 0.191 | 0.199 | 0.2 |
| End-use technology sales by technology - MDV - other | 0.003 | 0.003 | 0.002 | 0.001 | 0 | 0 | 0 |
| Light-duty vehicle capital costs - Cumulative 5-yr | 0 | 799553870 | 2072979298 | 3320878421 | 5045689764 | 5475009992 | 5229080857 |
| Number of public EV charging plugs - DC Fast Charging | 402 | 0 | 1310.6 | 0 | 5495.6 | 0 | 8839.9 |
| Number of public EV charging plugs - L2 Charging | 1673 | 0 | 31467 | 0 | 131951.9 | 0 | 212250 |

Table 3: *E- scenario - PILLAR 2: Clean Electricity - Generating capacity*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|-------|-------|-------|-------|-------|--------|
| Power generation capital investment - biomass power plant | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Power generation capital investment - biomass w/ccu allam power plant | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Power generation capital investment - biomass w/ccu power plant | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Power generation capital investment - Offshore Wind - Base | 0 | 0 | 0 | 0 | 0 | 6.326 | 14.683 |
| Power generation capital investment - Offshore Wind - Constrained | 0 | 0 | 0 | 0 | 0 | 1.459 | 19.057 |
| Power generation capital investment - Solar PV - Base | 0 | 4.413 | 2.059 | 2.193 | 1.119 | 1.282 | 0.169 |
| Power generation capital investment - Solar PV - Constrained | 0 | 2.9 | 0.138 | 0.35 | 0 | 1.226 | 1.46 |
| Power generation capital investment - Wind - Constrained | 0 | 0 | 0 | 0.457 | 3.712 | 0 | 0 |

Table 4: *E- scenario - PILLAR 2: Clean Electricity - Generation*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|------|
| Power generation by technology - biomass power plant | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Power generation by technology - biomass w/ccu allam power plant | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Power generation by technology - biomass w/ccu power plant | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 5: *E- scenario - PILLAR 2: Clean Electricity - Transmission*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|---------|---------|---------|---------|---------|---------|
| HV transmission for wind and solar - base all | 0 | 327.787 | 633.454 | 1056.4 | 1554.8 | 6823.1 | 30282.6 |
| HV transmission for wind and solar - base other intra-state | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HV transmission for wind and solar - base spur intra-state | 0 | 237.074 | 344.628 | 344.628 | 417.906 | 2367.4 | 16096.9 |
| HV transmission for wind and solar - constrained all | 0 | 247.092 | 546.899 | 792.022 | 1236.6 | 2511.6 | 29902 |
| HV transmission for wind and solar - constrained other intra-state | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HV transmission for wind and solar - constrained spur intra-state | 0 | 182.486 | 238.119 | 339.95 | 457.871 | 840.918 | 16086.8 |

Table 6: *E- scenario - PILLAR 3: Bioenergy and Hydrogen - Bioconversion*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|-------|
| Biomass purchases | 0 | 0 | 0 | 0 | 0 | 0 | 0.21 |
| Capital investment | 0 | 0 | 0 | 0 | 0 | 0 | 4.554 |
| Number of facilities - allam power w ccu | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 6: *E- scenario - PILLAR 3: Bioenergy and Hydrogen - Bioconversion (continued)*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---------------------------------------|------|------|------|------|------|------|------|
| Number of facilities - beccs hydrogen | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Number of facilities - diesel | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - diesel ccu | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - power | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - power ccu | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - pyrolysis | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - pyrolysis ccu | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - sng | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - sng ccu | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 7: *E- scenario - PILLAR 4: CO2 capture, use, storage - CO2 capture*

| variable_name | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---------------------|------|------|------|------|------|-------|
| Annual - All | 0 | 0 | 0 | 3.32 | 3.42 | 9.75 |
| Annual - BECCS | 0 | 0 | 0 | 0 | 0 | 6.21 |
| Annual - Cement | 0 | 0 | 0 | 3.32 | 3.42 | 3.53 |
| Annual - NGCC | 0 | 0 | 0 | 0 | 0 | 0 |
| Cumulative - All | 0 | 0 | 0 | 3.32 | 6.74 | 16.49 |
| Cumulative - BECCS | 0 | 0 | 0 | 0 | 0 | 6.21 |
| Cumulative - Cement | 0 | 0 | 0 | 3.32 | 6.74 | 10.27 |
| Cumulative - NGCC | 0 | 0 | 0 | 0 | 0 | 0 |

Table 8: *E- scenario - PILLAR 4: CO2 capture, use, storage - CO2 storage*

| variable_name | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|
| Annual | 0 | 0 | 0 | 0 | 0 | 0 |
| Injection wells | 0 | 0 | 0 | 0 | 0 | 0 |
| Resource characterization, appraisal and permitting costs cumulative | 0 | 0 | 0 | 0 | 0 | 0 |
| Wells and facilities construction costs cumulative | 0 | 0 | 0 | 0 | 0 | 0 |

Table 9: *E- scenario - PILLAR 4: CO2 capture, use, storage - CO2 transportation*

| variable_name | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|-----------------------|------|------|------------|------------|------------|------------|
| CO2 pipelines - All | 0 | 0 | 666899.424 | 748333.101 | 749667.601 | 961126.334 |
| CO2 pipelines - Spur | 0 | 0 | 0 | 81433.677 | 82768.177 | 294226.91 |
| CO2 pipelines - Trunk | 0 | 0 | 666899.424 | 666899.424 | 666899.424 | 666899.424 |

