



Net-Zero America - Oklahoma data

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See the [Data Sheet Guide](#) for explanations of the contents of this document. The data herein underlie graphs and tables found in Princeton's Net-Zero America report:

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Table 1: E+ scenario - IMPACTS - Health

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|-------|-------|-------|-------|-------|-------|
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Coal (deaths) | | 30 | 0.027 | 0.026 | 0.021 | 0.013 | 0 |
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths) | | 26.9 | 14 | 6.25 | 4.66 | 2.7 | 1.44 |
| Premature deaths from air pollution - Mobile - On-Road (deaths) | | 75.8 | 71.3 | 54.5 | 31.6 | 14.5 | 5.72 |
| Premature deaths from air pollution - Gas Stations (deaths) | | 9.32 | 8.65 | 6.61 | 3.98 | 2.01 | 1.02 |
| Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths) | | 10 | 8.11 | 5.33 | 2.87 | 1.32 | 0.555 |
| Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths) | | 0.142 | 0.118 | 0.084 | 0.051 | 0.025 | 0.011 |
| Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths) | | 1.65 | 1.48 | 1.14 | 0.747 | 0.401 | 0.198 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths) | | 0.888 | 0.854 | 0.816 | 0.774 | 0.731 | 0.685 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths) | | 7.19 | 6.21 | 4.35 | 2.56 | 1.43 | 0.835 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths) | | 1.49 | 1.21 | 0.961 | 0.727 | 0.521 | 0.339 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths) | | 0.692 | 0.587 | 0.485 | 0.383 | 0.284 | 0.189 |
| Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths) | | 1.04 | 0.198 | 0.188 | 0.175 | 0.169 | 0.164 |
| Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths) | | 173 | 164 | 151 | 118 | 88.6 | 55.5 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019) | | 266 | 0.238 | 0.229 | 0.184 | 0.119 | 0.002 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019) | | 238 | 124 | 55.4 | 41.2 | 23.9 | 12.8 |
| Monetary damages from air pollution - Mobile - On-Road (million \$2019) | | 674 | 634 | 485 | 281 | 129 | 50.9 |
| Monetary damages from air pollution - Gas Stations (million \$2019) | | 82.5 | 76.6 | 58.5 | 35.3 | 17.8 | 9.02 |
| Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019) | | 88.7 | 71.8 | 47.2 | 25.4 | 11.7 | 4.92 |
| Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019) | | 1.26 | 1.05 | 0.741 | 0.453 | 0.222 | 0.096 |
| Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019) | | 14.6 | 13.2 | 10.1 | 6.62 | 3.55 | 1.76 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019) | | 7.87 | 7.56 | 7.22 | 6.86 | 6.47 | 6.07 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019) | | 63.6 | 54.9 | 38.5 | 22.7 | 12.7 | 7.39 |

Table 1: *E+ scenario - IMPACTS - Health (continued)*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|-------|-------|-------|-------|------|------|
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019) | | 13.2 | 10.7 | 8.51 | 6.44 | 4.61 | 3 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019) | | 6.13 | 5.2 | 4.29 | 3.39 | 2.51 | 1.67 |
| Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019) | | 9.18 | 1.75 | 1.66 | 1.54 | 1.49 | 1.45 |
| Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019) | | 1,535 | 1,455 | 1,339 | 1,049 | 787 | 492 |

Table 2: *E+ scenario - IMPACTS - Jobs*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|--------|--------|--------|--------|---------|---------|
| By economic sector - Agriculture (jobs) | | 27.4 | 55.6 | 505 | 554 | 642 | 566 |
| By economic sector - Construction (jobs) | | 17,395 | 23,380 | 29,455 | 34,194 | 39,930 | 43,669 |
| By economic sector - Manufacturing (jobs) | | 24,039 | 25,963 | 28,985 | 25,991 | 21,691 | 21,595 |
| By economic sector - Mining (jobs) | | 35,058 | 27,735 | 21,464 | 14,038 | 9,029 | 4,915 |
| By economic sector - Other (jobs) | | 998 | 1,514 | 2,299 | 3,269 | 4,623 | 5,324 |
| By economic sector - Pipeline (jobs) | | 1,798 | 2,040 | 1,681 | 1,137 | 881 | 643 |
| By economic sector - Professional (jobs) | | 15,201 | 18,354 | 23,496 | 27,674 | 32,417 | 36,818 |
| By economic sector - Trade (jobs) | | 13,211 | 14,016 | 15,762 | 16,956 | 19,074 | 21,023 |
| By economic sector - Utilities (jobs) | | 13,004 | 16,889 | 21,886 | 25,802 | 30,039 | 34,689 |
| By resource sector - Biomass (jobs) | | 118 | 153 | 1,439 | 1,667 | 2,340 | 2,416 |
| By resource sector - CO2 (jobs) | | 53.6 | 3,571 | 2,476 | 756 | 1,295 | 1,714 |
| By resource sector - Coal (jobs) | | 679 | 47.7 | 0.976 | 0.751 | 0.607 | 0.518 |
| By resource sector - Grid (jobs) | | 13,113 | 19,811 | 31,722 | 41,421 | 50,843 | 60,951 |
| By resource sector - Natural Gas (jobs) | | 34,455 | 26,923 | 20,616 | 15,610 | 10,051 | 5,835 |
| By resource sector - Nuclear (jobs) | | 0 | 0.003 | 0.006 | 0 | 0 | 0 |
| By resource sector - Oil (jobs) | | 52,247 | 47,100 | 42,254 | 30,570 | 22,744 | 13,938 |
| By resource sector - Solar (jobs) | | 2,963 | 3,622 | 5,224 | 6,822 | 10,257 | 9,305 |
| By resource sector - Wind (jobs) | | 17,101 | 28,717 | 41,803 | 52,768 | 60,796 | 75,080 |
| By education level - All sectors - High school diploma or less (jobs) | | 47,116 | 51,410 | 58,098 | 59,756 | 63,147 | 67,202 |
| By education level - All sectors - Associates degree or some college (jobs) | | 35,164 | 38,736 | 44,081 | 46,184 | 49,548 | 53,664 |
| By education level - All sectors - Bachelors degree (jobs) | | 30,081 | 31,093 | 33,756 | 33,802 | 35,101 | 37,079 |
| By education level - All sectors - Masters or professional degree (jobs) | | 7,294 | 7,572 | 8,322 | 8,521 | 9,056 | 9,699 |
| By education level - All sectors - Doctoral degree (jobs) | | 1,074 | 1,135 | 1,277 | 1,351 | 1,475 | 1,596 |
| Related work experience - All sectors - None (jobs) | | 16,460 | 17,898 | 20,198 | 20,920 | 22,299 | 23,908 |
| Related work experience - All sectors - Up to 1 year (jobs) | | 22,092 | 24,144 | 27,530 | 28,621 | 30,517 | 32,800 |
| Related work experience - All sectors - 1 to 4 years (jobs) | | 45,201 | 48,279 | 53,708 | 54,878 | 57,834 | 61,564 |
| Related work experience - All sectors - 4 to 10 years (jobs) | | 28,777 | 30,965 | 34,572 | 35,586 | 37,705 | 40,380 |
| Related work experience - All sectors - Over 10 years (jobs) | | 8,198 | 8,659 | 9,526 | 9,609 | 9,972 | 10,589 |
| On-the-Job Training - All sectors - None (jobs) | | 6,783 | 7,160 | 7,920 | 8,104 | 8,592 | 9,165 |
| On-the-Job Training - All sectors - Up to 1 year (jobs) | | 81,853 | 87,388 | 97,492 | 99,434 | 104,420 | 111,166 |

Table 2: *E+ scenario - IMPACTS - Jobs (continued)*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|--------|--------|--------|--------|--------|---------|
| On-the-Job Training - All sectors - 1 to 4 years (jobs) | | 24,273 | 26,527 | 29,894 | 31,083 | 33,207 | 35,734 |
| On-the-Job Training - All sectors - 4 to 10 years (jobs) | | 6,630 | 7,588 | 8,809 | 9,558 | 10,622 | 11,604 |
| On-the-Job Training - All sectors - Over 10 years (jobs) | | 1,190 | 1,282 | 1,421 | 1,435 | 1,486 | 1,571 |
| On-Site or In-Plant Training - All sectors - None (jobs) | | 19,612 | 21,084 | 23,672 | 24,439 | 25,954 | 27,870 |
| On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) | | 73,906 | 78,940 | 88,027 | 89,823 | 94,404 | 100,516 |
| On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) | | 18,984 | 20,691 | 23,279 | 24,106 | 25,660 | 27,526 |
| On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) | | 7,351 | 8,228 | 9,388 | 9,993 | 10,941 | 11,835 |
| On-Site or In-Plant Training - All sectors - Over 10 years (jobs) | | 876 | 1,002 | 1,169 | 1,253 | 1,368 | 1,494 |
| Wage income - All (million \$2019) | | 6,715 | 7,181 | 7,999 | 8,203 | 8,699 | 9,330 |

Table 3: *E+ scenario - IMPACTS - Fossil fuel industries*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|-------|-------|-------|-------|-------|--------|
| Oil consumption - Annual (million bbls) | | 102 | 87.7 | 66.7 | 45.9 | 29.6 | 14.7 |
| Oil consumption - Cumulative (million bbls) | | | | | | | 2,028 |
| Oil production - Annual (million bbls) | | 260 | 261 | 261 | 206 | 168 | 112 |
| Natural gas consumption - Annual (tcf) | | 626 | 528 | 423 | 319 | 200 | 139 |
| Natural gas consumption - Cumulative (tcf) | | | | | | | 12,746 |
| Natural gas production - Annual (tcf) | | 3,291 | 3,111 | 2,709 | 2,291 | 1,817 | 1,411 |

Table 4: *E+ scenario - PILLAR 1: Efficiency/Electrification - Overview*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|------|
| Final energy use - Transportation (PJ) | 431 | 405 | 359 | 302 | 250 | 219 | 207 |
| Final energy use - Residential (PJ) | 177 | 168 | 153 | 133 | 115 | 105 | 99.9 |
| Final energy use - Commercial (PJ) | 121 | 122 | 117 | 109 | 103 | 101 | 103 |
| Final energy use - Industry (PJ) | 310 | 318 | 324 | 323 | 325 | 323 | 330 |

Table 5: *E+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|------|
| Electricity distribution capital invested - Cumulative 5-yr (billion \$2018) | | 2.97 | 3.05 | 4.83 | 5.11 | 4.99 | 5.22 |

Table 6: *E+ scenario - PILLAR 1: Efficiency/Electrification - Transportation*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|-------|-------|-------|-------|-------|-------|-------|
| Vehicle stocks - LDV – EV (1000 units) | 19.7 | 322 | 624 | 1,681 | 2,738 | 3,583 | 4,428 |
| Vehicle stocks - LDV – All others (1000 units) | 3,692 | 3,516 | 3,339 | 2,434 | 1,528 | 864 | 201 |
| Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018) | | 710 | 1,819 | 2,948 | 4,465 | 4,860 | 4,634 |
| Public EV charging plugs - DC Fast (1000 units) | 0.326 | | 1.4 | | 6.16 | | 9.97 |
| Public EV charging plugs - L2 (1000 units) | 0.301 | | 33.8 | | 148 | | 240 |

Table 7: E+ scenario - PILLAR 1: Efficiency/Electrification - Residential

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|-------|------|------|------|
| Sales of space heating units - Electric Heat Pump (%) | 8.53 | 25.2 | 76.9 | 88.5 | 89 | 88.9 | 88.8 |
| Sales of space heating units - Electric Resistance (%) | 24.8 | 26.1 | 10.9 | 7.55 | 7.39 | 7.53 | 7.57 |
| Sales of space heating units - Gas (%) | 60.7 | 39.8 | 8.68 | 1.75 | 1.46 | 1.44 | 1.43 |
| Sales of space heating units - Fossil (%) | 5.91 | 8.95 | 3.48 | 2.25 | 2.19 | 2.17 | 2.16 |
| Sales of water heating units - Electric Heat Pump (%) | 0 | 11.6 | 61.7 | 72.9 | 73.4 | 73.4 | 73.4 |
| Sales of water heating units - Electric Resistance (%) | 30.5 | 39.9 | 28.2 | 25.5 | 25.4 | 25.4 | 25.4 |
| Sales of water heating units - Gas Furnace (%) | 68.2 | 47.2 | 8.93 | 0.373 | 0 | 0 | 0 |
| Sales of water heating units - Other (%) | 1.38 | 1.21 | 1.22 | 1.2 | 1.19 | 1.2 | 1.2 |
| Sales of cooking units - Electric Resistance (%) | 40.4 | 53.1 | 92 | 99.6 | 100 | 100 | 100 |
| Sales of cooking units - Gas (%) | 59.6 | 46.9 | 8.02 | 0.404 | 0 | 0 | 0 |
| Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018) | | 3.2 | 3.89 | | | | |

Table 8: E+ scenario - PILLAR 1: Efficiency/Electrification - Commercial

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|--------|--------|-------|------|------|------|
| Sales of space heating units - Electric Heat Pump (%) | 1.94 | 26.9 | 77 | 91.1 | 92.3 | 92.3 | 92.3 |
| Sales of space heating units - Electric Resistance (%) | 2 | 4.42 | 4.72 | 6.04 | 6.33 | 6.36 | 6.38 |
| Sales of space heating units - Gas Furnace (%) | 96.1 | 68.7 | 18.2 | 2.83 | 1.38 | 1.34 | 1.33 |
| Sales of space heating units - Fossil (%) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales of water heating units - Electric Heat Pump (%) | 0.059 | 10.7 | 56.4 | 66.5 | 67 | 67 | 66.9 |
| Sales of water heating units - Electric Resistance (%) | 1.74 | 8.05 | 26.9 | 31.1 | 31.3 | 31.3 | 31.3 |
| Sales of water heating units - Gas Furnace (%) | 97.4 | 79.4 | 15 | 0.632 | 0 | 0 | 0 |
| Sales of water heating units - Other (%) | 0.794 | 1.77 | 1.77 | 1.77 | 1.78 | 1.78 | 1.79 |
| Sales of cooking units - Electric Resistance (%) | 30.1 | 44.4 | 79.2 | 86.1 | 86.5 | 86.5 | 86.5 |
| Sales of cooking units - Gas (%) | 69.9 | 55.6 | 20.8 | 13.9 | 13.5 | 13.5 | 13.5 |
| Commercial HVAC investment in 2020s - Cumulative 5-yr (million \$2018) | | 14,173 | 16,554 | | | | |