Table 10: *E- scenario - IMPACTS - Jobs*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------------|------------|------------|------------|------------|------------|------------|
| Jobs by economic sector - agriculture | 43.206 | 49.811 | 101.135 | 38.656 | 29.986 | 22.04 | 323.515 |
| Jobs by economic sector - construction | 6859.8 | 8177.3 | 6965.1 | 8178.2 | 8091.6 | 10411.2 | 20267 |
| Jobs by economic sector - manufacturing | 3736.9 | 6919.6 | 12733.7 | 12785.2 | 10097.9 | 11764.3 | 11071.1 |
| Jobs by economic sector - mining | 1822.5 | 1386.9 | 923.143 | 589.272 | 349.932 | 190.372 | 100.103 |
| Jobs by economic sector - other | 909.488 | 1194.9 | 1055.3 | 1307.5 | 1397.7 | 1767.5 | 3128.3 |
| Jobs by economic sector - pipeline | 310.26 | 303.826 | 256.419 | 279.8 | 152.66 | 101.747 | 100.173 |
| Jobs by economic sector - professional | 2924 | 3366.2 | 2914.7 | 3203.1 | 3313 | 4881.9 | 11061.1 |
| Jobs by economic sector - trade | 2368.9 | 2506.4 | 2073.8 | 2245.5 | 2286.5 | 3158.5 | 6652.2 |
| Jobs by economic sector - utilities | 5008.6 | 5916.8 | 5607.6 | 6813.5 | 7153.1 | 9692.3 | 20441.2 |
| Jobs by resource sector - Biomass | 179.102 | 213.784 | 278.854 | 110.098 | 90.268 | 80.382 | 1381.5 |
| Jobs by resource sector - CO2 | 0 | 0 | 0 | 654.764 | 56.012 | 72.214 | 326.24 |
| Jobs by resource sector - Coal | 1453 | 803.343 | 212.276 | 0 | 0 | 0 | 0 |
| Jobs by resource sector - Grid | 4690.9 | 7243.9 | 7652.8 | 10558.2 | 12271.3 | 18066.2 | 40246.4 |
| Jobs by resource sector - Natural Gas | 3478.4 | 3256.9 | 2605.9 | 2312.2 | 2622.5 | 1855.6 | 1306.1 |
| Jobs by resource sector - Nuclear | 938.123 | 922.998 | 908.258 | 526.827 | 0 | 0 | 0 |
| Jobs by resource sector - Oil | 3602.1 | 3071.4 | 2409.7 | 1678.3 | 1089.4 | 672.771 | 385.112 |
| Jobs by resource sector - Solar | 9525.2 | 14154.9 | 17960.6 | 19116.8 | 15492.6 | 15637.7 | 16688.5 |
| Jobs by resource sector - Wind | 116.823 | 154.492 | 602.391 | 483.495 | 1250.4 | 5604.9 | 12810.8 |
| Median wages - All | 62708 | 62912.4 | 63005 | 63816.2 | 64973.9 | 66381.4 | 68723.7 |
| Required Level of Education - Associates degree or some college | 7520.9 | 9449.8 | 10361.9 | 11399.3 | 10660.8 | 13642.6 | 23749.2 |
| Required Level of Education - Bachelors degree | 4927.6 | 5983.7 | 6519.4 | 6920.9 | 6348.8 | 8182 | 14417.3 |
| Required Level of Education - Doctoral degree | 169.291 | 193.317 | 180.212 | 189.753 | 181.199 | 248.141 | 507.291 |
| Required Level of Education - High school diploma or less | 10194.7 | 12802.6 | 14136.5 | 15395.9 | 14235.9 | 18004.7 | 30863.1 |
| Required Level of Education - Masters or professional degree | 1171 | 1392.3 | 1432.9 | 1534.9 | 1445.7 | 1912.3 | 3607.8 |
| Wage income - All | 1504118074 | 1876355587 | 2056082773 | 2261911770 | 2136091399 | 2787658321 | 5027373814 |

Table 11: *E- scenario - PILLAR 6: Land carbon sinks - Agriculture*

| variable_name | 2050 |
|--|----------|
| Carbon sink enhancement potential - Accelerate regeneration | 65.835 |
| Carbon sink enhancement potential - All (not counting overlap) | 8724.4 |
| Carbon sink enhancement potential - Avoid deforestation | 1742.593 |
| Carbon sink enhancement potential - corn-ethanol to energy grasses | 0 |
| Carbon sink enhancement potential - cropland measures | -907.997 |
| Carbon sink enhancement potential - Extend rotation length | 2253.147 |
| Carbon sink enhancement potential - Improve plantations | 244.11 |
| Carbon sink enhancement potential - Increase retention of HWP | 1439.783 |
| Carbon sink enhancement potential - Increase trees outside forests | 596.553 |

Table 11: *E- scenario - PILLAR 6: Land carbon sinks - Agriculture (continued)*

| variable_name | 2050 |
|--|----------|
| Carbon sink enhancement potential - permanent conservation cover | -43.482 |
| Carbon sink enhancement potential - Reforest cropland | 108.745 |
| Carbon sink enhancement potential - Reforest pasture | 1362.39 |
| Carbon sink enhancement potential - Restore productivity | 911.248 |
| Carbon sink enhancement potential - total | -951.479 |
| Land impacted for carbon sink enhancement - Accelerate regeneration | 26.534 |
| Land impacted for carbon sink enhancement - All (not counting overlap) | 1479.8 |
| Land impacted for carbon sink enhancement - Avoid deforestation | 467.764 |
| Land impacted for carbon sink enhancement - corn-ethanol to energy grasses | 0 |
| Land impacted for carbon sink enhancement - cropland measures | 800.797 |
| Land impacted for carbon sink enhancement - Extend rotation length | 1241.222 |
| Land impacted for carbon sink enhancement - Improve plantations | 135.671 |
| Land impacted for carbon sink enhancement - Increase retention of HWP | 287.956 |
| Land impacted for carbon sink enhancement - Increase trees outside forests | 168.282 |
| Land impacted for carbon sink enhancement - permanent conservation cover | 79.087 |
| Land impacted for carbon sink enhancement - Reforest cropland | 36.205 |
| Land impacted for carbon sink enhancement - Reforest pasture | 103.018 |
| Land impacted for carbon sink enhancement - Restore productivity | 514.226 |
| Land impacted for carbon sink enhancement - total | 879.884 |
| Land impacted for carbon sink enhancement - Total impacted (over 30 years) | 1501.098 |

Table 12: *E- scenario - PILLAR 6: Land carbon sinks - Forests*

| variable_name | 2050 |
|--|---------|
| Business-as-usual carbon sink - Accelerate regeneration | 6.153 |
| Business-as-usual carbon sink - Avoid deforestation | 149.008 |
| Business-as-usual carbon sink - Extend rotation length | 679.034 |
| Business-as-usual carbon sink - Improve plantations | 51.521 |
| Business-as-usual carbon sink - Increase retention of HWP | 0 |
| Business-as-usual carbon sink - Increase trees outside forests | 33.834 |
| Business-as-usual carbon sink - Reforest cropland | 4.108 |
| Business-as-usual carbon sink - Reforest pasture | 25.167 |
| Business-as-usual carbon sink - Restore productivity | 181.022 |
| Business-as-usual carbon sink - Total impacted (over 30 years) | 4.108 |

Table 13: *E- scenario - IMPACTS - Fossil fuel industries*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|-------------------------|----------|----------|----------|----------|----------|---------|---------|
| Natural gas consumption | 229416.6 | 232823.7 | 196257.2 | 157406.4 | 118493.2 | 74551.9 | 51707.3 |
| Oil consumption | 73896 | 69086.7 | 59068.8 | 44560.9 | 31144.5 | 20588.4 | 12545.8 |