Table 9: E+ scenario - PILLAR 2: Clean Electricity - Generating capacity

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|--------|--------|--------|--------|--------|--------|--------|
| Installed thermal - Coal (MW) | 4,259 | 350 | 0 | 0 | 0 | 0 | 0 |
| Installed thermal - Natural gas (MW) | 13,067 | 9,237 | 9,519 | 9,519 | 6,924 | 4,650 | 4,593 |
| Installed thermal - Nuclear (MW) | 0 | 0 | 0.001 | 0.004 | 0 | 0 | 0 |
| Installed renewables - Rooftop PV (MW) | 130 | 228 | 333 | 490 | 714 | 1,005 | 1,384 |
| Installed renewables - Solar - Base land use assumptions (MW) | 222 | 222 | 222 | 222 | 1,269 | 5,813 | 6,870 |
| Installed renewables - Wind - Base land use assumptions (MW) | 9,420 | 11,527 | 17,669 | 31,558 | 45,644 | 56,327 | 57,442 |
| Installed renewables - Solar - Constrained land use assumptions (MW) | 214 | 675 | 4,249 | 10,886 | 17,746 | 23,674 | 26,614 |
| Installed renewables - Wind - Constrained land use assumptions (MW) | 11,527 | 11,868 | 17,422 | 28,542 | 40,274 | 48,054 | 48,365 |
| Capital invested - Solar PV - Base (billion \$2018) | | 0 | 0 | 0 | 1.09 | 4.46 | 0.979 |

Table 9: E+ scenario - PILLAR 2: Clean Electricity - Generating capacity (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|-------|------|------|-------|
| Capital invested - Wind - Base (billion \$2018) | | 0 | 8.18 | 17.2 | 16.7 | 12 | 1.18 |
| Capital invested - Solar PV - Constrained (billion \$2018) | | 1.7 | 4.96 | 6.17 | 5.53 | 5.51 | 2.59 |
| Capital invested - Wind - Constrained (billion \$2018) | | 6.51 | 7.43 | 13.6 | 12.3 | 8.59 | 0.321 |
| Capital invested - Biomass power plant (billion \$2018) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capital invested - Biomass w/ccu allam power plant (billion \$2018) | 0 | 0 | 0 | 0.019 | 0 | 0 | 0 |
| Capital invested - Biomass w/ccu power plant (billion \$2018) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 10: E+ scenario - PILLAR 2: Clean Electricity - Generation

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|--------|--------|--------|---------|---------|---------|---------|
| Solar - Base land use assumptions (GWh) | 551 | 551 | 551 | 551 | 2,764 | 12,560 | 14,854 |
| Wind - Base land use assumptions (GWh) | 48,113 | 48,113 | 71,210 | 122,262 | 173,218 | 211,315 | 215,061 |
| OffshoreWind - Base land use assumptions (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Solar - Constrained land use assumptions (GWh) | 531 | 1,500 | 9,235 | 23,604 | 38,522 | 51,191 | 57,598 |
| Wind - Constrained land use assumptions (GWh) | 48,113 | 49,220 | 69,807 | 109,923 | 151,621 | 178,536 | 179,576 |
| OffshoreWind - Constrained land use assumptions (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Biomass power plant (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Biomass w/ccu power plant (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Biomass w/ccu allam power plant (GWh) | 0 | 0 | 0 | 19 | 19 | 19 | 19 |

Table 11: E+ scenario - PILLAR 3: Clean fuels - Bioenergy

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|-------|-------|-------|-------|
| Number of facilities - Power (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - Power ccu (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - Allam power w ccu (quantity) | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| Number of facilities - Beccs hydrogen (quantity) | 0 | 0 | 0 | 4 | 7 | 9 | 12 |
| Number of facilities - Diesel (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - Diesel ccu (quantity) | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| Number of facilities - Pyrolysis (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - Pyrolysis ccu (quantity) | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| Number of facilities - Sng (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - Sng ccu (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Conversion capital investment - Cumulative 5-yr (million \$2018) | | 0 | 0 | 3,342 | 1,276 | 2,536 | 2,177 |
| Biomass purchases (million \$2018/y) | | 0 | 0 | 192 | 266 | 412 | 531 |

Table 12: E+ scenario - PILLAR 4: CCUS - CO2 capture

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--------------------------------|------|------|------|------|------|------|------|
| Annual - All (MMT) | | 0 | 0 | 11 | 12.5 | 16 | 18.8 |
| Annual - BECCS (MMT) | | 0 | 0 | 4.26 | 5.9 | 9.16 | 11.8 |
| Annual - NGCC (MMT) | | 0 | 0 | 0 | 0 | 0 | 0 |
| Annual - Cement and lime (MMT) | | 0 | 0 | 6.71 | 6.64 | 6.84 | 7.07 |
| Cumulative - All (MMT) | | 0 | 0 | 11 | 23.5 | 39.5 | 58.3 |
| Cumulative - BECCS (MMT) | | 0 | 0 | 4.26 | 10.2 | 19.3 | 31.1 |

Table 12: *E+ scenario - PILLAR 4: CCUS - CO2 capture (continued)*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|------------------------------------|------|------|------|------|------|------|------|
| Cumulative - NGCC (MMT) | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cumulative - Cement and lime (MMT) | | 0 | 0 | 6.71 | 13.3 | 20.2 | 27.3 |

Table 13: *E+ scenario - PILLAR 4: CCUS - CO2 pipelines*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|-------|-------|-------|-------|-------|
| Trunk (km) | | 0 | 774 | 1,136 | 1,136 | 1,136 | 1,136 |
| Spur (km) | | 0 | 0 | 670 | 988 | 1,715 | 2,050 |
| All (km) | | 0 | 774 | 1,805 | 2,123 | 2,851 | 3,186 |
| Cumulative investment - Trunk (million \$2018) | | 0 | 4,032 | 5,944 | 5,944 | 5,944 | 5,944 |
| Cumulative investment - Spur (million \$2018) | | 0 | 0 | 557 | 740 | 1,259 | 1,462 |
| Cumulative investment - All (million \$2018) | | 0 | 4,032 | 6,502 | 6,684 | 7,204 | 7,407 |

Table 14: *E+ scenario - PILLAR 4: CCUS - CO2 storage*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|------|
| Annual (MMT) | | 0 | 1.1 | 1.76 | 3.61 | 6.02 | 7.46 |
| Injection wells (wells) | | 0 | 1 | 4 | 8 | 13 | 16 |
| Resource characterization, appraisal, permitting costs (million \$2020) | | 103 | 251 | 295 | 295 | 295 | 295 |
| Wells and facilities construction costs (million \$2020) | | 0 | 35.6 | 139 | 247 | 413 | 513 |

Table 15: *E+ scenario - PILLAR 6: Land sinks - Forests*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|---------|
| Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -477 |
| Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y) | | | | | | | -281 |
| Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y) | | | | | | | -1,783 |
| Carbon sink potential - Low - Improve plantations (1000 tCO2e/y) | | | | | | | -329 |
| Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -591 |
| Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -482 |
| Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y) | | | | | | | -4,866 |
| Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y) | | | | | | | -1,451 |
| Carbon sink potential - Low - Restore productivity (1000 tCO2e/y) | | | | | | | -1,120 |
| Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -11,380 |
| Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -715 |
| Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y) | | | | | | | -984 |
| Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y) | | | | | | | -3,213 |
| Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y) | | | | | | | -482 |
| Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -1,182 |

Table 15: E+ scenario - PILLAR 6: Land sinks - Forests (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|---------|
| Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -930 |
| Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y) | | | | | | | -7,299 |
| Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y) | | | | | | | -10,302 |
| Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y) | | | | | | | -2,221 |
| Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -27,327 |
| Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -952 |
| Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y) | | | | | | | -1,687 |
| Carbon sink potential - High - Extend rotation length (1000 tCO2e/y) | | | | | | | -4,643 |
| Carbon sink potential - High - Improve plantations (1000 tCO2e/y) | | | | | | | -646 |
| Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -1,773 |
| Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -1,378 |
| Carbon sink potential - High - Reforest cropland (1000 tCO2e/y) | | | | | | | -9,732 |
| Carbon sink potential - High - Reforest pasture (1000 tCO2e/y) | | | | | | | -19,153 |
| Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -43,286 |
| Carbon sink potential - High - Restore productivity (1000 tCO2e/y) | | | | | | | -3,321 |
| Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) | | | | | | | 77.9 |
| Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 214 |
| Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) | | | | | | | 907 |
| Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) | | | | | | | 119 |
| Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) | | | | | | | 68.9 |
| Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) | | | | | | | 322 |
| Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares) | | | | | | | 94.3 |
| Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) | | | | | | | 666 |
| Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares) | | | | | | | 2,470 |
| Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) | | | | | | | 117 |

Table 15: *E+ scenario - PILLAR 6: Land sinks - Forests (continued)*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|-------|
| Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 221 |
| Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares) | | | | | | | 1,637 |
| Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares) | | | | | | | 179 |
| Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares) | | | | | | | 99.9 |
| Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) | | | | | | | 483 |
| Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares) | | | | | | | 682 |
| Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) | | | | | | | 1,342 |
| Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares) | | | | | | | 4,761 |
| Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares) | | | | | | | 156 |
| Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 228 |
| Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares) | | | | | | | 2,368 |
| Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) | | | | | | | 238 |
| Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares) | | | | | | | 131 |
| Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) | | | | | | | 643 |
| Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) | | | | | | | 544 |
| Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) | | | | | | | 1,101 |
| Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) | | | | | | | 5,409 |

Table 16: *E+ scenario - PILLAR 6: Land sinks - Agriculture*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|-------|
| Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) | | | | | | | -18.2 |

Table 16: E+ scenario - PILLAR 6: Land sinks - Agriculture (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|--------|
| Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -2,381 |
| Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -131 |
| Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y) | | | | | | | -2,530 |
| Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) | | | | | | | -18.2 |
| Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -4,525 |
| Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -262 |
| Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y) | | | | | | | -4,806 |
| Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 11.7 |
| Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares) | | | | | | | 2,254 |
| Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares) | | | | | | | 225 |
| Land impacted for carbon sink - Moderate deployment - Total (1000 hectares) | | | | | | | 2,491 |
| Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 11.7 |
| Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) | | | | | | | 4,283 |
| Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) | | | | | | | 450 |
| Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) | | | | | | | 4,745 |

Table 17: E- scenario - IMPACTS - Health

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|-------|-------|-------|-------|-------|-------|
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Coal (deaths) | | 30 | 0.027 | 0.026 | 0.021 | 0.013 | 0 |
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths) | | 26.7 | 11.9 | 5.81 | 3.05 | 1.09 | 0.88 |
| Premature deaths from air pollution - Mobile - On-Road (deaths) | | 77 | 78.2 | 76.7 | 69.6 | 55.8 | 38.5 |
| Premature deaths from air pollution - Gas Stations (deaths) | | 9.5 | 9.63 | 9.36 | 8.46 | 6.8 | 4.78 |
| Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths) | | 10.1 | 9.32 | 8.32 | 6.83 | 5.01 | 3.24 |
| Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths) | | 0.145 | 0.14 | 0.134 | 0.121 | 0.099 | 0.076 |

Table 17: E- scenario - IMPACTS - Health (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|-------|-------|-------|-------|-------|-------|
| Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths) | | 1.67 | 1.7 | 1.71 | 1.57 | 1.24 | 0.883 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths) | | 0.888 | 0.854 | 0.816 | 0.774 | 0.731 | 0.685 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths) | | 7.26 | 7.24 | 6.95 | 6.1 | 4.8 | 3.44 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths) | | 1.49 | 1.31 | 1.14 | 0.985 | 0.835 | 0.696 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths) | | 0.692 | 0.63 | 0.568 | 0.506 | 0.445 | 0.385 |
| Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths) | | 0.986 | 0.2 | 0.196 | 0.188 | 0.17 | 0.138 |
| Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths) | | 172 | 158 | 140 | 124 | 111 | 77.7 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019) | | 266 | 0.238 | 0.229 | 0.184 | 0.119 | 0.002 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019) | | 237 | 105 | 51.4 | 27 | 9.67 | 7.79 |
| Monetary damages from air pollution - Mobile - On-Road (million \$2019) | | 685 | 696 | 682 | 619 | 496 | 343 |
| Monetary damages from air pollution - Gas Stations (million \$2019) | | 84.1 | 85.3 | 82.9 | 74.9 | 60.3 | 42.4 |
| Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019) | | 89.6 | 82.6 | 73.7 | 60.5 | 44.4 | 28.7 |
| Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019) | | 1.29 | 1.24 | 1.18 | 1.07 | 0.875 | 0.672 |
| Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019) | | 14.8 | 15.1 | 15.1 | 13.9 | 11 | 7.83 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019) | | 7.87 | 7.56 | 7.22 | 6.86 | 6.47 | 6.07 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019) | | 64.3 | 64.1 | 61.5 | 54 | 42.5 | 30.4 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019) | | 13.2 | 11.6 | 10.1 | 8.72 | 7.39 | 6.17 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019) | | 6.13 | 5.57 | 5.03 | 4.48 | 3.94 | 3.41 |
| Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019) | | 8.7 | 1.77 | 1.73 | 1.66 | 1.5 | 1.22 |
| Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019) | | 1,531 | 1,406 | 1,242 | 1,103 | 987 | 690 |

Table 18: E- scenario - IMPACTS - Jobs

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|--------|--------|--------|---------|---------|---------|
| By economic sector - Agriculture (jobs) | | 33.4 | 42.8 | 918 | 986 | 895 | 566 |
| By economic sector - Construction (jobs) | | 17,523 | 24,554 | 29,060 | 34,060 | 45,312 | 53,637 |
| By economic sector - Manufacturing (jobs) | | 24,391 | 26,186 | 26,983 | 27,201 | 28,766 | 29,501 |
| By economic sector - Mining (jobs) | | 35,028 | 27,139 | 20,598 | 15,688 | 12,015 | 7,164 |
| By economic sector - Other (jobs) | | 1,010 | 1,550 | 2,230 | 3,191 | 5,106 | 6,322 |
| By economic sector - Pipeline (jobs) | | 1,798 | 2,285 | 1,803 | 1,257 | 1,196 | 988 |
| By economic sector - Professional (jobs) | | 15,307 | 18,488 | 23,254 | 28,627 | 37,046 | 45,013 |
| By economic sector - Trade (jobs) | | 13,261 | 14,048 | 15,488 | 17,740 | 22,143 | 26,011 |
| By economic sector - Utilities (jobs) | | 12,983 | 17,894 | 21,203 | 24,764 | 33,682 | 42,721 |
| By resource sector - Biomass (jobs) | | 127 | 115 | 3,046 | 4,146 | 3,811 | 2,334 |
| By resource sector - CO2 (jobs) | | 53.9 | 6,082 | 4,253 | 1,324 | 2,221 | 2,903 |
| By resource sector - Coal (jobs) | | 678 | 47.7 | 1.05 | 0.857 | 0.617 | 0.352 |
| By resource sector - Grid (jobs) | | 13,019 | 19,934 | 29,625 | 39,400 | 57,101 | 74,188 |
| By resource sector - Natural Gas (jobs) | | 34,371 | 24,979 | 17,322 | 13,126 | 9,668 | 7,584 |
| By resource sector - Nuclear (jobs) | | 0 | 0.004 | 0.007 | 0 | 0 | 0 |
| By resource sector - Oil (jobs) | | 52,295 | 47,370 | 42,989 | 38,228 | 33,358 | 21,274 |
| By resource sector - Solar (jobs) | | 3,103 | 3,778 | 4,334 | 5,970 | 11,451 | 9,491 |
| By resource sector - Wind (jobs) | | 17,687 | 29,880 | 39,966 | 51,317 | 68,552 | 94,148 |
| By education level - All sectors - High school diploma or less (jobs) | | 47,372 | 52,447 | 56,638 | 61,345 | 74,474 | 84,242 |
| By education level - All sectors - Associates degree or some college (jobs) | | 35,353 | 39,560 | 42,692 | 46,815 | 57,807 | 67,048 |
| By education level - All sectors - Bachelors degree (jobs) | | 30,208 | 31,406 | 32,837 | 35,112 | 41,548 | 46,564 |
| By education level - All sectors - Masters or professional degree (jobs) | | 7,323 | 7,635 | 8,115 | 8,833 | 10,616 | 12,093 |
| By education level - All sectors - Doctoral degree (jobs) | | 1,078 | 1,139 | 1,254 | 1,408 | 1,716 | 1,975 |
| Related work experience - All sectors - None (jobs) | | 16,542 | 18,249 | 19,678 | 21,423 | 26,165 | 29,898 |
| Related work experience - All sectors - Up to 1 year (jobs) | | 22,226 | 24,602 | 26,851 | 29,408 | 35,922 | 40,990 |
| Related work experience - All sectors - 1 to 4 years (jobs) | | 45,412 | 49,045 | 52,232 | 56,424 | 68,085 | 77,164 |
| Related work experience - All sectors - 4 to 10 years (jobs) | | 28,915 | 31,509 | 33,566 | 36,405 | 44,210 | 50,550 |
| Related work experience - All sectors - Over 10 years (jobs) | | 8,239 | 8,782 | 9,208 | 9,853 | 11,779 | 13,320 |
| On-the-Job Training - All sectors - None (jobs) | | 6,817 | 7,264 | 7,720 | 8,366 | 10,110 | 11,453 |
| On-the-Job Training - All sectors - Up to 1 year (jobs) | | 82,271 | 88,719 | 94,869 | 102,533 | 123,354 | 139,446 |
| On-the-Job Training - All sectors - 1 to 4 years (jobs) | | 24,390 | 27,087 | 28,987 | 31,553 | 38,751 | 44,669 |
| On-the-Job Training - All sectors - 4 to 10 years (jobs) | | 6,657 | 7,807 | 8,586 | 9,594 | 12,187 | 14,375 |
| On-the-Job Training - All sectors - Over 10 years (jobs) | | 1,198 | 1,308 | 1,374 | 1,468 | 1,759 | 1,980 |
| On-Site or In-Plant Training - All sectors - None (jobs) | | 19,719 | 21,439 | 23,034 | 25,077 | 30,468 | 34,842 |
| On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) | | 74,277 | 80,170 | 85,633 | 92,534 | 111,452 | 126,069 |
| On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) | | 19,077 | 21,113 | 22,585 | 24,537 | 30,025 | 34,444 |
| On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) | | 7,380 | 8,437 | 9,150 | 10,101 | 12,631 | 14,707 |
| On-Site or In-Plant Training - All sectors - Over 10 years (jobs) | | 880 | 1,028 | 1,134 | 1,264 | 1,586 | 1,861 |
| Wage income - All (million \$2019) | | 6,743 | 7,281 | 7,777 | 8,447 | 10,246 | 11,700 |

Table 19: E- scenario - PILLAR 1: Efficiency/Electrification - Overview

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|------|
| Final energy use - Transportation (PJ) | 431 | 408 | 374 | 347 | 327 | 302 | 274 |
| Final energy use - Residential (PJ) | 177 | 169 | 164 | 158 | 146 | 131 | 118 |
| Final energy use - Commercial (PJ) | 121 | 122 | 121 | 120 | 117 | 113 | 111 |
| Final energy use - Industry (PJ) | 310 | 319 | 325 | 326 | 330 | 327 | 334 |

Table 20: E- scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|------|
| Electricity distribution capital invested - Cumulative 5-yr (billion \$2018) | | 2.54 | 2.56 | 3.09 | 3.17 | 4.7 | 4.96 |

Table 21: E- scenario - PILLAR 1: Efficiency/Electrification - Transportation

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|-------|-------|-------|-------|-------|-------|-------|
| Vehicle stocks - LDV – EV (1000 units) | 15.2 | 104 | 193 | 604 | 1,015 | 1,926 | 2,836 |
| Vehicle stocks - LDV – All others (1000 units) | 3,707 | 3,707 | 3,707 | 3,517 | 3,326 | 2,563 | 1,800 |
| Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018) | | 0 | 115 | 241 | 815 | 2,564 | 3,735 |
| Public EV charging plugs - DC Fast (1000 units) | 0.326 | | 0.434 | | 2.29 | | 6.38 |
| Public EV charging plugs - L2 (1000 units) | 0.301 | | 10.4 | | 55 | | 154 |

Table 22: E- scenario - PILLAR 1: Efficiency/Electrification - Residential

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|------|
| Sales of space heating units - Electric Heat Pump (%) | 8.53 | 15.3 | 21.1 | 38.1 | 64.1 | 81 | 86.8 |
| Sales of space heating units - Electric Resistance (%) | 24.8 | 29 | 27.1 | 22.1 | 14.5 | 9.75 | 8.07 |
| Sales of space heating units - Gas (%) | 60.7 | 45.8 | 42.3 | 32.2 | 16.6 | 6.26 | 2.7 |
| Sales of space heating units - Fossil (%) | 5.91 | 10 | 9.47 | 7.6 | 4.79 | 3.01 | 2.4 |
| Sales of water heating units - Electric Heat Pump (%) | 0 | 2 | 7.69 | 24.1 | 49.2 | 65.6 | 71.4 |
| Sales of water heating units - Electric Resistance (%) | 30.5 | 42.2 | 40.8 | 37 | 31.1 | 27.3 | 25.9 |
| Sales of water heating units - Gas Furnace (%) | 68.2 | 54.6 | 50.3 | 37.7 | 18.4 | 5.87 | 1.53 |
| Sales of water heating units - Other (%) | 1.38 | 1.21 | 1.22 | 1.21 | 1.21 | 1.21 | 1.2 |
| Sales of cooking units - Electric Resistance (%) | 40.2 | 41.8 | 47.2 | 61.7 | 81.7 | 94.1 | 98.4 |
| Sales of cooking units - Gas (%) | 59.8 | 58.2 | 52.8 | 38.3 | 18.3 | 5.9 | 1.59 |
| Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018) | | 3.16 | 3.73 | | | | |

Table 23: E- scenario - PILLAR 1: Efficiency/Electrification - Commercial

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|------|------|------|------|------|------|
| Sales of space heating units - Electric Heat Pump (%) | 1.94 | 17.4 | 23.1 | 39.7 | 65.5 | 83.2 | 89.8 |
| Sales of space heating units - Electric Resistance (%) | 2 | 4.42 | 4.46 | 4.63 | 5.06 | 5.73 | 6.18 |
| Sales of space heating units - Gas Furnace (%) | 96.1 | 78.2 | 72.4 | 55.7 | 29.4 | 11 | 3.98 |
| Sales of space heating units - Fossil (%) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales of water heating units - Electric Heat Pump (%) | 0.059 | 1.96 | 7.15 | 22.1 | 45 | 59.9 | 65.1 |
| Sales of water heating units - Electric Resistance (%) | 1.74 | 4.42 | 6.55 | 12.7 | 22.2 | 28.4 | 30.5 |

Table 23: E- scenario - PILLAR 1: Efficiency/Electrification - Commercial (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|--------|--------|------|------|------|------|
| Sales of water heating units - Gas Furnace (%) | 97.4 | 91.9 | 84.5 | 63.4 | 31 | 9.91 | 2.58 |
| Sales of water heating units - Other (%) | 0.794 | 1.77 | 1.77 | 1.77 | 1.78 | 1.78 | 1.79 |
| Sales of cooking units - Electric Resistance (%) | 30.1 | 34.2 | 39 | 52 | 70.1 | 81.2 | 85 |
| Sales of cooking units - Gas (%) | 69.9 | 65.8 | 61 | 48 | 29.9 | 18.8 | 15 |
| Commercial HVAC investment in 2020s - Cumulative 5-yr (million \$2018) | | 14,157 | 16,435 | | | | |

Table 24: E- scenario - PILLAR 2: Clean Electricity - Generating capacity

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--------------------------------------|--------|-------|-------|-------|-------|-------|-------|
| Installed thermal - Coal (MW) | 4,259 | 350 | 0 | 0 | 0 | 0 | 0 |
| Installed thermal - Natural gas (MW) | 13,108 | 9,237 | 9,237 | 9,237 | 5,732 | 4,811 | 7,266 |
| Installed thermal - Nuclear (MW) | 0 | 0 | 0.002 | 0.004 | 0 | 0 | 0 |

Table 25: E- scenario - PILLAR 6: Land sinks - Forests

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|---------|
| Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -477 |
| Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y) | | | | | | | -281 |
| Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y) | | | | | | | -1,783 |
| Carbon sink potential - Low - Improve plantations (1000 tCO2e/y) | | | | | | | -329 |
| Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -591 |
| Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -482 |
| Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y) | | | | | | | -4,866 |
| Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y) | | | | | | | -1,451 |
| Carbon sink potential - Low - Restore productivity (1000 tCO2e/y) | | | | | | | -1,120 |
| Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -11,380 |
| Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -715 |
| Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y) | | | | | | | -984 |
| Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y) | | | | | | | -3,213 |
| Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y) | | | | | | | -482 |
| Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -1,182 |
| Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -930 |
| Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y) | | | | | | | -7,299 |
| Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y) | | | | | | | -10,302 |
| Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y) | | | | | | | -2,221 |
| Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -27,327 |

Table 25: E- scenario - PILLAR 6: Land sinks - Forests (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|---------|
| Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -952 |
| Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y) | | | | | | | -1,687 |
| Carbon sink potential - High - Extend rotation length (1000 tCO2e/y) | | | | | | | -4,643 |
| Carbon sink potential - High - Improve plantations (1000 tCO2e/y) | | | | | | | -646 |
| Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -1,773 |
| Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -1,378 |
| Carbon sink potential - High - Reforest cropland (1000 tCO2e/y) | | | | | | | -9,732 |
| Carbon sink potential - High - Reforest pasture (1000 tCO2e/y) | | | | | | | -19,153 |
| Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -43,286 |
| Carbon sink potential - High - Restore productivity (1000 tCO2e/y) | | | | | | | -3,321 |
| Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) | | | | | | | 77.9 |
| Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 214 |
| Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) | | | | | | | 907 |
| Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) | | | | | | | 119 |
| Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) | | | | | | | 68.9 |
| Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) | | | | | | | 322 |
| Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares) | | | | | | | 94.3 |
| Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) | | | | | | | 666 |
| Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares) | | | | | | | 2,470 |
| Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) | | | | | | | 117 |
| Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 221 |
| Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares) | | | | | | | 1,637 |
| Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares) | | | | | | | 179 |

Table 25: E- scenario - PILLAR 6: Land sinks - Forests (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|-------|
| Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares) | | | | | | | 99.9 |
| Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) | | | | | | | 483 |
| Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares) | | | | | | | 682 |
| Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) | | | | | | | 1,342 |
| Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares) | | | | | | | 4,761 |
| Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares) | | | | | | | 156 |
| Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 228 |
| Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares) | | | | | | | 2,368 |
| Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) | | | | | | | 238 |
| Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares) | | | | | | | 131 |
| Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) | | | | | | | 643 |
| Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) | | | | | | | 544 |
| Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) | | | | | | | 1,101 |
| Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) | | | | | | | 5,409 |

Table 26: E- scenario - PILLAR 6: Land sinks - Agriculture

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|--------|
| Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) | | | | | | | -18.2 |
| Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -2,381 |
| Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -131 |
| Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y) | | | | | | | -2,530 |

Table 26: E- scenario - PILLAR 6: Land sinks - Agriculture (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|--------|
| Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) | | | | | | | -18.2 |
| Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -4,525 |
| Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -262 |
| Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y) | | | | | | | -4,806 |
| Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 11.7 |
| Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares) | | | | | | | 2,254 |
| Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares) | | | | | | | 225 |
| Land impacted for carbon sink - Moderate deployment - Total (1000 hectares) | | | | | | | 2,491 |
| Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 11.7 |
| Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) | | | | | | | 4,283 |
| Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) | | | | | | | 450 |
| Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) | | | | | | | 4,745 |

Table 27: E+RE+ scenario - IMPACTS - Health

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|-------|-------|-------|-------|-------|-------|
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Coal (deaths) | | 30 | 0.027 | 0.026 | 0.021 | 0.013 | 0 |
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths) | | 25.4 | 13.6 | 3.96 | 2.69 | 1.16 | 0.763 |
| Premature deaths from air pollution - Mobile - On-Road (deaths) | | 75.8 | 71.3 | 54.5 | 31.6 | 14.5 | 5.72 |
| Premature deaths from air pollution - Gas Stations (deaths) | | 9.32 | 8.65 | 6.61 | 3.98 | 2.01 | 1.02 |
| Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths) | | 10 | 8.11 | 5.33 | 2.87 | 1.32 | 0.555 |
| Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths) | | 0.142 | 0.118 | 0.084 | 0.051 | 0.025 | 0.011 |
| Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths) | | 1.65 | 1.48 | 1.14 | 0.747 | 0.401 | 0.198 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths) | | 0.888 | 0.854 | 0.816 | 0.774 | 0.731 | 0.685 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths) | | 7.19 | 6.21 | 4.35 | 2.56 | 1.43 | 0.835 |