Table 14: *E- scenario - PILLAR 1: Efficiency/Electrification - Overview*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|-------|-------|-------|-------|-------|-------|
| Final energy demand by sector - commercial | 0.189 | 0.188 | 0.18 | 0.167 | 0.157 | 0.154 | 0.156 |
| Final energy demand by sector - industry | 0.13 | 0.132 | 0.132 | 0.141 | 0.151 | 0.159 | 0.167 |
| Final energy demand by sector - residential | 0.241 | 0.228 | 0.209 | 0.183 | 0.162 | 0.149 | 0.144 |
| Final energy demand by sector - transportation | 0.448 | 0.417 | 0.367 | 0.305 | 0.249 | 0.213 | 0.197 |

Table 15: *E- scenario - PILLAR 1: Efficiency/Electrification - Commercial*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|-------|-------------|-------------|-------|-------|-------|-------|
| Commercial HVAC investment in 2020s - Cumulative 5-yr | 0 | 21775780624 | 24347085573 | 0 | 0 | 0 | 0 |
| Sales of cooking units - Electric Resistance | 0.32 | 0.46 | 0.799 | 0.865 | 0.869 | 0.869 | 0.869 |
| Sales of cooking units - Gas | 0.68 | 0.54 | 0.201 | 0.135 | 0.131 | 0.131 | 0.131 |
| Sales of space heating units - Electric Heat Pump | 0.022 | 0.281 | 0.704 | 0.837 | 0.85 | 0.851 | 0.851 |
| Sales of space heating units - Electric Resistance | 0.025 | 0.084 | 0.106 | 0.127 | 0.131 | 0.131 | 0.131 |
| Sales of space heating units - Fossil | 0.11 | 0.042 | 0.008 | 0 | 0 | 0 | 0 |
| Sales of space heating units - Gas Furnace | 0.843 | 0.593 | 0.183 | 0.036 | 0.019 | 0.019 | 0.018 |
| Sales of water heating units - Electric Heat Pump | 0.001 | 0.105 | 0.544 | 0.643 | 0.647 | 0.648 | 0.647 |
| Sales of water heating units - Electric Resistance | 0.025 | 0.108 | 0.283 | 0.323 | 0.325 | 0.325 | 0.325 |
| Sales of water heating units - Gas Furnace | 0.93 | 0.745 | 0.143 | 0.006 | 0 | 0 | 0 |
| Sales of water heating units - Other | 0.044 | 0.042 | 0.03 | 0.027 | 0.027 | 0.027 | 0.027 |

Table 16: *E- scenario - PILLAR 1: Efficiency/Electrification - Electricity demand*

| variable_name | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|-------|-------|-------|-------|
| Electricity distribution peak load (capital invested) - Cumulative 5-yr | 2.99 | 3.04 | 5.996 | 6.391 | 5.396 | 5.626 |

Table 17: *RE- scenario - PILLAR 1: Efficiency/Electrification - Residential*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|-------|-------|-------|-------|-------|-------|
| Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr | 0 | 4.7 | 4.337 | 0 | 0 | 0 | 0 |
| Sale of space heating units by type - Electric Heat Pump | 0.15 | 0.403 | 0.414 | 0.428 | 0.437 | 0.446 | 0.459 |
| Sale of space heating units by type - Electric Resistance | 0.137 | 0.127 | 0.124 | 0.12 | 0.117 | 0.108 | 0.095 |
| Sale of space heating units by type - Fossil | 0.147 | 0.161 | 0.077 | 0.04 | 0.038 | 0.038 | 0.038 |
| Sale of space heating units by type - Gas | 0.566 | 0.31 | 0.384 | 0.411 | 0.408 | 0.408 | 0.409 |
| Sales of cooking units - Electric Resistance | 0.587 | 0.587 | 0.587 | 0.587 | 0.587 | 0.587 | 0.587 |
| Sales of cooking units - Gas | 0.413 | 0.413 | 0.413 | 0.413 | 0.413 | 0.413 | 0.413 |
| Sales of water heating units by type - Electric Heat Pump | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales of water heating units by type - Electric Resistance | 0.357 | 0.53 | 0.53 | 0.529 | 0.529 | 0.528 | 0.528 |
| Sales of water heating units by type - Gas Furnace | 0.595 | 0.434 | 0.434 | 0.435 | 0.435 | 0.436 | 0.436 |
| Sales of water heating units by type - Other | 0.048 | 0.036 | 0.036 | 0.036 | 0.036 | 0.036 | 0.036 |

Table 18: *RE- scenario - PILLAR 1: Efficiency/Electrification - Transportation*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|-------|-------|-------|-------|-------|-------|
| End-use technology sales by technology - HDV - diesel | 0.981 | 0.982 | 0.979 | 0.97 | 0.956 | 0.935 | 0.916 |
| End-use technology sales by technology - HDV - EV | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| End-use technology sales by technology - HDV - gasoline | 0.002 | 0.002 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 |
| End-use technology sales by technology - HDV - hybrid | 0.001 | 0.001 | 0.001 | 0.001 | 0.002 | 0.002 | 0.002 |
| End-use technology sales by technology - HDV - hydrogen FC | 0.001 | 0.001 | 0.002 | 0.002 | 0.002 | 0.002 | 0.003 |
| End-use technology sales by technology - HDV - other | 0.015 | 0.013 | 0.016 | 0.024 | 0.037 | 0.057 | 0.076 |
| End-use technology sales by technology - LDV - diesel | 0.013 | 0.017 | 0.021 | 0.02 | 0.018 | 0.017 | 0.016 |
| End-use technology sales by technology - LDV - EV | 0.044 | 0.067 | 0.075 | 0.093 | 0.113 | 0.128 | 0.141 |
| End-use technology sales by technology - LDV - gasoline | 0.888 | 0.85 | 0.825 | 0.804 | 0.781 | 0.763 | 0.748 |
| End-use technology sales by technology - LDV - hybrid | 0.053 | 0.061 | 0.074 | 0.079 | 0.084 | 0.089 | 0.092 |
| End-use technology sales by technology - LDV - hydrogen FC | 0.001 | 0.004 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 |
| End-use technology sales by technology - LDV - other | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| End-use technology sales by technology - MDV - diesel | 0.652 | 0.635 | 0.616 | 0.596 | 0.58 | 0.565 | 0.552 |
| End-use technology sales by technology - MDV - EV | 0 | 0.001 | 0.003 | 0.007 | 0.009 | 0.01 | 0.01 |
| End-use technology sales by technology - MDV - gasoline | 0.34 | 0.355 | 0.37 | 0.385 | 0.397 | 0.408 | 0.417 |
| End-use technology sales by technology - MDV - hybrid | 0.004 | 0.004 | 0.005 | 0.006 | 0.007 | 0.008 | 0.009 |
| End-use technology sales by technology - MDV - hydrogen FC | 0.002 | 0.002 | 0.002 | 0.003 | 0.003 | 0.004 | 0.005 |
| End-use technology sales by technology - MDV - other | 0.003 | 0.003 | 0.003 | 0.003 | 0.004 | 0.005 | 0.007 |