Table 27: *E+RE+ scenario - IMPACTS - Health (continued)*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|-------|-------|-------|-------|-------|-------|
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths) | | 1.49 | 1.21 | 0.961 | 0.727 | 0.521 | 0.339 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths) | | 0.692 | 0.587 | 0.485 | 0.383 | 0.284 | 0.189 |
| Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths) | | 1.18 | 0.198 | 0.188 | 0.173 | 0.167 | 0.105 |
| Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths) | | 170 | 162 | 142 | 103 | 63.9 | 10 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019) | | 266 | 0.238 | 0.229 | 0.184 | 0.119 | 0.002 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019) | | 225 | 120 | 35.1 | 23.8 | 10.3 | 6.76 |
| Monetary damages from air pollution - Mobile - On-Road (million \$2019) | | 674 | 634 | 485 | 281 | 129 | 50.9 |
| Monetary damages from air pollution - Gas Stations (million \$2019) | | 82.5 | 76.6 | 58.5 | 35.3 | 17.8 | 9.02 |
| Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019) | | 88.7 | 71.8 | 47.2 | 25.4 | 11.7 | 4.92 |
| Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019) | | 1.26 | 1.05 | 0.741 | 0.453 | 0.222 | 0.096 |
| Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019) | | 14.6 | 13.2 | 10.1 | 6.62 | 3.55 | 1.76 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019) | | 7.87 | 7.56 | 7.22 | 6.86 | 6.47 | 6.07 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019) | | 63.6 | 54.9 | 38.5 | 22.7 | 12.7 | 7.39 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019) | | 13.2 | 10.7 | 8.51 | 6.44 | 4.61 | 3 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019) | | 6.13 | 5.2 | 4.29 | 3.39 | 2.51 | 1.67 |
| Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019) | | 10.4 | 1.75 | 1.65 | 1.53 | 1.48 | 0.924 |
| Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019) | | 1,511 | 1,436 | 1,257 | 912 | 568 | 89.2 |

Table 28: *E+RE+ scenario - IMPACTS - Jobs*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|--------|--------|--------|--------|--------|--------|
| By economic sector - Agriculture (jobs) | | 27.6 | 57.2 | 464 | 508 | 547 | 567 |
| By economic sector - Construction (jobs) | | 17,706 | 23,142 | 34,254 | 46,692 | 65,990 | 84,643 |
| By economic sector - Manufacturing (jobs) | | 24,791 | 28,274 | 34,281 | 33,404 | 36,745 | 37,475 |
| By economic sector - Mining (jobs) | | 34,602 | 27,364 | 20,232 | 12,248 | 6,495 | 974 |
| By economic sector - Other (jobs) | | 1,037 | 1,631 | 2,923 | 5,015 | 8,462 | 11,025 |
| By economic sector - Pipeline (jobs) | | 1,759 | 1,575 | 1,264 | 881 | 519 | 124 |
| By economic sector - Professional (jobs) | | 15,464 | 19,249 | 27,640 | 36,887 | 50,856 | 67,375 |

Table 28: E+RE+ scenario - IMPACTS - Jobs (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|--------|--------|---------|---------|---------|---------|
| By economic sector - Trade (jobs) | | 13,282 | 14,388 | 17,615 | 21,474 | 28,733 | 37,215 |
| By economic sector - Utilities (jobs) | | 12,818 | 15,691 | 24,822 | 34,188 | 51,104 | 71,964 |
| By resource sector - Biomass (jobs) | | 107 | 161 | 1,249 | 1,660 | 2,033 | 2,496 |
| By resource sector - CO2 (jobs) | | 0 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| By resource sector - Coal (jobs) | | 681 | 477 | 0.968 | 0.739 | 0.598 | 0.146 |
| By resource sector - Grid (jobs) | | 12,844 | 20,782 | 39,843 | 58,259 | 91,714 | 133,345 |
| By resource sector - Natural Gas (jobs) | | 33,397 | 25,989 | 18,044 | 12,389 | 7,779 | 3,584 |
| By resource sector - Nuclear (jobs) | | 0 | 0 | 0 | 0 | 0 | 0 |
| By resource sector - Oil (jobs) | | 52,249 | 47,065 | 41,182 | 28,078 | 17,716 | 3,524 |
| By resource sector - Solar (jobs) | | 3,305 | 5,049 | 8,035 | 14,249 | 26,926 | 23,666 |
| By resource sector - Wind (jobs) | | 18,904 | 32,278 | 55,138 | 76,660 | 103,283 | 144,748 |
| By education level - All sectors - High school diploma or less (jobs) | | 47,454 | 51,917 | 65,389 | 76,676 | 100,268 | 124,449 |
| By education level - All sectors - Associates degree or some college (jobs) | | 35,417 | 39,066 | 49,888 | 59,794 | 79,399 | 100,390 |
| By education level - All sectors - Bachelors degree (jobs) | | 30,215 | 31,541 | 37,504 | 42,360 | 53,689 | 66,257 |
| By education level - All sectors - Masters or professional degree (jobs) | | 7,322 | 7,685 | 9,276 | 10,746 | 13,859 | 17,433 |
| By education level - All sectors - Doctoral degree (jobs) | | 1,080 | 1,162 | 1,437 | 1,720 | 2,237 | 2,833 |
| Related work experience - All sectors - None (jobs) | | 16,556 | 18,023 | 22,679 | 26,812 | 35,291 | 44,258 |
| Related work experience - All sectors - Up to 1 year (jobs) | | 22,299 | 24,572 | 31,299 | 37,143 | 48,921 | 61,110 |
| Related work experience - All sectors - 1 to 4 years (jobs) | | 45,443 | 48,763 | 60,067 | 69,708 | 90,363 | 112,470 |
| Related work experience - All sectors - 4 to 10 years (jobs) | | 28,943 | 31,235 | 38,775 | 45,439 | 59,247 | 74,201 |
| Related work experience - All sectors - Over 10 years (jobs) | | 8,247 | 8,779 | 10,674 | 12,195 | 15,628 | 19,324 |
| On-the-Job Training - All sectors - None (jobs) | | 6,826 | 7,266 | 8,899 | 10,377 | 13,507 | 16,802 |
| On-the-Job Training - All sectors - Up to 1 year (jobs) | | 82,386 | 88,641 | 109,452 | 126,651 | 163,829 | 203,265 |
| On-the-Job Training - All sectors - 1 to 4 years (jobs) | | 24,413 | 26,645 | 33,613 | 39,967 | 52,755 | 66,491 |
| On-the-Job Training - All sectors - 4 to 10 years (jobs) | | 6,659 | 7,514 | 9,920 | 12,448 | 16,987 | 21,916 |
| On-the-Job Training - All sectors - Over 10 years (jobs) | | 1,203 | 1,305 | 1,610 | 1,853 | 2,374 | 2,889 |
| On-Site or In-Plant Training - All sectors - None (jobs) | | 19,763 | 21,404 | 26,735 | 31,451 | 41,099 | 51,381 |
| On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) | | 74,368 | 79,990 | 98,777 | 114,417 | 148,196 | 184,034 |
| On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) | | 19,096 | 20,810 | 26,158 | 30,934 | 40,685 | 51,079 |
| On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) | | 7,378 | 8,165 | 10,499 | 12,866 | 17,275 | 22,058 |
| On-Site or In-Plant Training - All sectors - Over 10 years (jobs) | | 882 | 1,003 | 1,324 | 1,629 | 2,196 | 2,810 |
| Wage income - All (million \$2019) | | 6,740 | 7,235 | 8,886 | 10,324 | 13,436 | 16,896 |

Table 29: E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Overview

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|------|
| Final energy use - Transportation (PJ) | 431 | 405 | 359 | 302 | 250 | 219 | 207 |
| Final energy use - Residential (PJ) | 177 | 168 | 153 | 133 | 115 | 105 | 99.9 |
| Final energy use - Commercial (PJ) | 121 | 122 | 117 | 109 | 103 | 101 | 103 |
| Final energy use - Industry (PJ) | 310 | 318 | 324 | 323 | 325 | 323 | 330 |

Table 30: E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|------|
| Electricity distribution capital invested - Cumulative 5-yr (billion \$2018) | | 2.97 | 3.05 | 4.83 | 5.11 | 4.99 | 5.22 |

Table 31: E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Transportation

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|-------|-------|-------|-------|-------|-------|-------|
| Vehicle stocks - LDV - EV (1000 units) | 19.7 | 322 | 624 | 1,681 | 2,738 | 3,583 | 4,428 |
| Vehicle stocks - LDV - All others (1000 units) | 3,692 | 3,516 | 3,339 | 2,434 | 1,528 | 864 | 201 |
| Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018) | | 710 | 1,819 | 2,948 | 4,465 | 4,860 | 4,634 |
| Public EV charging plugs - DC Fast (1000 units) | 0.326 | | 1.4 | | 6.16 | | 9.97 |
| Public EV charging plugs - L2 (1000 units) | 0.301 | | 33.8 | | 148 | | 240 |

Table 32: E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Residential

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|-------|------|------|------|
| Sales of space heating units - Electric Heat Pump (%) | 8.53 | 25.2 | 76.9 | 88.5 | 89 | 88.9 | 88.8 |
| Sales of space heating units - Electric Resistance (%) | 24.8 | 26.1 | 10.9 | 7.55 | 7.39 | 7.53 | 7.57 |
| Sales of space heating units - Gas (%) | 60.7 | 39.8 | 8.68 | 1.75 | 1.46 | 1.44 | 1.43 |
| Sales of space heating units - Fossil (%) | 5.91 | 8.95 | 3.48 | 2.25 | 2.19 | 2.17 | 2.16 |
| Sales of water heating units - Electric Heat Pump (%) | 0 | 11.6 | 61.7 | 72.9 | 73.4 | 73.4 | 73.4 |
| Sales of water heating units - Electric Resistance (%) | 30.5 | 39.9 | 28.2 | 25.5 | 25.4 | 25.4 | 25.4 |
| Sales of water heating units - Gas Furnace (%) | 68.2 | 47.2 | 8.93 | 0.373 | 0 | 0 | 0 |
| Sales of water heating units - Other (%) | 1.38 | 1.21 | 1.22 | 1.2 | 1.19 | 1.2 | 1.2 |
| Sales of cooking units - Electric Resistance (%) | 40.4 | 53.1 | 92 | 99.6 | 100 | 100 | 100 |
| Sales of cooking units - Gas (%) | 59.6 | 46.9 | 8.02 | 0.404 | 0 | 0 | 0 |
| Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018) | | 3.2 | 3.89 | | | | |

Table 33: E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Commercial

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|--------|--------|-------|------|------|------|
| Sales of space heating units - Electric Heat Pump (%) | 1.94 | 26.9 | 77 | 91.1 | 92.3 | 92.3 | 92.3 |
| Sales of space heating units - Electric Resistance (%) | 2 | 4.42 | 4.72 | 6.04 | 6.33 | 6.36 | 6.38 |
| Sales of space heating units - Gas Furnace (%) | 96.1 | 68.7 | 18.2 | 2.83 | 1.38 | 1.34 | 1.33 |
| Sales of space heating units - Fossil (%) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales of water heating units - Electric Heat Pump (%) | 0.059 | 10.7 | 56.4 | 66.5 | 67 | 67 | 66.9 |
| Sales of water heating units - Electric Resistance (%) | 1.74 | 8.05 | 26.9 | 31.1 | 31.3 | 31.3 | 31.3 |
| Sales of water heating units - Gas Furnace (%) | 97.4 | 79.4 | 15 | 0.632 | 0 | 0 | 0 |
| Sales of water heating units - Other (%) | 0.794 | 1.77 | 1.77 | 1.77 | 1.78 | 1.78 | 1.79 |
| Sales of cooking units - Electric Resistance (%) | 30.1 | 44.4 | 79.2 | 86.1 | 86.5 | 86.5 | 86.5 |
| Sales of cooking units - Gas (%) | 69.9 | 55.6 | 20.8 | 13.9 | 13.5 | 13.5 | 13.5 |
| Commercial HVAC investment in 2020s - Cumulative 5-yr (million \$2018) | | 14,173 | 16,554 | | | | |

Table 34: *E+RE+ scenario - PILLAR 2: Clean Electricity - Generating capacity*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|--------|--------|--------|--------|--------|---------|---------|
| Installed thermal - Coal (MW) | 4,259 | 350 | 0 | 0 | 0 | 0 | 0 |
| Installed thermal - Natural gas (MW) | 13,108 | 9,237 | 9,237 | 9,237 | 6,642 | 11,235 | 17,738 |
| Installed thermal - Nuclear (MW) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Installed renewables - Rooftop PV (MW) | 130 | 228 | 333 | 490 | 714 | 1,005 | 1,384 |
| Installed renewables - Solar - Base land use assumptions (MW) | 222 | 222 | 222 | 568 | 4,930 | 16,219 | 24,779 |
| Installed renewables - Wind - Base land use assumptions (MW) | 11,527 | 14,207 | 21,569 | 46,636 | 71,921 | 101,639 | 133,466 |
| Installed renewables - Solar - Constrained land use assumptions (MW) | 222 | 3,030 | 11,278 | 16,865 | 29,180 | 53,652 | 67,537 |
| Installed renewables - Wind - Constrained land use assumptions (MW) | 12,751 | 15,506 | 22,260 | 42,264 | 62,169 | 86,004 | 100,966 |
| Installed renewables - Offshore Wind - Constrained land use assumptions (MW) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capital invested - Solar PV - Base (billion \$2018) | | 0 | 0 | 0.381 | 4.53 | 11.1 | 7.93 |
| Capital invested - Wind - Base (billion \$2018) | | 3.94 | 9.8 | 31.2 | 29.9 | 33.3 | 33.7 |

Table 35: *E+RE+ scenario - PILLAR 2: Clean Electricity - Generation*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|--------|---------|---------|---------|---------|---------|---------|
| Solar - Base land use assumptions (GWh) | 551 | 551 | 551 | 1,289 | 10,675 | 34,995 | 53,523 |
| Wind - Base land use assumptions (GWh) | 48,113 | 58,260 | 85,647 | 176,825 | 266,347 | 369,711 | 477,993 |
| OffshoreWind - Base land use assumptions (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Solar - Constrained land use assumptions (GWh) | 1,102 | 13,197 | 49,056 | 73,202 | 125,988 | 229,674 | 288,320 |
| Wind - Constrained land use assumptions (GWh) | 96,225 | 116,526 | 165,926 | 308,604 | 444,515 | 600,153 | 693,679 |
| OffshoreWind - Constrained land use assumptions (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 36: *E+RE+ scenario - PILLAR 6: Land sinks - Forests*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|---------|
| Carbon sink potential - Low - Accelerate regeneration (1000 tCO ₂ e/y) | | | | | | | -477 |
| Carbon sink potential - Low - Avoid deforestation (1000 tCO ₂ e/y) | | | | | | | -281 |
| Carbon sink potential - Low - Extend rotation length (1000 tCO ₂ e/y) | | | | | | | -1,783 |
| Carbon sink potential - Low - Improve plantations (1000 tCO ₂ e/y) | | | | | | | -329 |
| Carbon sink potential - Low - Increase retention of HWP (1000 tCO ₂ e/y) | | | | | | | -591 |
| Carbon sink potential - Low - Increase trees outside forests (1000 tCO ₂ e/y) | | | | | | | -482 |
| Carbon sink potential - Low - Reforest cropland (1000 tCO ₂ e/y) | | | | | | | -4,866 |
| Carbon sink potential - Low - Reforest pasture (1000 tCO ₂ e/y) | | | | | | | -1,451 |
| Carbon sink potential - Low - Restore productivity (1000 tCO ₂ e/y) | | | | | | | -1,120 |
| Carbon sink potential - Low - All (not counting overlap) (1000 tCO ₂ e/y) | | | | | | | -11,380 |

Table 36: E+RE+ scenario - PILLAR 6: Land sinks - Forests (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|---------|
| Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -715 |
| Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y) | | | | | | | -984 |
| Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y) | | | | | | | -3,213 |
| Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y) | | | | | | | -482 |
| Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -1,182 |
| Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -930 |
| Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y) | | | | | | | -7,299 |
| Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y) | | | | | | | -10,302 |
| Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y) | | | | | | | -2,221 |
| Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -27,327 |
| Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -952 |
| Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y) | | | | | | | -1,687 |
| Carbon sink potential - High - Extend rotation length (1000 tCO2e/y) | | | | | | | -4,643 |
| Carbon sink potential - High - Improve plantations (1000 tCO2e/y) | | | | | | | -646 |
| Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -1,773 |
| Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -1,378 |
| Carbon sink potential - High - Reforest cropland (1000 tCO2e/y) | | | | | | | -9,732 |
| Carbon sink potential - High - Reforest pasture (1000 tCO2e/y) | | | | | | | -19,153 |
| Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -43,286 |
| Carbon sink potential - High - Restore productivity (1000 tCO2e/y) | | | | | | | -3,321 |
| Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) | | | | | | | 779 |
| Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 214 |
| Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) | | | | | | | 907 |
| Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) | | | | | | | 119 |
| Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) | | | | | | | 68.9 |
| Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) | | | | | | | 322 |

Table 36: E+RE+ scenario - PILLAR 6: Land sinks - Forests (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|-------|
| Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares) | | | | | | | 94.3 |
| Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) | | | | | | | 666 |
| Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares) | | | | | | | 2,470 |
| Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) | | | | | | | 117 |
| Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 221 |
| Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares) | | | | | | | 1,637 |
| Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares) | | | | | | | 179 |
| Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares) | | | | | | | 99.9 |
| Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) | | | | | | | 483 |
| Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares) | | | | | | | 682 |
| Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) | | | | | | | 1,342 |
| Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares) | | | | | | | 4,761 |
| Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares) | | | | | | | 156 |
| Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 228 |
| Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares) | | | | | | | 2,368 |
| Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) | | | | | | | 238 |
| Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares) | | | | | | | 131 |
| Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) | | | | | | | 643 |
| Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) | | | | | | | 544 |
| Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) | | | | | | | 1,101 |

Table 36: *E+RE+ scenario - PILLAR 6: Land sinks - Forests (continued)*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|-------|
| Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) | | | | | | | 5,409 |

Table 37: *E+RE+ scenario - PILLAR 6: Land sinks - Agriculture*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|--------|
| Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) | | | | | | | -18.2 |
| Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -2,381 |
| Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -131 |
| Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y) | | | | | | | -2,530 |
| Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) | | | | | | | -18.2 |
| Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -4,525 |
| Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -262 |
| Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y) | | | | | | | -4,806 |
| Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 11.7 |
| Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares) | | | | | | | 2,254 |
| Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares) | | | | | | | 225 |
| Land impacted for carbon sink - Moderate deployment - Total (1000 hectares) | | | | | | | 2,491 |
| Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 11.7 |
| Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) | | | | | | | 4,283 |
| Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) | | | | | | | 450 |
| Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) | | | | | | | 4,745 |

Table 38: *E+RE- scenario - IMPACTS - Health*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|-------|-------|-------|-------|------|
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Coal (deaths) | | 30 | 0.027 | 0.026 | 0.021 | 0.013 | 0 |

Table 38: E+RE- scenario - IMPACTS - Health (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|-------|-------|-------|-------|-------|-------|
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths) | | 28.4 | 12.9 | 12.8 | 8.91 | 3.66 | 1.62 |
| Premature deaths from air pollution - Mobile - On-Road (deaths) | | 75.8 | 71.3 | 54.5 | 31.6 | 14.5 | 5.72 |
| Premature deaths from air pollution - Gas Stations (deaths) | | 9.32 | 8.65 | 6.61 | 3.98 | 2.01 | 1.02 |
| Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths) | | 10 | 8.11 | 5.33 | 2.87 | 1.32 | 0.555 |
| Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths) | | 0.142 | 0.118 | 0.084 | 0.051 | 0.025 | 0.011 |
| Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths) | | 1.65 | 1.48 | 1.14 | 0.747 | 0.401 | 0.198 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths) | | 0.888 | 0.854 | 0.816 | 0.774 | 0.731 | 0.685 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths) | | 7.19 | 6.21 | 4.35 | 2.56 | 1.43 | 0.835 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths) | | 1.49 | 1.21 | 0.961 | 0.727 | 0.521 | 0.339 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths) | | 0.692 | 0.587 | 0.485 | 0.383 | 0.284 | 0.189 |
| Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths) | | 0.902 | 0.197 | 0.188 | 0.174 | 0.169 | 0.104 |
| Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths) | | 175 | 170 | 167 | 141 | 118 | 87.7 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019) | | 266 | 0.238 | 0.229 | 0.184 | 0.119 | 0.002 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019) | | 251 | 114 | 114 | 78.9 | 32.4 | 14.4 |
| Monetary damages from air pollution - Mobile - On-Road (million \$2019) | | 674 | 634 | 485 | 281 | 129 | 50.9 |
| Monetary damages from air pollution - Gas Stations (million \$2019) | | 82.5 | 76.6 | 58.5 | 35.3 | 17.8 | 9.02 |
| Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019) | | 88.7 | 71.8 | 47.2 | 25.4 | 11.7 | 4.92 |
| Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019) | | 1.26 | 1.05 | 0.741 | 0.453 | 0.222 | 0.096 |
| Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019) | | 14.6 | 13.2 | 10.1 | 6.62 | 3.55 | 1.76 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019) | | 7.87 | 7.56 | 7.22 | 6.86 | 6.47 | 6.07 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019) | | 63.6 | 54.9 | 38.5 | 22.7 | 12.7 | 7.39 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019) | | 13.2 | 10.7 | 8.51 | 6.44 | 4.61 | 3 |

Table 38: E+RE- scenario - IMPACTS - Health (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|-------|-------|-------|-------|-------|-------|
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019) | | 6.13 | 5.2 | 4.29 | 3.39 | 2.51 | 1.67 |
| Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019) | | 7.96 | 1.74 | 1.66 | 1.54 | 1.49 | 0.922 |
| Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019) | | 1,552 | 1,511 | 1,486 | 1,254 | 1,048 | 779 |

Table 39: E+RE- scenario - IMPACTS - Jobs

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|--------|--------|--------|--------|--------|--------|
| By economic sector - Agriculture (jobs) | | 31.3 | 44.9 | 930 | 794 | 721 | 565 |
| By economic sector - Construction (jobs) | | 17,067 | 20,907 | 22,371 | 22,854 | 24,660 | 24,171 |
| By economic sector - Manufacturing (jobs) | | 22,821 | 21,403 | 20,737 | 18,997 | 16,272 | 12,680 |
| By economic sector - Mining (jobs) | | 35,457 | 28,650 | 23,381 | 16,245 | 11,439 | 7,284 |
| By economic sector - Other (jobs) | | 957 | 1,150 | 1,448 | 1,885 | 2,464 | 2,679 |
| By economic sector - Pipeline (jobs) | | 1,836 | 2,523 | 2,166 | 1,505 | 1,357 | 1,175 |
| By economic sector - Professional (jobs) | | 14,922 | 15,609 | 17,819 | 18,698 | 19,616 | 18,925 |
| By economic sector - Trade (jobs) | | 13,124 | 12,834 | 13,141 | 12,669 | 12,689 | 11,894 |
| By economic sector - Utilities (jobs) | | 13,127 | 16,376 | 18,121 | 18,782 | 20,096 | 20,355 |
| By resource sector - Biomass (jobs) | | 110 | 115 | 3,188 | 2,969 | 2,824 | 2,347 |
| By resource sector - CO2 (jobs) | | 54.2 | 6,891 | 4,827 | 1,480 | 2,487 | 3,271 |
| By resource sector - Coal (jobs) | | 677 | 47.7 | 0.972 | 0.744 | 0.608 | 0.145 |
| By resource sector - Grid (jobs) | | 13,217 | 15,222 | 21,563 | 26,037 | 29,287 | 30,503 |
| By resource sector - Natural Gas (jobs) | | 35,488 | 29,806 | 26,500 | 23,311 | 18,595 | 14,155 |
| By resource sector - Nuclear (jobs) | | 0 | 0.006 | 0.015 | 0 | 0 | 0 |
| By resource sector - Oil (jobs) | | 52,245 | 47,100 | 42,254 | 30,569 | 23,273 | 15,837 |
| By resource sector - Solar (jobs) | | 2,524 | 2,383 | 2,402 | 3,219 | 5,123 | 5,265 |
| By resource sector - Wind (jobs) | | 15,026 | 17,932 | 19,379 | 24,844 | 27,725 | 28,348 |
| By education level - All sectors - High school diploma or less (jobs) | | 46,506 | 47,164 | 47,884 | 44,925 | 43,810 | 39,975 |
| By education level - All sectors - Associates degree or some college (jobs) | | 34,714 | 35,486 | 35,771 | 34,057 | 33,639 | 31,159 |
| By education level - All sectors - Bachelors degree (jobs) | | 29,815 | 28,813 | 28,414 | 25,974 | 24,658 | 22,052 |
| By education level - All sectors - Masters or professional degree (jobs) | | 7,242 | 7,001 | 6,988 | 6,471 | 6,226 | 5,643 |
| By education level - All sectors - Doctoral degree (jobs) | | 1,065 | 1,032 | 1,057 | 1,002 | 981 | 898 |
| Related work experience - All sectors - None (jobs) | | 16,278 | 16,509 | 16,728 | 15,748 | 15,426 | 14,167 |
| Related work experience - All sectors - Up to 1 year (jobs) | | 21,751 | 21,842 | 22,254 | 21,066 | 20,649 | 18,921 |
| Related work experience - All sectors - 1 to 4 years (jobs) | | 44,738 | 44,598 | 44,697 | 41,603 | 40,258 | 36,583 |
| Related work experience - All sectors - 4 to 10 years (jobs) | | 28,471 | 28,575 | 28,560 | 26,727 | 26,006 | 23,772 |
| Related work experience - All sectors - Over 10 years (jobs) | | 8,104 | 7,973 | 7,874 | 7,284 | 6,974 | 6,283 |
| On-the-Job Training - All sectors - None (jobs) | | 6,707 | 6,571 | 6,537 | 6,073 | 5,880 | 5,342 |
| On-the-Job Training - All sectors - Up to 1 year (jobs) | | 80,873 | 80,196 | 80,648 | 75,144 | 72,549 | 65,722 |
| On-the-Job Training - All sectors - 1 to 4 years (jobs) | | 24,012 | 24,501 | 24,558 | 23,156 | 22,756 | 20,995 |
| On-the-Job Training - All sectors - 4 to 10 years (jobs) | | 6,580 | 7,065 | 7,230 | 6,998 | 7,112 | 6,753 |

Table 39: E+RE- scenario - IMPACTS - Jobs (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|--------|--------|--------|--------|--------|--------|
| On-the-Job Training - All sectors - Over 10 years (jobs) | | 1,169 | 1,165 | 1,141 | 1,057 | 1,017 | 915 |
| On-Site or In-Plant Training - All sectors - None (jobs) | | 19,356 | 19,250 | 19,328 | 18,137 | 17,659 | 16,128 |
| On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) | | 73,044 | 72,534 | 72,874 | 67,906 | 65,616 | 59,502 |
| On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) | | 18,776 | 19,098 | 19,157 | 18,019 | 17,654 | 16,233 |
| On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) | | 7,301 | 7,694 | 7,807 | 7,448 | 7,460 | 6,994 |
| On-Site or In-Plant Training - All sectors - Over 10 years (jobs) | | 865 | 921 | 948 | 920 | 925 | 870 |
| Wage income - All (million \$2019) | | 6,659 | 6,683 | 6,752 | 6,317 | 6,149 | 5,631 |

Table 40: E+RE- scenario - PILLAR 1: Efficiency/Electrification - Overview

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|------|
| Final energy use - Transportation (PJ) | 431 | 405 | 359 | 302 | 250 | 219 | 207 |
| Final energy use - Residential (PJ) | 177 | 168 | 153 | 133 | 115 | 105 | 99.9 |
| Final energy use - Commercial (PJ) | 121 | 122 | 117 | 109 | 103 | 101 | 103 |
| Final energy use - Industry (PJ) | 310 | 318 | 324 | 323 | 325 | 323 | 330 |