Table 19: *RE- scenario - PILLAR 6: Land carbon sinks - Agriculture*

| variable_name | 2020 | 2030 | 2050 |
|--|--------|--------|----------|
| Carbon sink enhancement potential - Accelerate regeneration | 0 | 0 | 65.835 |
| Carbon sink enhancement potential - All (not counting overlap) | 0 | 0 | 8724.4 |
| Carbon sink enhancement potential - Avoid deforestation | 0 | 0 | 1742.593 |
| Carbon sink enhancement potential - Extend rotation length | 0 | 0 | 2253.147 |
| Carbon sink enhancement potential - Improve plantations | 0 | 0 | 244.11 |
| Carbon sink enhancement potential - Increase retention of HWP | 0 | 0 | 1439.783 |
| Carbon sink enhancement potential - Increase trees outside forests | 0 | 0 | 596.553 |
| Carbon sink enhancement potential - Reforest cropland | 0 | 0 | 108.745 |
| Carbon sink enhancement potential - Reforest pasture | 0 | 0 | 1362.39 |
| Carbon sink enhancement potential - Restore productivity | 0 | 0 | 911.248 |
| Land impacted for carbon sink enhancement - Accelerate regeneration | 0 | 0 | 26.534 |
| Land impacted for carbon sink enhancement - All (not counting overlap) | 0 | 0 | 1479.8 |
| Land impacted for carbon sink enhancement - Avoid deforestation | 0 | 0 | 467.764 |
| Land impacted for carbon sink enhancement - Extend rotation length | 0 | 0 | 1241.222 |
| Land impacted for carbon sink enhancement - Improve plantations | 0 | 0 | 135.671 |
| Land impacted for carbon sink enhancement - Increase retention of HWP | 0 | 0 | 287.956 |
| Land impacted for carbon sink enhancement - Increase trees outside forests | 0 | 0 | 168.282 |
| Land impacted for carbon sink enhancement - Natural uptake | -4.41 | -2.143 | -1.916 |
| Land impacted for carbon sink enhancement - Reforest cropland | 0 | 0 | 36.205 |
| Land impacted for carbon sink enhancement - Reforest pasture | 0 | 0 | 103.018 |
| Land impacted for carbon sink enhancement - Restore productivity | 0 | 0 | 514.226 |
| Land impacted for carbon sink enhancement - Retained in Hardwood Products | -0.235 | -0.423 | -0.44 |
| Land impacted for carbon sink enhancement - Total | -4.645 | -2.566 | -2.356 |
| Land impacted for carbon sink enhancement - Total impacted (over 30 years) | 0 | 0 | 1501.098 |

Table 20: *RE- scenario - PILLAR 6: Land carbon sinks - Forests*

| variable_name | 2050 |
|---|---------|
| Business-as-usual carbon sink - Accelerate regeneration | 6.153 |
| Business-as-usual carbon sink - Avoid deforestation | 149.008 |
| Business-as-usual carbon sink - Extend rotation length | 679.034 |
| Business-as-usual carbon sink - Improve plantations | 51.521 |

Table 20: *RE- scenario - PILLAR 6: Land carbon sinks - Forests (continued)*

| variable_name | 2050 |
|--|---------|
| Business-as-usual carbon sink - Increase retention of HWP | 0 |
| Business-as-usual carbon sink - Increase trees outside forests | 33.834 |
| Business-as-usual carbon sink - Reforest cropland | 4.108 |
| Business-as-usual carbon sink - Reforest pasture | 25.167 |
| Business-as-usual carbon sink - Restore productivity | 181.022 |
| Business-as-usual carbon sink - Total impacted (over 30 years) | 4.108 |

Table 21: *RE- scenario - PILLAR 1: Efficiency/Electrification - Overview*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|-------|-------|-------|-------|-------|-------|
| Final energy demand by sector - commercial | 0.189 | 0.191 | 0.193 | 0.193 | 0.194 | 0.199 | 0.21 |
| Final energy demand by sector - industry | 0.13 | 0.136 | 0.143 | 0.15 | 0.159 | 0.169 | 0.18 |
| Final energy demand by sector - residential | 0.241 | 0.228 | 0.225 | 0.225 | 0.227 | 0.233 | 0.239 |
| Final energy demand by sector - transportation | 0.449 | 0.422 | 0.391 | 0.372 | 0.373 | 0.384 | 0.398 |

Table 22: *RE- scenario - PILLAR 1: Efficiency/Electrification - Commercial*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|-------|-------------|-------------|-------|-------|-------|-------|
| Commercial HVAC investment in 2020s - Cumulative 5-yr | 0 | 21455144118 | 22310815863 | 0 | 0 | 0 | 0 |
| Sales of cooking units - Electric Resistance | 0.32 | 0.343 | 0.343 | 0.343 | 0.344 | 0.343 | 0.343 |
| Sales of cooking units - Gas | 0.68 | 0.657 | 0.657 | 0.657 | 0.656 | 0.657 | 0.657 |
| Sales of space heating units - Electric Heat Pump | 0.022 | 0.241 | 0.485 | 0.685 | 0.718 | 0.722 | 0.722 |
| Sales of space heating units - Electric Resistance | 0.025 | 0.088 | 0.128 | 0.201 | 0.252 | 0.259 | 0.26 |
| Sales of space heating units - Fossil | 0.11 | 0.047 | 0.035 | 0.015 | 0.002 | 0 | 0 |
| Sales of space heating units - Gas Furnace | 0.843 | 0.624 | 0.352 | 0.099 | 0.029 | 0.019 | 0.019 |
| Sales of water heating units - Electric Heat Pump | 0.001 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 |
| Sales of water heating units - Electric Resistance | 0.025 | 0.067 | 0.066 | 0.066 | 0.067 | 0.066 | 0.067 |
| Sales of water heating units - Gas Furnace | 0.93 | 0.885 | 0.885 | 0.886 | 0.885 | 0.885 | 0.886 |
| Sales of water heating units - Other | 0.044 | 0.045 | 0.046 | 0.045 | 0.045 | 0.046 | 0.045 |