Table 41: E+RE- scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|------|
| Electricity distribution capital invested - Cumulative 5-yr (billion \$2018) | | 2.97 | 3.05 | 4.83 | 5.11 | 4.99 | 5.22 |

Table 42: E+RE- scenario - PILLAR 1: Efficiency/Electrification - Transportation

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|-------|-------|-------|-------|-------|-------|-------|
| Vehicle stocks - LDV – EV (1000 units) | 19.7 | 322 | 624 | 1,681 | 2,738 | 3,583 | 4,428 |
| Vehicle stocks - LDV – All others (1000 units) | 3,692 | 3,516 | 3,339 | 2,434 | 1,528 | 864 | 201 |
| Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018) | | 710 | 1,819 | 2,948 | 4,465 | 4,860 | 4,634 |
| Public EV charging plugs - DC Fast (1000 units) | 0.326 | | 1.4 | | 6.16 | | 9.97 |
| Public EV charging plugs - L2 (1000 units) | 0.301 | | 33.8 | | 148 | | 240 |

Table 43: E+RE- scenario - PILLAR 1: Efficiency/Electrification - Residential

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|-------|------|------|------|
| Sales of space heating units - Electric Heat Pump (%) | 8.53 | 25.2 | 76.9 | 88.5 | 89 | 88.9 | 88.8 |
| Sales of space heating units - Electric Resistance (%) | 24.8 | 26.1 | 10.9 | 7.55 | 7.39 | 7.53 | 7.57 |
| Sales of space heating units - Gas (%) | 60.7 | 39.8 | 8.68 | 1.75 | 1.46 | 1.44 | 1.43 |
| Sales of space heating units - Fossil (%) | 5.91 | 8.95 | 3.48 | 2.25 | 2.19 | 2.17 | 2.16 |
| Sales of water heating units - Electric Heat Pump (%) | 0 | 11.6 | 61.7 | 72.9 | 73.4 | 73.4 | 73.4 |
| Sales of water heating units - Electric Resistance (%) | 30.5 | 39.9 | 28.2 | 25.5 | 25.4 | 25.4 | 25.4 |
| Sales of water heating units - Gas Furnace (%) | 68.2 | 47.2 | 8.93 | 0.373 | 0 | 0 | 0 |
| Sales of water heating units - Other (%) | 1.38 | 1.21 | 1.22 | 1.2 | 1.19 | 1.2 | 1.2 |
| Sales of cooking units - Electric Resistance (%) | 40.4 | 53.1 | 92 | 99.6 | 100 | 100 | 100 |
| Sales of cooking units - Gas (%) | 59.6 | 46.9 | 8.02 | 0.404 | 0 | 0 | 0 |

Table 43: E+RE- scenario - PILLAR 1: Efficiency/Electrification - Residential (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|------|
| Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018) | | 3.2 | 3.89 | | | | |

Table 44: E+RE- scenario - PILLAR 1: Efficiency/Electrification - Commercial

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|--------|--------|-------|------|------|------|
| Sales of space heating units - Electric Heat Pump (%) | 1.94 | 26.9 | 77 | 91.1 | 92.3 | 92.3 | 92.3 |
| Sales of space heating units - Electric Resistance (%) | 2 | 4.42 | 4.72 | 6.04 | 6.33 | 6.36 | 6.38 |
| Sales of space heating units - Gas Furnace (%) | 96.1 | 68.7 | 18.2 | 2.83 | 1.38 | 1.34 | 1.33 |
| Sales of space heating units - Fossil (%) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales of water heating units - Electric Heat Pump (%) | 0.059 | 10.7 | 56.4 | 66.5 | 67 | 67 | 66.9 |
| Sales of water heating units - Electric Resistance (%) | 1.74 | 8.05 | 26.9 | 31.1 | 31.3 | 31.3 | 31.3 |
| Sales of water heating units - Gas Furnace (%) | 97.4 | 79.4 | 15 | 0.632 | 0 | 0 | 0 |
| Sales of water heating units - Other (%) | 0.794 | 1.77 | 1.77 | 1.77 | 1.78 | 1.78 | 1.79 |
| Sales of cooking units - Electric Resistance (%) | 30.1 | 44.4 | 79.2 | 86.1 | 86.5 | 86.5 | 86.5 |
| Sales of cooking units - Gas (%) | 69.9 | 55.6 | 20.8 | 13.9 | 13.5 | 13.5 | 13.5 |
| Commercial HVAC investment in 2020s - Cumulative 5-yr (million \$2018) | | 14,173 | 16,554 | | | | |

Table 45: E+RE- scenario - PILLAR 2: Clean Electricity - Generating capacity

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|--------|--------|--------|--------|--------|--------|--------|
| Installed thermal - Coal (MW) | 4,259 | 350 | 0 | 0 | 0 | 0 | 0 |
| Installed thermal - Natural gas (MW) | 13,108 | 9,237 | 12,322 | 12,322 | 10,631 | 8,242 | 9,997 |
| Installed thermal - Nuclear (MW) | 0 | 0 | 0.002 | 0.008 | 0 | 0 | 0 |
| Installed renewables - Rooftop PV (MW) | 130 | 228 | 333 | 490 | 714 | 1,005 | 1,384 |
| Installed renewables - Solar - Base land use assumptions (MW) | 222 | 222 | 222 | 222 | 856 | 3,556 | 5,128 |
| Installed renewables - Wind - Base land use assumptions (MW) | 11,727 | 11,763 | 11,763 | 18,176 | 27,190 | 31,711 | 31,711 |
| Installed renewables - Solar - Constrained land use assumptions (MW) | 222 | 3,925 | 9,886 | 14,271 | 19,665 | 27,598 | 33,906 |
| Installed renewables - Wind - Constrained land use assumptions (MW) | 11,527 | 11,527 | 11,868 | 17,664 | 24,882 | 28,195 | 28,278 |
| Installed renewables - Offshore Wind - Constrained land use assumptions (MW) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capital invested - Solar PV - Base (billion \$2018) | | 0 | 0 | 0 | 0.659 | 2.65 | 1.08 |
| Capital invested - Wind - Base (billion \$2018) | | 0 | 0 | 7.96 | 10.5 | 4.98 | 0 |
| Capital invested - Solar PV - Constrained (billion \$2018) | | 4.95 | 7.13 | 4.83 | 5.6 | 7.78 | 5.84 |
| Capital invested - Wind - Constrained (billion \$2018) | | 0 | 0.453 | 7.19 | 8.53 | 3.71 | 0.089 |

Table 46: E+RE- scenario - PILLAR 2: Clean Electricity - Generation

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|--------|--------|--------|--------|---------|---------|---------|
| Solar - Base land use assumptions (GWh) | 551 | 551 | 551 | 551 | 1,884 | 7,748 | 10,295 |
| Wind - Base land use assumptions (GWh) | 48,113 | 48,113 | 48,113 | 72,219 | 105,046 | 121,255 | 121,255 |
| Offshore Wind - Base land use assumptions (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 46: E+RE- scenario - PILLAR 2: Clean Electricity - Generation (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|--------|--------|--------|--------|--------|---------|---------|
| Solar - Constrained land use assumptions (GWh) | 551 | 8,560 | 21,637 | 31,206 | 42,932 | 59,833 | 73,465 |
| Wind - Constrained land use assumptions (GWh) | 48,113 | 48,113 | 49,220 | 70,691 | 96,785 | 108,692 | 108,979 |
| OffshoreWind - Constrained land use assumptions (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 47: E+RE- scenario - PILLAR 6: Land sinks - Forests

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|---------|
| Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -477 |
| Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y) | | | | | | | -281 |
| Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y) | | | | | | | -1,783 |
| Carbon sink potential - Low - Improve plantations (1000 tCO2e/y) | | | | | | | -329 |
| Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -591 |
| Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -482 |
| Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y) | | | | | | | -4,866 |
| Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y) | | | | | | | -1,451 |
| Carbon sink potential - Low - Restore productivity (1000 tCO2e/y) | | | | | | | -1,120 |
| Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -11,380 |
| Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -715 |
| Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y) | | | | | | | -984 |
| Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y) | | | | | | | -3,213 |
| Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y) | | | | | | | -482 |
| Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -1,182 |
| Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -930 |
| Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y) | | | | | | | -7,299 |
| Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y) | | | | | | | -10,302 |
| Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y) | | | | | | | -2,221 |
| Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -27,327 |
| Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -952 |
| Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y) | | | | | | | -1,687 |
| Carbon sink potential - High - Extend rotation length (1000 tCO2e/y) | | | | | | | -4,643 |
| Carbon sink potential - High - Improve plantations (1000 tCO2e/y) | | | | | | | -646 |
| Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -1,773 |

Table 47: E+RE- scenario - PILLAR 6: Land sinks - Forests (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|---------|
| Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -1,378 |
| Carbon sink potential - High - Reforest cropland (1000 tCO2e/y) | | | | | | | -9,732 |
| Carbon sink potential - High - Reforest pasture (1000 tCO2e/y) | | | | | | | -19,153 |
| Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -43,286 |
| Carbon sink potential - High - Restore productivity (1000 tCO2e/y) | | | | | | | -3,321 |
| Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) | | | | | | | 77.9 |
| Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 214 |
| Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) | | | | | | | 907 |
| Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) | | | | | | | 119 |
| Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) | | | | | | | 68.9 |
| Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) | | | | | | | 322 |
| Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares) | | | | | | | 94.3 |
| Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) | | | | | | | 666 |
| Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares) | | | | | | | 2,470 |
| Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) | | | | | | | 117 |
| Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 221 |
| Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares) | | | | | | | 1,637 |
| Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares) | | | | | | | 179 |
| Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares) | | | | | | | 99.9 |
| Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) | | | | | | | 483 |
| Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares) | | | | | | | 682 |

Table 47: *E+RE- scenario - PILLAR 6: Land sinks - Forests (continued)*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|-------|
| Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) | | | | | | | 1,342 |
| Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares) | | | | | | | 4,761 |
| Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares) | | | | | | | 156 |
| Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 228 |
| Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares) | | | | | | | 2,368 |
| Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) | | | | | | | 238 |
| Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares) | | | | | | | 131 |
| Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) | | | | | | | 643 |
| Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) | | | | | | | 544 |
| Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) | | | | | | | 1,101 |
| Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) | | | | | | | 5,409 |

Table 48: *E+RE- scenario - PILLAR 6: Land sinks - Agriculture*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|--------|
| Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO ₂ e/y) | | | | | | | -18.2 |
| Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO ₂ e/y) | | | | | | | -2,381 |
| Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO ₂ e/y) | | | | | | | -131 |
| Carbon sink potential - Moderate deployment - Total (1000 tCO ₂ e/y) | | | | | | | -2,530 |
| Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO ₂ e/y) | | | | | | | -18.2 |
| Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO ₂ e/y) | | | | | | | -4,525 |
| Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO ₂ e/y) | | | | | | | -262 |
| Carbon sink potential - Aggressive deployment - Total (1000 tCO ₂ e/y) | | | | | | | -4,806 |

Table 48: E+RE- scenario - PILLAR 6: Land sinks - Agriculture (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|-------|
| Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 11.7 |
| Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares) | | | | | | | 2,254 |
| Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares) | | | | | | | 225 |
| Land impacted for carbon sink - Moderate deployment - Total (1000 hectares) | | | | | | | 2,491 |
| Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 11.7 |
| Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) | | | | | | | 4,283 |
| Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) | | | | | | | 450 |
| Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) | | | | | | | 4,745 |

Table 49: E-B+ scenario - IMPACTS - Health

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|-------|-------|-------|-------|-------|-------|
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Coal (deaths) | | 30 | 0.027 | 0.026 | 0.021 | 0.013 | 0 |
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths) | | 25.8 | 11.1 | 7.52 | 4.76 | 2.02 | 1.12 |
| Premature deaths from air pollution - Mobile - On-Road (deaths) | | 77 | 78.2 | 76.7 | 69.6 | 55.8 | 38.5 |
| Premature deaths from air pollution - Gas Stations (deaths) | | 9.5 | 9.63 | 9.36 | 8.46 | 6.8 | 4.78 |
| Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths) | | 10.1 | 9.32 | 8.32 | 6.83 | 5.01 | 3.24 |
| Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths) | | 0.145 | 0.14 | 0.134 | 0.121 | 0.099 | 0.076 |
| Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths) | | 1.67 | 1.7 | 1.71 | 1.57 | 1.24 | 0.883 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths) | | 0.888 | 0.854 | 0.816 | 0.774 | 0.731 | 0.685 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths) | | 7.26 | 7.24 | 6.95 | 6.1 | 4.8 | 3.44 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths) | | 1.49 | 1.31 | 1.14 | 0.985 | 0.835 | 0.696 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths) | | 0.692 | 0.63 | 0.568 | 0.506 | 0.445 | 0.385 |
| Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths) | | 1.03 | 0.2 | 0.196 | 0.189 | 0.183 | 0.172 |

Table 49: E-B+ scenario - IMPACTS - Health (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|-------|-------|-------|-------|-------|-------|
| Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths) | | 172 | 158 | 140 | 124 | 111 | 77.7 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019) | | 266 | 0.238 | 0.229 | 0.184 | 0.119 | 0.002 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019) | | 229 | 98.6 | 66.6 | 42.2 | 17.9 | 9.91 |
| Monetary damages from air pollution - Mobile - On-Road (million \$2019) | | 685 | 696 | 682 | 619 | 496 | 343 |
| Monetary damages from air pollution - Gas Stations (million \$2019) | | 84.1 | 85.3 | 82.9 | 74.9 | 60.3 | 42.4 |
| Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019) | | 89.6 | 82.6 | 73.7 | 60.5 | 44.4 | 28.7 |
| Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019) | | 1.29 | 1.24 | 1.18 | 1.07 | 0.875 | 0.672 |
| Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019) | | 14.8 | 15.1 | 15.1 | 13.9 | 11 | 7.83 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019) | | 7.87 | 7.56 | 7.22 | 6.86 | 6.47 | 6.07 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019) | | 64.3 | 64.1 | 61.5 | 54 | 42.5 | 30.4 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019) | | 13.2 | 11.6 | 10.1 | 8.72 | 7.39 | 6.17 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019) | | 6.13 | 5.57 | 5.03 | 4.48 | 3.94 | 3.41 |
| Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019) | | 9.12 | 1.76 | 1.73 | 1.67 | 1.61 | 1.52 |
| Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019) | | 1,531 | 1,406 | 1,242 | 1,103 | 987 | 690 |