Table 23: *RE- scenario - PILLAR 1: Efficiency/Electrification - Electricity demand*

| variable_name | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|-------|------|-------|-------|-------|-------|
| Electricity distribution peak load (capital invested) - Cumulative 5-yr | 2.722 | 2.74 | 4.822 | 5.086 | 5.098 | 5.332 |

Table 24: *REF scenario - PILLAR 1: Efficiency/Electrification - Residential*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|-------|-------|-------|-------|-------|-------|
| Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr | 0 | 4.796 | 4.724 | 0 | 0 | 0 | 0 |
| Sale of space heating units by type - Electric Heat Pump | 0.174 | 0.272 | 0.322 | 0.467 | 0.688 | 0.833 | 0.883 |
| Sale of space heating units by type - Electric Resistance | 0.132 | 0.153 | 0.143 | 0.116 | 0.077 | 0.051 | 0.042 |
| Sale of space heating units by type - Fossil | 0.143 | 0.215 | 0.201 | 0.157 | 0.089 | 0.045 | 0.029 |
| Sale of space heating units by type - Gas | 0.551 | 0.36 | 0.334 | 0.26 | 0.146 | 0.071 | 0.045 |
| Sales of cooking units - Electric Resistance | 0.59 | 0.601 | 0.638 | 0.737 | 0.875 | 0.96 | 0.989 |
| Sales of cooking units - Gas | 0.41 | 0.399 | 0.362 | 0.263 | 0.125 | 0.04 | 0.011 |
| Sales of water heating units by type - Electric Heat Pump | 0 | 0.016 | 0.061 | 0.19 | 0.389 | 0.519 | 0.564 |
| Sales of water heating units by type - Electric Resistance | 0.357 | 0.527 | 0.516 | 0.487 | 0.443 | 0.415 | 0.405 |
| Sales of water heating units by type - Gas Furnace | 0.595 | 0.422 | 0.389 | 0.292 | 0.144 | 0.046 | 0.012 |
| Sales of water heating units by type - Other | 0.048 | 0.035 | 0.034 | 0.03 | 0.024 | 0.02 | 0.019 |

Table 25: *REF scenario - PILLAR 1: Efficiency/Electrification - Transportation*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|-------|-----------|-----------|-----------|------------|------------|
| End-use technology sales by technology - HDV - diesel | 0.974 | 0.96 | 0.913 | 0.798 | 0.582 | 0.321 | 0.137 |
| End-use technology sales by technology - HDV - EV | 0.005 | 0.015 | 0.041 | 0.108 | 0.236 | 0.394 | 0.51 |
| End-use technology sales by technology - HDV - gasoline | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.001 | 0.001 |
| End-use technology sales by technology - HDV - hybrid | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0 |
| End-use technology sales by technology - HDV - hydrogen FC | 0.003 | 0.01 | 0.027 | 0.072 | 0.157 | 0.263 | 0.34 |
| End-use technology sales by technology - HDV - other | 0.015 | 0.013 | 0.015 | 0.019 | 0.022 | 0.02 | 0.011 |
| End-use technology sales by technology - LDV - diesel | 0.013 | 0.018 | 0.02 | 0.016 | 0.01 | 0.005 | 0.002 |
| End-use technology sales by technology - LDV - EV | 0.022 | 0.054 | 0.132 | 0.28 | 0.507 | 0.735 | 0.882 |
| End-use technology sales by technology - LDV - gasoline | 0.908 | 0.862 | 0.775 | 0.639 | 0.436 | 0.233 | 0.103 |
| End-use technology sales by technology - LDV - hybrid | 0.055 | 0.062 | 0.069 | 0.062 | 0.045 | 0.026 | 0.012 |
| End-use technology sales by technology - LDV - hydrogen FC | 0.001 | 0.004 | 0.003 | 0.002 | 0.002 | 0.001 | 0 |
| End-use technology sales by technology - LDV - other | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0 | 0 |
| End-use technology sales by technology - MDV - diesel | 0.648 | 0.622 | 0.577 | 0.494 | 0.356 | 0.196 | 0.084 |
| End-use technology sales by technology - MDV - EV | 0.007 | 0.019 | 0.055 | 0.143 | 0.314 | 0.526 | 0.68 |
| End-use technology sales by technology - MDV - gasoline | 0.338 | 0.347 | 0.347 | 0.319 | 0.244 | 0.142 | 0.063 |
| End-use technology sales by technology - MDV - hybrid | 0.004 | 0.004 | 0.005 | 0.005 | 0.004 | 0.003 | 0.001 |
| End-use technology sales by technology - MDV - hydrogen FC | 0.002 | 0.005 | 0.014 | 0.036 | 0.079 | 0.132 | 0.17 |
| End-use technology sales by technology - MDV - other | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.002 | 0.001 |
| Light-duty vehicle capital costs - Cumulative 5-yr | 0 | 0 | 133477044 | 271285755 | 924975322 | 2882881621 | 4209653912 |
| Number of public EV charging plugs - DC Fast Charging | 402 | 0 | 439.738 | 0 | 2065 | 0 | 5662 |
| Number of public EV charging plugs - L2 Charging | 1673 | 0 | 10558.3 | 0 | 49581.3 | 0 | 135946 |

Table 26: *REF scenario - PILLAR 6: Land carbon sinks - Agriculture*

| variable_name | 2050 |
|--|----------|
| Carbon sink enhancement potential - Accelerate regeneration | 65.835 |
| Carbon sink enhancement potential - All (not counting overlap) | 8724.4 |
| Carbon sink enhancement potential - Avoid deforestation | 1742.593 |
| Carbon sink enhancement potential - corn-ethanol to energy grasses | 0 |
| Carbon sink enhancement potential - cropland measures | -907.997 |
| Carbon sink enhancement potential - Extend rotation length | 2253.147 |
| Carbon sink enhancement potential - Improve plantations | 244.11 |
| Carbon sink enhancement potential - Increase retention of HWP | 1439.783 |
| Carbon sink enhancement potential - Increase trees outside forests | 596.553 |
| Carbon sink enhancement potential - permanent conservation cover | -43.482 |
| Carbon sink enhancement potential - Reforest cropland | 108.745 |
| Carbon sink enhancement potential - Reforest pasture | 1362.39 |
| Carbon sink enhancement potential - Restore productivity | 911.248 |
| Carbon sink enhancement potential - total | -951.479 |
| Land impacted for carbon sink enhancement - Accelerate regeneration | 26.534 |
| Land impacted for carbon sink enhancement - All (not counting overlap) | 1479.8 |
| Land impacted for carbon sink enhancement - Avoid deforestation | 467.764 |
| Land impacted for carbon sink enhancement - corn-ethanol to energy grasses | 0 |
| Land impacted for carbon sink enhancement - cropland measures | 800.797 |
| Land impacted for carbon sink enhancement - Extend rotation length | 1241.222 |
| Land impacted for carbon sink enhancement - Improve plantations | 135.671 |
| Land impacted for carbon sink enhancement - Increase retention of HWP | 287.956 |
| Land impacted for carbon sink enhancement - Increase trees outside forests | 168.282 |
| Land impacted for carbon sink enhancement - permanent conservation cover | 79.087 |
| Land impacted for carbon sink enhancement - Reforest cropland | 36.205 |
| Land impacted for carbon sink enhancement - Reforest pasture | 103.018 |
| Land impacted for carbon sink enhancement - Restore productivity | 514.226 |
| Land impacted for carbon sink enhancement - total | 879.884 |
| Land impacted for carbon sink enhancement - Total impacted (over 30 years) | 1501.098 |

Table 27: *REF scenario - PILLAR 6: Land carbon sinks - Forests*

| variable_name | 2050 |
|--|---------|
| Business-as-usual carbon sink - Accelerate regeneration | 6.153 |
| Business-as-usual carbon sink - Avoid deforestation | 149.008 |
| Business-as-usual carbon sink - Extend rotation length | 679.034 |
| Business-as-usual carbon sink - Improve plantations | 51.521 |
| Business-as-usual carbon sink - Increase retention of HWP | 0 |
| Business-as-usual carbon sink - Increase trees outside forests | 33.834 |
| Business-as-usual carbon sink - Reforest cropland | 4.108 |
| Business-as-usual carbon sink - Reforest pasture | 25.167 |
| Business-as-usual carbon sink - Restore productivity | 181.022 |
| Business-as-usual carbon sink - Total impacted (over 30 years) | 4.108 |

Table 28: *REF scenario - PILLAR 1: Efficiency/Electrification - Overview*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|-------|-------|-------|-------|-------|-------|
| Final energy demand by sector - commercial | 0.189 | 0.189 | 0.186 | 0.183 | 0.177 | 0.171 | 0.167 |
| Final energy demand by sector - industry | 0.13 | 0.132 | 0.133 | 0.143 | 0.154 | 0.162 | 0.17 |
| Final energy demand by sector - residential | 0.241 | 0.229 | 0.222 | 0.214 | 0.2 | 0.183 | 0.167 |
| Final energy demand by sector - transportation | 0.449 | 0.421 | 0.386 | 0.356 | 0.331 | 0.302 | 0.268 |

Table 29: *REF scenario - PILLAR 1: Efficiency/Electrification - Commercial*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|-------|-------------|-------------|-------|-------|-------|-------|
| Commercial HVAC investment in 2020s - Cumulative 5-yr | 0 | 21751783547 | 24163264349 | 0 | 0 | 0 | 0 |
| Sales of cooking units - Electric Resistance | 0.32 | 0.362 | 0.409 | 0.534 | 0.71 | 0.817 | 0.855 |
| Sales of cooking units - Gas | 0.68 | 0.638 | 0.591 | 0.466 | 0.29 | 0.183 | 0.145 |
| Sales of space heating units - Electric Heat Pump | 0.022 | 0.201 | 0.249 | 0.389 | 0.61 | 0.767 | 0.828 |
| Sales of space heating units - Electric Resistance | 0.025 | 0.08 | 0.083 | 0.091 | 0.106 | 0.12 | 0.128 |
| Sales of space heating units - Fossil | 0.11 | 0.048 | 0.045 | 0.034 | 0.017 | 0.005 | 0.001 |
| Sales of space heating units - Gas Furnace | 0.843 | 0.67 | 0.623 | 0.485 | 0.267 | 0.108 | 0.043 |
| Sales of water heating units - Electric Heat Pump | 0.001 | 0.02 | 0.07 | 0.214 | 0.435 | 0.579 | 0.63 |
| Sales of water heating units - Electric Resistance | 0.025 | 0.074 | 0.093 | 0.151 | 0.24 | 0.298 | 0.318 |
| Sales of water heating units - Gas Furnace | 0.93 | 0.861 | 0.792 | 0.596 | 0.292 | 0.094 | 0.025 |
| Sales of water heating units - Other | 0.044 | 0.045 | 0.044 | 0.039 | 0.033 | 0.029 | 0.028 |

Table 30: *REF scenario - PILLAR 1: Efficiency/Electrification - Electricity demand*

| variable_name | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|-------|-------|-------|-------|-------|-------|
| Electricity distribution peak load (capital invested) - Cumulative 5-yr | 2.538 | 2.534 | 3.676 | 3.808 | 5.554 | 5.878 |

Table 31: *E+ scenario - PILLAR 2: Clean Electricity - Generating capacity*

| variable_name | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|-------|-------|-------|--------|--------|
| Power generation capital investment - Offshore Wind - Base | 0 | 0 | 0 | 1.714 | 17.224 | 3.588 |
| Power generation capital investment - Solar PV - Base | 4.528 | 0.414 | 2.161 | 2.487 | 3.649 | 14.928 |
| Power generation capital investment - Wind - Base | 0 | 0 | 0 | 0 | 2.428 | 6.496 |

Table 32: *E+ scenario - PILLAR 2: Clean Electricity - Transmission*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|---------|---------|---------|---------|---------|---------|
| HV transmission for wind and solar - base all | 0 | 325.215 | 413.846 | 747.467 | 2046.5 | 23695.6 | 32556.8 |
| HV transmission for wind and solar - base other intra-state | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HV transmission for wind and solar - base spur intra-state | 0 | 251.764 | 285.818 | 441.306 | 823.912 | 11471.5 | 16928.4 |