Table 50: E-B+ scenario - IMPACTS - Jobs

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|--------|--------|--------|--------|--------|--------|
| By economic sector - Agriculture (jobs) | | 30.6 | 319 | 3,094 | 3,670 | 4,490 | 4,141 |
| By economic sector - Construction (jobs) | | 17,632 | 25,025 | 29,604 | 30,949 | 38,286 | 43,503 |
| By economic sector - Manufacturing (jobs) | | 24,492 | 26,457 | 26,699 | 24,161 | 25,977 | 26,873 |
| By economic sector - Mining (jobs) | | 34,888 | 27,090 | 20,735 | 15,889 | 12,105 | 6,871 |
| By economic sector - Other (jobs) | | 1,022 | 1,587 | 2,253 | 2,795 | 4,051 | 4,975 |
| By economic sector - Pipeline (jobs) | | 1,784 | 2,301 | 1,831 | 1,281 | 1,198 | 964 |
| By economic sector - Professional (jobs) | | 15,379 | 19,064 | 25,831 | 29,830 | 37,053 | 41,343 |
| By economic sector - Trade (jobs) | | 13,281 | 14,214 | 16,092 | 17,412 | 20,432 | 22,059 |
| By economic sector - Utilities (jobs) | | 13,019 | 18,254 | 22,096 | 23,069 | 29,463 | 35,280 |
| By resource sector - Biomass (jobs) | | 121 | 860 | 10,472 | 15,402 | 20,778 | 19,534 |
| By resource sector - CO2 (jobs) | | 53.8 | 6,234 | 4,366 | 1,389 | 2,303 | 2,925 |
| By resource sector - Coal (jobs) | | 679 | 47.7 | 1.05 | 0.864 | 0.705 | 0.568 |
| By resource sector - Grid (jobs) | | 13,180 | 20,459 | 31,087 | 36,410 | 49,444 | 61,255 |
| By resource sector - Natural Gas (jobs) | | 33,997 | 24,860 | 17,724 | 13,484 | 9,641 | 6,560 |
| By resource sector - Nuclear (jobs) | | 0 | 0.003 | 0.006 | 0 | 0 | 0 |
| By resource sector - Oil (jobs) | | 52,296 | 47,370 | 42,989 | 38,322 | 33,521 | 20,506 |

Table 50: E-B+ scenario - IMPACTS - Jobs (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|--------|--------|--------|---------|---------|---------|
| By resource sector - Solar (jobs) | | 3,066 | 3,736 | 3,798 | 4,422 | 7,801 | 8,979 |
| By resource sector - Wind (jobs) | | 18,133 | 30,744 | 37,797 | 39,625 | 49,567 | 66,250 |
| By education level - All sectors - High school diploma or less (jobs) | | 47,459 | 53,378 | 59,922 | 60,171 | 70,098 | 75,141 |
| By education level - All sectors - Associates degree or some college (jobs) | | 35,421 | 40,166 | 44,114 | 44,300 | 52,019 | 57,180 |
| By education level - All sectors - Bachelors degree (jobs) | | 30,238 | 31,848 | 34,288 | 34,387 | 39,144 | 41,148 |
| By education level - All sectors - Masters or professional degree (jobs) | | 7,330 | 7,757 | 8,562 | 8,760 | 10,108 | 10,743 |
| By education level - All sectors - Doctoral degree (jobs) | | 1,080 | 1,162 | 1,349 | 1,437 | 1,686 | 1,797 |
| Related work experience - All sectors - None (jobs) | | 16,568 | 18,560 | 20,744 | 20,945 | 24,483 | 26,411 |
| Related work experience - All sectors - Up to 1 year (jobs) | | 22,276 | 25,072 | 28,571 | 29,067 | 34,203 | 36,970 |
| Related work experience - All sectors - 1 to 4 years (jobs) | | 45,475 | 49,805 | 54,614 | 54,755 | 63,181 | 67,498 |
| Related work experience - All sectors - 4 to 10 years (jobs) | | 28,958 | 31,974 | 34,811 | 34,892 | 40,427 | 43,615 |
| Related work experience - All sectors - Over 10 years (jobs) | | 8,250 | 8,900 | 9,495 | 9,397 | 10,762 | 11,516 |
| On-the-Job Training - All sectors - None (jobs) | | 6,827 | 7,378 | 8,104 | 8,201 | 9,516 | 10,163 |
| On-the-Job Training - All sectors - Up to 1 year (jobs) | | 82,398 | 90,186 | 99,955 | 100,626 | 116,430 | 124,210 |
| On-the-Job Training - All sectors - 1 to 4 years (jobs) | | 24,431 | 27,487 | 29,904 | 29,828 | 34,761 | 37,933 |
| On-the-Job Training - All sectors - 4 to 10 years (jobs) | | 6,671 | 7,934 | 8,868 | 9,027 | 10,775 | 12,010 |
| On-the-Job Training - All sectors - Over 10 years (jobs) | | 1,200 | 1,326 | 1,404 | 1,372 | 1,573 | 1,692 |
| On-Site or In-Plant Training - All sectors - None (jobs) | | 19,754 | 21,805 | 24,217 | 24,424 | 28,421 | 30,668 |
| On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) | | 74,390 | 81,469 | 90,034 | 90,556 | 104,805 | 111,913 |
| On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) | | 19,108 | 21,427 | 23,355 | 23,304 | 27,108 | 29,438 |
| On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) | | 7,392 | 8,565 | 9,456 | 9,574 | 11,293 | 12,401 |
| On-Site or In-Plant Training - All sectors - Over 10 years (jobs) | | 882 | 1,045 | 1,173 | 1,197 | 1,428 | 1,588 |
| Wage income - All (million \$2019) | | 6,750 | 7,390 | 8,138 | 8,240 | 9,574 | 10,288 |

Table 51: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Overview

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|------|
| Final energy use - Transportation (PJ) | 431 | 408 | 374 | 347 | 327 | 302 | 274 |
| Final energy use - Residential (PJ) | 177 | 169 | 164 | 158 | 146 | 131 | 118 |
| Final energy use - Commercial (PJ) | 121 | 122 | 121 | 120 | 117 | 113 | 111 |
| Final energy use - Industry (PJ) | 310 | 319 | 325 | 326 | 330 | 327 | 334 |

Table 52: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|------|
| Electricity distribution capital invested - Cumulative 5-yr (billion \$2018) | | 2.54 | 2.56 | 3.09 | 3.17 | 4.7 | 4.96 |

Table 53: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Transportation

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|-------|-------|-------|-------|-------|-------|-------|
| Vehicle stocks - LDV – EV (1000 units) | 15.2 | 104 | 193 | 604 | 1,015 | 1,926 | 2,836 |
| Vehicle stocks - LDV – All others (1000 units) | 3,707 | 3,707 | 3,707 | 3,517 | 3,326 | 2,563 | 1,800 |
| Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018) | | 0 | 115 | 241 | 815 | 2,564 | 3,735 |
| Public EV charging plugs - DC Fast (1000 units) | 0.326 | | 0.434 | | 2.29 | | 6.38 |
| Public EV charging plugs - L2 (1000 units) | 0.301 | | 10.4 | | 55 | | 154 |

Table 54: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Residential

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|------|
| Sales of space heating units - Electric Heat Pump (%) | 8.53 | 15.3 | 21.1 | 38.1 | 64.1 | 81 | 86.8 |
| Sales of space heating units - Electric Resistance (%) | 24.8 | 29 | 27.1 | 22.1 | 14.5 | 9.75 | 8.07 |
| Sales of space heating units - Gas (%) | 60.7 | 45.8 | 42.3 | 32.2 | 16.6 | 6.26 | 2.7 |
| Sales of space heating units - Fossil (%) | 5.91 | 10 | 9.47 | 7.6 | 4.79 | 3.01 | 2.4 |
| Sales of water heating units - Electric Heat Pump (%) | 0 | 2 | 7.69 | 24.1 | 49.2 | 65.6 | 71.4 |
| Sales of water heating units - Electric Resistance (%) | 30.5 | 42.2 | 40.8 | 37 | 31.1 | 27.3 | 25.9 |
| Sales of water heating units - Gas Furnace (%) | 68.2 | 54.6 | 50.3 | 37.7 | 18.4 | 5.87 | 1.53 |
| Sales of water heating units - Other (%) | 1.38 | 1.21 | 1.22 | 1.21 | 1.21 | 1.21 | 1.2 |
| Sales of cooking units - Electric Resistance (%) | 40.2 | 41.8 | 47.2 | 61.7 | 81.7 | 94.1 | 98.4 |
| Sales of cooking units - Gas (%) | 59.8 | 58.2 | 52.8 | 38.3 | 18.3 | 5.9 | 1.59 |
| Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018) | | 3.16 | 3.73 | | | | |

Table 55: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Commercial

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|--------|--------|------|------|------|------|
| Sales of space heating units - Electric Heat Pump (%) | 1.94 | 17.4 | 23.1 | 39.7 | 65.5 | 83.2 | 89.8 |
| Sales of space heating units - Electric Resistance (%) | 2 | 4.42 | 4.46 | 4.63 | 5.06 | 5.73 | 6.18 |
| Sales of space heating units - Gas Furnace (%) | 96.1 | 78.2 | 72.4 | 55.7 | 29.4 | 11 | 3.98 |
| Sales of space heating units - Fossil (%) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales of water heating units - Electric Heat Pump (%) | 0.059 | 1.96 | 7.15 | 22.1 | 45 | 59.9 | 65.1 |
| Sales of water heating units - Electric Resistance (%) | 1.74 | 4.42 | 6.55 | 12.7 | 22.2 | 28.4 | 30.5 |
| Sales of water heating units - Gas Furnace (%) | 97.4 | 91.9 | 84.5 | 63.4 | 31 | 9.91 | 2.58 |
| Sales of water heating units - Other (%) | 0.794 | 1.77 | 1.77 | 1.77 | 1.78 | 1.78 | 1.79 |
| Sales of cooking units - Electric Resistance (%) | 30.1 | 34.2 | 39 | 52 | 70.1 | 81.2 | 85 |
| Sales of cooking units - Gas (%) | 69.9 | 65.8 | 61 | 48 | 29.9 | 18.8 | 15 |
| Commercial HVAC investment in 2020s - Cumulative 5-yr (million \$2018) | | 14,157 | 16,435 | | | | |

Table 56: E-B+ scenario - PILLAR 2: Clean Electricity - Generating capacity

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--------------------------------------|--------|-------|-------|-------|-------|-------|-------|
| Installed thermal - Coal (MW) | 4,259 | 350 | 0 | 0 | 0 | 0 | 0 |
| Installed thermal - Natural gas (MW) | 13,067 | 9,237 | 9,237 | 9,237 | 6,442 | 3,495 | 2,870 |
| Installed thermal - Nuclear (MW) | 0 | 0 | 0.001 | 0.004 | 0 | 0 | 0 |

Table 56: E-B+ scenario - PILLAR 2: Clean Electricity - Generating capacity (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|-------|------|------|------|
| Capital invested - Biomass power plant (billion \$2018) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capital invested - Biomass w/ccu allam power plant (billion \$2018) | 0 | 0 | 0 | 0.034 | 0 | 0 | 0 |
| Capital invested - Biomass w/ccu power plant (billion \$2018) | 0 | 0 | 2.6 | 1.6 | 12.5 | 21.2 | 5.44 |

Table 57: E-B+ scenario - PILLAR 2: Clean Electricity - Generation

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---------------------------------------|------|------|-------|-------|--------|--------|--------|
| Biomass power plant (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Biomass w/ccu power plant (GWh) | 0 | 0 | 2,913 | 4,709 | 18,789 | 42,612 | 48,723 |
| Biomass w/ccu allam power plant (GWh) | 0 | 0 | 0 | 34.2 | 34.2 | 34.2 | 34.2 |

Table 58: E-B+ scenario - PILLAR 3: Clean fuels - Bioenergy

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|-------|--------|--------|--------|-------|
| Number of facilities - Power (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - Power ccu (quantity) | 0 | 0 | 2 | 3 | 14 | 34 | 39 |
| Number of facilities - Allam power w ccu (quantity) | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| Number of facilities - Beccs hydrogen (quantity) | 0 | 0 | 0 | 27 | 39 | 51 | 51 |
| Number of facilities - Diesel (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - Diesel ccu (quantity) | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| Number of facilities - Pyrolysis (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - Pyrolysis ccu (quantity) | 0 | 0 | 0 | 1 | 2 | 2 | 2 |
| Number of facilities - Sng (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - Sng ccu (quantity) | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| Conversion capital investment - Cumulative 5-yr (million \$2018) | | 0 | 2,381 | 25,955 | 21,506 | 29,942 | 4,994 |
| Biomass purchases (million \$2018/y) | | 0 | 188 | 2,532 | 4,349 | 6,838 | 7,232 |

Table 59: E-B+ scenario - PILLAR 4: CCUS - CO2 capture

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|------------------------------------|------|------|------|------|------|------|------|
| Annual - All (MMT) | | 0 | 2.89 | 42.8 | 69.5 | 107 | 113 |
| Annual - BECCS (MMT) | | 0 | 2.89 | 36.1 | 62.8 | 99.9 | 106 |
| Annual - NGCC (MMT) | | 0 | 0 | 0 | 0 | 0 | 0 |
| Annual - Cement and lime (MMT) | | 0 | 0 | 6.71 | 6.64 | 6.84 | 7.07 |
| Cumulative - All (MMT) | | 0 | 2.89 | 45.7 | 115 | 222 | 335 |
| Cumulative - BECCS (MMT) | | 0 | 2.89 | 39 | 102 | 202 | 307 |
| Cumulative - NGCC (MMT) | | 0 | 0 | 0 | 0 | 0 | 0 |
| Cumulative - Cement and lime (MMT) | | 0 | 0 | 6.71 | 13.3 | 20.2 | 27.3 |