Table 33: *E+ scenario - PILLAR 6: Land carbon sinks - Agriculture*

| variable_name | 2050 |
|--|----------|
| Carbon sink enhancement potential - Accelerate regeneration | 65.835 |
| Carbon sink enhancement potential - All (not counting overlap) | 8724.4 |
| Carbon sink enhancement potential - Avoid deforestation | 1742.593 |
| Carbon sink enhancement potential - corn-ethanol to energy grasses | 0 |
| Carbon sink enhancement potential - cropland measures | -907.997 |
| Carbon sink enhancement potential - Extend rotation length | 2253.147 |
| Carbon sink enhancement potential - Improve plantations | 244.11 |
| Carbon sink enhancement potential - Increase retention of HWP | 1439.783 |
| Carbon sink enhancement potential - Increase trees outside forests | 596.553 |
| Carbon sink enhancement potential - permanent conservation cover | -43.482 |
| Carbon sink enhancement potential - Reforest cropland | 108.745 |
| Carbon sink enhancement potential - Reforest pasture | 1362.39 |
| Carbon sink enhancement potential - Restore productivity | 911.248 |
| Carbon sink enhancement potential - total | -951.479 |
| Land impacted for carbon sink enhancement - Accelerate regeneration | 26.534 |
| Land impacted for carbon sink enhancement - All (not counting overlap) | 1479.8 |
| Land impacted for carbon sink enhancement - Avoid deforestation | 467.764 |
| Land impacted for carbon sink enhancement - corn-ethanol to energy grasses | 0 |
| Land impacted for carbon sink enhancement - cropland measures | 800.797 |
| Land impacted for carbon sink enhancement - Extend rotation length | 1241.222 |
| Land impacted for carbon sink enhancement - Improve plantations | 135.671 |
| Land impacted for carbon sink enhancement - Increase retention of HWP | 287.956 |
| Land impacted for carbon sink enhancement - Increase trees outside forests | 168.282 |
| Land impacted for carbon sink enhancement - permanent conservation cover | 79.087 |
| Land impacted for carbon sink enhancement - Reforest cropland | 36.205 |
| Land impacted for carbon sink enhancement - Reforest pasture | 103.018 |
| Land impacted for carbon sink enhancement - Restore productivity | 514.226 |
| Land impacted for carbon sink enhancement - total | 879.884 |
| Land impacted for carbon sink enhancement - Total impacted (over 30 years) | 1501.098 |

Table 34: *E+ scenario - PILLAR 6: Land carbon sinks - Forests*

| variable_name | 2050 |
|--|---------|
| Business-as-usual carbon sink - Accelerate regeneration | 6.153 |
| Business-as-usual carbon sink - Avoid deforestation | 149.008 |
| Business-as-usual carbon sink - Extend rotation length | 679.034 |
| Business-as-usual carbon sink - Improve plantations | 51.521 |
| Business-as-usual carbon sink - Increase retention of HWP | 0 |
| Business-as-usual carbon sink - Increase trees outside forests | 33.834 |
| Business-as-usual carbon sink - Reforest cropland | 4.108 |
| Business-as-usual carbon sink - Reforest pasture | 25.167 |
| Business-as-usual carbon sink - Restore productivity | 181.022 |
| Business-as-usual carbon sink - Total impacted (over 30 years) | 4.108 |

Table 35: *RE+ scenario - PILLAR 2: Clean Electricity - Generating capacity*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|------|
| Power generation capital investment - biomass power plant | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Power generation capital investment - biomass w/ccu allam power plant | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Power generation capital investment - biomass w/ccu power plant | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 36: *RE+ scenario - PILLAR 2: Clean Electricity - Generation*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|------|
| Power generation by technology - biomass power plant | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Power generation by technology - biomass w/ccu allam power plant | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Power generation by technology - biomass w/ccu power plant | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 37: *RE+ scenario - PILLAR 3: Bioenergy and Hydrogen - Bioconversion*

| variable_name | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|-------|
| Biomass purchases | 0 | 0 | 0 | 0 | 0 | 0 | 0.449 |
| Capital investment | 0 | 0 | 0 | 0 | 0 | 0 | 4.949 |
| Number of facilities - allam power w ccu | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - beccs hydrogen | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - diesel | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - diesel ccu | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - power | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - power ccu | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - pyrolysis | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Number of facilities - pyrolysis ccu | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - sng | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - sng ccu | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 38: *RE+ scenario - PILLAR 4: CO2 capture, use, storage - CO2 capture*

| variable_name | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---------------------|------|------|------|------|------|-------|
| Annual - All | 0 | 0 | 0 | 3.32 | 3.42 | 3.53 |
| Annual - BECCS | 0 | 0 | 0 | 0 | 0 | 0 |
| Annual - Cement | 0 | 0 | 0 | 3.32 | 3.42 | 3.53 |
| Annual - NGCC | 0 | 0 | 0 | 0 | 0 | 0 |
| Cumulative - All | 0 | 0 | 0 | 3.32 | 6.74 | 10.27 |
| Cumulative - BECCS | 0 | 0 | 0 | 0 | 0 | 0 |
| Cumulative - Cement | 0 | 0 | 0 | 3.32 | 6.74 | 10.27 |
| Cumulative - NGCC | 0 | 0 | 0 | 0 | 0 | 0 |

Table 39: *RE+ scenario - PILLAR 4: CO2 capture, use, storage - CO2 storage*

| variable_name | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|
| Annual | 0 | 0 | 0 | 0 | 0 | 0 |
| Injection wells | 0 | 0 | 0 | 0 | 0 | 0 |
| Resource characterization, appraisal and permitting costs cumulative | 0 | 0 | 0 | 0 | 0 | 0 |
| Wells and facilities construction costs cumulative | 0 | 0 | 0 | 0 | 0 | 0 |

Table 40: *RE+ scenario - PILLAR 4: CO2 capture, use, storage - CO2 transportation*

| variable_name | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|-----------------------|------|------|------------|------------|------------|------------|
| CO2 pipelines - All | 0 | 0 | 666899.424 | 748333.101 | 749667.601 | 819782.785 |
| CO2 pipelines - Spur | 0 | 0 | 0 | 81433.677 | 82768.177 | 152883.361 |
| CO2 pipelines - Trunk | 0 | 0 | 666899.424 | 666899.424 | 666899.424 | 666899.424 |

Table 41: *RE+ scenario - PILLAR 6: Land carbon sinks - Agriculture*

| variable_name | 2050 |
|--|----------|
| Carbon sink enhancement potential - Accelerate regeneration | 65.835 |
| Carbon sink enhancement potential - All (not counting overlap) | 8724.4 |
| Carbon sink enhancement potential - Avoid deforestation | 1742.593 |
| Carbon sink enhancement potential - corn-ethanol to energy grasses | -280.024 |
| Carbon sink enhancement potential - cropland measures | -801.957 |
| Carbon sink enhancement potential - Cropland to woody energy crops | 0 |
| Carbon sink enhancement potential - Extend rotation length | 2253.147 |
| Carbon sink enhancement potential - Improve plantations | 244.11 |
| Carbon sink enhancement potential - Increase retention of HWP | 1439.783 |
| Carbon sink enhancement potential - Increase trees outside forests | 596.553 |
| Carbon sink enhancement potential - pasture to energy crops | 0 |
| Carbon sink enhancement potential - permanent conservation cover | -37.749 |
| Carbon sink enhancement potential - Reforest cropland | 108.745 |
| Carbon sink enhancement potential - Reforest pasture | 1362.39 |
| Carbon sink enhancement potential - Restore productivity | 911.248 |

Table 41: *RE+ scenario - PILLAR 6: Land carbon sinks - Agriculture (continued)*

| | |
|--|----------|
| variable_name | 2050 |
| Carbon sink enhancement potential - total | -1119.73 |
| Land impacted for carbon sink enhancement - Accelerate regeneration | 26.534 |
| Land impacted for carbon sink enhancement - All (not counting overlap) | 1479.8 |
| Land impacted for carbon sink enhancement - Avoid deforestation | 467.764 |
| Land impacted for carbon sink enhancement - corn-ethanol to energy grasses | 133.012 |
| Land impacted for carbon sink enhancement - cropland measures | 1384.698 |
| Land impacted for carbon sink enhancement - Cropland to woody energy crops | 49.582 |
| Land impacted for carbon sink enhancement - Extend rotation length | 1241.222 |
| Land impacted for carbon sink enhancement - Improve plantations | 135.671 |
| Land impacted for carbon sink enhancement - Increase retention of HWP | 287.956 |
| Land impacted for carbon sink enhancement - Increase trees outside forests | 168.282 |
| Land impacted for carbon sink enhancement - pasture to energy crops | 31.024 |
| Land impacted for carbon sink enhancement - permanent conservation cover | 68.659 |
| Land impacted for carbon sink enhancement - Reforest cropland | 36.205 |
| Land impacted for carbon sink enhancement - Reforest pasture | 103.018 |
| Land impacted for carbon sink enhancement - Restore productivity | 514.226 |
| Land impacted for carbon sink enhancement - total | 1666.994 |
| Land impacted for carbon sink enhancement - Total impacted (over 30 years) | 1501.098 |

Table 42: *RE+ scenario - PILLAR 6: Land carbon sinks - Forests*

| | |
|--|---------|
| variable_name | 2050 |
| Business-as-usual carbon sink - Accelerate regeneration | 6.153 |
| Business-as-usual carbon sink - Avoid deforestation | 149.008 |
| Business-as-usual carbon sink - Extend rotation length | 679.034 |
| Business-as-usual carbon sink - Improve plantations | 51.521 |
| Business-as-usual carbon sink - Increase retention of HWP | 0 |
| Business-as-usual carbon sink - Increase trees outside forests | 33.834 |
| Business-as-usual carbon sink - Reforest cropland | 4.108 |
| Business-as-usual carbon sink - Reforest pasture | 25.167 |
| Business-as-usual carbon sink - Restore productivity | 181.022 |
| Business-as-usual carbon sink - Total impacted (over 30 years) | 4.108 |

Table 43: *B+ scenario - PILLAR 6: Land carbon sinks - Agriculture*

| | |
|--|----------|
| variable_name | 2050 |
| Carbon sink enhancement potential - Accelerate regeneration | 65.835 |
| Carbon sink enhancement potential - All (not counting overlap) | 8724.4 |
| Carbon sink enhancement potential - Avoid deforestation | 1742.593 |
| Carbon sink enhancement potential - corn-ethanol to energy grasses | 0 |
| Carbon sink enhancement potential - cropland measures | -907.997 |
| Carbon sink enhancement potential - Extend rotation length | 2253.147 |
| Carbon sink enhancement potential - Improve plantations | 244.11 |
| Carbon sink enhancement potential - Increase retention of HWP | 1439.783 |
| Carbon sink enhancement potential - Increase trees outside forests | 596.553 |
| Carbon sink enhancement potential - permanent conservation cover | -43.482 |
| Carbon sink enhancement potential - Reforest cropland | 108.745 |
| Carbon sink enhancement potential - Reforest pasture | 1362.39 |
| Carbon sink enhancement potential - Restore productivity | 911.248 |
| Carbon sink enhancement potential - total | -951.479 |
| Land impacted for carbon sink enhancement - Accelerate regeneration | 26.534 |
| Land impacted for carbon sink enhancement - All (not counting overlap) | 1479.8 |
| Land impacted for carbon sink enhancement - Avoid deforestation | 467.764 |
| Land impacted for carbon sink enhancement - corn-ethanol to energy grasses | 0 |
| Land impacted for carbon sink enhancement - cropland measures | 800.797 |
| Land impacted for carbon sink enhancement - Extend rotation length | 1241.222 |
| Land impacted for carbon sink enhancement - Improve plantations | 135.671 |
| Land impacted for carbon sink enhancement - Increase retention of HWP | 287.956 |
| Land impacted for carbon sink enhancement - Increase trees outside forests | 168.282 |
| Land impacted for carbon sink enhancement - permanent conservation cover | 79.087 |

Table 43: *B+ scenario - PILLAR 6: Land carbon sinks - Agriculture (continued)*

| variable_name | 2050 |
|--|----------|
| Land impacted for carbon sink enhancement - Reforest cropland | 36.205 |
| Land impacted for carbon sink enhancement - Reforest pasture | 103.018 |
| Land impacted for carbon sink enhancement - Restore productivity | 514.226 |
| Land impacted for carbon sink enhancement - total | 879.884 |
| Land impacted for carbon sink enhancement - Total impacted (over 30 years) | 1501.098 |

Table 44: *B+ scenario - PILLAR 6: Land carbon sinks - Forests*

| variable_name | 2050 |
|--|---------|
| Business-as-usual carbon sink - Accelerate regeneration | 6.153 |
| Business-as-usual carbon sink - Avoid deforestation | 149.008 |
| Business-as-usual carbon sink - Extend rotation length | 679.034 |
| Business-as-usual carbon sink - Improve plantations | 51.521 |
| Business-as-usual carbon sink - Increase retention of HWP | 0 |
| Business-as-usual carbon sink - Increase trees outside forests | 33.834 |
| Business-as-usual carbon sink - Reforest cropland | 4.108 |
| Business-as-usual carbon sink - Reforest pasture | 25.167 |
| Business-as-usual carbon sink - Restore productivity | 181.022 |
| Business-as-usual carbon sink - Total Impacted (over 30 years) | 4.108 |