Table 60: E-B+ scenario - PILLAR 4: CCUS - CO2 pipelines

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|-------|-------|--------|--------|--------|
| Trunk (km) | | 0 | 774 | 1,136 | 1,572 | 1,572 | 1,572 |
| Spur (km) | | 0 | 90.7 | 1,586 | 2,740 | 4,332 | 4,584 |
| All (km) | | 0 | 865 | 2,722 | 4,312 | 5,904 | 6,156 |
| Cumulative investment - Trunk (million \$2018) | | 0 | 4,321 | 6,605 | 9,304 | 9,304 | 9,304 |
| Cumulative investment - Spur (million \$2018) | | 0 | 69.1 | 1,512 | 2,637 | 4,863 | 5,259 |
| Cumulative investment - All (million \$2018) | | 0 | 4,390 | 8,116 | 11,940 | 14,166 | 14,563 |

Table 61: E-B+ scenario - PILLAR 4: CCUS - CO2 storage

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|-------|
| Annual (MMT) | | 0 | 0.92 | 4.28 | 9.51 | 12.8 | 13.4 |
| Injection wells (wells) | | 0 | 2 | 9 | 16 | 26 | 33 |
| Resource characterization, appraisal, permitting costs (million \$2020) | | 103 | 294 | 380 | 380 | 380 | 380 |
| Wells and facilities construction costs (million \$2020) | | 0 | 70.4 | 274 | 489 | 817 | 1,014 |

Table 62: E-B+ scenario - PILLAR 6: Land sinks - Forests

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|---------|
| Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -477 |
| Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y) | | | | | | | -281 |
| Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y) | | | | | | | -1,783 |
| Carbon sink potential - Low - Improve plantations (1000 tCO2e/y) | | | | | | | -329 |
| Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -591 |
| Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -482 |
| Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y) | | | | | | | -4,866 |
| Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y) | | | | | | | -1,451 |
| Carbon sink potential - Low - Restore productivity (1000 tCO2e/y) | | | | | | | -1,120 |
| Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -11,380 |
| Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -715 |
| Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y) | | | | | | | -984 |
| Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y) | | | | | | | -3,213 |
| Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y) | | | | | | | -482 |
| Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -1,182 |
| Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -930 |
| Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y) | | | | | | | -7,299 |
| Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y) | | | | | | | -10,302 |
| Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y) | | | | | | | -2,221 |
| Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -27,327 |
| Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -952 |
| Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y) | | | | | | | -1,687 |
| Carbon sink potential - High - Extend rotation length (1000 tCO2e/y) | | | | | | | -4,643 |
| Carbon sink potential - High - Improve plantations (1000 tCO2e/y) | | | | | | | -646 |

Table 62: E-B+ scenario - PILLAR 6: Land sinks - Forests (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|---------|
| Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -1,773 |
| Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -1,378 |
| Carbon sink potential - High - Reforest cropland (1000 tCO2e/y) | | | | | | | -9,732 |
| Carbon sink potential - High - Reforest pasture (1000 tCO2e/y) | | | | | | | -19,153 |
| Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -43,286 |
| Carbon sink potential - High - Restore productivity (1000 tCO2e/y) | | | | | | | -3,321 |
| Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) | | | | | | | 77.9 |
| Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 214 |
| Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) | | | | | | | 907 |
| Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) | | | | | | | 119 |
| Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) | | | | | | | 68.9 |
| Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) | | | | | | | 322 |
| Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares) | | | | | | | 94.3 |
| Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) | | | | | | | 666 |
| Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares) | | | | | | | 2,470 |
| Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) | | | | | | | 117 |
| Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 221 |
| Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares) | | | | | | | 1,637 |
| Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares) | | | | | | | 179 |
| Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares) | | | | | | | 99.9 |
| Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) | | | | | | | 483 |
| Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares) | | | | | | | 682 |

Table 62: E-B+ scenario - PILLAR 6: Land sinks - Forests (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|-------|
| Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) | | | | | | | 1,342 |
| Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares) | | | | | | | 4,761 |
| Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares) | | | | | | | 156 |
| Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 228 |
| Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares) | | | | | | | 2,368 |
| Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) | | | | | | | 238 |
| Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares) | | | | | | | 131 |
| Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) | | | | | | | 643 |
| Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) | | | | | | | 544 |
| Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) | | | | | | | 1,101 |
| Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) | | | | | | | 5,409 |

Table 63: E-B+ scenario - PILLAR 6: Land sinks - Agriculture

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|--------|
| Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) | | | | | | | -560 |
| Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -2,212 |
| Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -116 |
| Carbon sink potential - Moderate deployment - Cropland to woody energy crops (1000 tCO2e/y) | | | | | | | 0 |
| Carbon sink potential - Moderate deployment - Pasture to energy crops (1000 tCO2e/y) | | | | | | | 0 |
| Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y) | | | | | | | -2,887 |
| Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) | | | | | | | -560 |
| Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -4,205 |

Table 63: E-B+ scenario - PILLAR 6: Land sinks - Agriculture (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|--------|
| Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -231 |
| Carbon sink potential - Aggressive deployment - Cropland to woody energy crops (1000 tCO2e/y) | | | | | | | 0 |
| Carbon sink potential - Aggressive deployment - Pasture to energy crops (1000 tCO2e/y) | | | | | | | 0 |
| Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y) | | | | | | | -4,996 |
| Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 496 |
| Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares) | | | | | | | 2,008 |
| Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares) | | | | | | | 199 |
| Land impacted for carbon sink - Moderate deployment - Cropland to woody energy crops (1000 hectares) | | | | | | | 183 |
| Land impacted for carbon sink - Moderate deployment - Pasture to energy crops (1000 hectares) | | | | | | | 2,300 |
| Land impacted for carbon sink - Moderate deployment - Total (1000 hectares) | | | | | | | 5,186 |
| Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 496 |
| Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) | | | | | | | 9,423 |
| Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) | | | | | | | 399 |
| Land impacted for carbon sink - Aggressive deployment - Cropland to woody energy crops (1000 hectares) | | | | | | | 183 |
| Land impacted for carbon sink - Aggressive deployment - Pasture to energy crops (1000 hectares) | | | | | | | 2,300 |
| Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) | | | | | | | 12,800 |

Table 64: REF scenario - IMPACTS - Health

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|------|
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Coal (deaths) | | 126 | 61.6 | 34.7 | 27.6 | 24.2 | 22.6 |
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths) | | 27.4 | 24 | 25.8 | 18.7 | 17.3 | 14.5 |
| Premature deaths from air pollution - Mobile - On-Road (deaths) | | 77 | 79.4 | 81.8 | 84.7 | 87.6 | 90.5 |
| Premature deaths from air pollution - Gas Stations (deaths) | | 9.47 | 9.72 | 9.94 | 10.2 | 10.5 | 10.7 |

Table 64: REF scenario - IMPACTS - Health (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|-------|-------|-------|-------|-------|-------|
| Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths) | | 9.88 | 9.07 | 8.35 | 7.9 | 7.75 | 7.67 |
| Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths) | | 0.144 | 0.128 | 0.099 | 0.07 | 0.047 | 0.034 |
| Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths) | | 1.55 | 1.52 | 1.52 | 1.55 | 1.58 | 1.59 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths) | | 0.928 | 0.935 | 0.937 | 0.935 | 0.932 | 0.924 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths) | | 7.26 | 6.98 | 6.33 | 5.77 | 5.7 | 6.11 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths) | | 1.56 | 1.54 | 1.52 | 1.5 | 1.49 | 1.49 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths) | | 0.723 | 0.747 | 0.773 | 0.797 | 0.823 | 0.85 |
| Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths) | | 2.65 | 1.75 | 1.35 | 1.26 | 1.2 | 1.1 |
| Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths) | | 173 | 183 | 187 | 180 | 179 | 167 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019) | | 1,114 | 546 | 308 | 245 | 215 | 201 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019) | | 242 | 213 | 229 | 166 | 153 | 128 |
| Monetary damages from air pollution - Mobile - On-Road (million \$2019) | | 685 | 706 | 728 | 753 | 779 | 805 |
| Monetary damages from air pollution - Gas Stations (million \$2019) | | 83.9 | 86.1 | 88 | 90.6 | 93 | 95.2 |
| Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019) | | 87.6 | 80.4 | 74 | 70 | 68.6 | 67.9 |
| Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019) | | 1.28 | 1.13 | 0.878 | 0.624 | 0.419 | 0.301 |
| Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019) | | 13.8 | 13.5 | 13.5 | 13.8 | 14 | 14.1 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019) | | 8.22 | 8.27 | 8.29 | 8.28 | 8.25 | 8.18 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019) | | 64.3 | 61.8 | 56 | 51.1 | 50.4 | 54.1 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019) | | 13.8 | 13.6 | 13.5 | 13.3 | 13.2 | 13.2 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019) | | 6.4 | 6.61 | 6.84 | 7.06 | 7.28 | 7.52 |
| Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019) | | 23.4 | 15.4 | 11.9 | 11.1 | 10.6 | 9.71 |

Table 64: REF scenario - IMPACTS - Health (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|-------|-------|-------|-------|-------|-------|
| Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019) | | 1,539 | 1,621 | 1,662 | 1,598 | 1,589 | 1,482 |

Table 65: REF scenario - IMPACTS - Jobs

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|--------|--------|--------|--------|--------|--------|
| By economic sector - Agriculture (jobs) | | 29 | 26 | 25.7 | 20.9 | 20.9 | 22.6 |
| By economic sector - Construction (jobs) | | 13,824 | 14,716 | 16,024 | 17,573 | 19,237 | 19,924 |
| By economic sector - Manufacturing (jobs) | | 17,943 | 19,156 | 19,684 | 19,980 | 19,026 | 17,530 |
| By economic sector - Mining (jobs) | | 35,521 | 30,489 | 25,729 | 20,682 | 17,137 | 13,313 |
| By economic sector - Other (jobs) | | 631 | 767 | 921 | 1,193 | 1,449 | 1,744 |
| By economic sector - Pipeline (jobs) | | 1,829 | 1,917 | 1,954 | 1,856 | 1,859 | 1,781 |
| By economic sector - Professional (jobs) | | 12,905 | 13,069 | 13,478 | 14,499 | 15,506 | 15,736 |
| By economic sector - Trade (jobs) | | 12,319 | 11,949 | 11,769 | 11,847 | 12,143 | 11,973 |
| By economic sector - Utilities (jobs) | | 11,476 | 11,269 | 12,746 | 13,603 | 15,426 | 15,906 |
| By resource sector - Biomass (jobs) | | 112 | 105 | 97.2 | 86.8 | 88.9 | 90.3 |
| By resource sector - CO2 (jobs) | | 0 | 0.062 | 0.078 | 0.084 | 0.093 | 0.099 |
| By resource sector - Coal (jobs) | | 1,415 | 794 | 287 | 127 | 51.8 | 6.35 |
| By resource sector - Grid (jobs) | | 10,212 | 10,456 | 13,182 | 15,039 | 18,016 | 19,903 |
| By resource sector - Natural Gas (jobs) | | 35,200 | 34,389 | 33,754 | 30,464 | 29,868 | 27,557 |
| By resource sector - Nuclear (jobs) | | 0 | 0.002 | 0.005 | 0.005 | 0.011 | 0 |
| By resource sector - Oil (jobs) | | 52,349 | 47,485 | 43,245 | 38,861 | 35,297 | 29,393 |
| By resource sector - Solar (jobs) | | | 1,230 | 1,762 | 1,914 | 2,210 | 3,454 |
| By resource sector - Wind (jobs) | | 7,190 | 8,899 | 10,002 | 14,761 | 16,272 | 17,526 |
| By education level - All sectors - High school diploma or less (jobs) | | 41,146 | 40,298 | 40,260 | 40,096 | 40,486 | 39,132 |
| By education level - All sectors - Associates degree or some college (jobs) | | 30,574 | 29,954 | 30,042 | 30,107 | 30,640 | 29,824 |
| By education level - All sectors - Bachelors degree (jobs) | | 27,169 | 25,893 | 25,054 | 24,264 | 23,932 | 22,563 |
| By education level - All sectors - Masters or professional degree (jobs) | | 6,617 | 6,284 | 6,072 | 5,897 | 5,854 | 5,555 |
| By education level - All sectors - Doctoral degree (jobs) | | 970 | 930 | 901 | 889 | 892 | 857 |
| Related work experience - All sectors - None (jobs) | | 14,483 | 14,134 | 14,105 | 14,038 | 14,219 | 13,770 |
| Related work experience - All sectors - Up to 1 year (jobs) | | 19,077 | 18,594 | 18,465 | 18,414 | 18,545 | 17,943 |
| Related work experience - All sectors - 1 to 4 years (jobs) | | 40,201 | 38,933 | 38,443 | 37,898 | 38,020 | 36,452 |
| Related work experience - All sectors - 4 to 10 years (jobs) | | 25,465 | 24,693 | 24,439 | 24,170 | 24,326 | 23,392 |
| Related work experience - All sectors - Over 10 years (jobs) | | 7,250 | 7,004 | 6,876 | 6,733 | 6,695 | 6,373 |
| On-the-Job Training - All sectors - None (jobs) | | 6,017 | 5,757 | 5,602 | 5,480 | 5,447 | 5,202 |
| On-the-Job Training - All sectors - Up to 1 year (jobs) | | 72,294 | 70,066 | 69,129 | 68,174 | 68,211 | 65,336 |
| On-the-Job Training - All sectors - 1 to 4 years (jobs) | | 21,326 | 20,793 | 20,754 | 20,663 | 20,958 | 20,303 |
| On-the-Job Training - All sectors - 4 to 10 years (jobs) | | 5,818 | 5,746 | 5,864 | 5,969 | 6,228 | 6,174 |
| On-the-Job Training - All sectors - Over 10 years (jobs) | | 1,021 | 995 | 980 | 967 | 960 | 915 |
| On-Site or In-Plant Training - All sectors - None (jobs) | | 17,176 | 16,609 | 16,353 | 16,168 | 16,202 | 15,572 |
| On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) | | 65,331 | 63,306 | 62,482 | 61,614 | 61,687 | 59,117 |

Table 65: REF scenario - IMPACTS - Jobs (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|--------|--------|--------|--------|--------|--------|
| On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) | | 16,693 | 16,280 | 16,239 | 16,152 | 16,353 | 15,815 |
| On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) | | 6,522 | 6,407 | 6,477 | 6,523 | 6,734 | 6,608 |
| On-Site or In-Plant Training - All sectors - Over 10 years (jobs) | | 755 | 756 | 778 | 796 | 828 | 818 |
| Wage income - All (million \$2019) | | 6,028 | 5,896 | 5,873 | 5,824 | 5,897 | 5,701 |

Table 66: REF scenario - PILLAR 1: Efficiency/Electrification - Overview

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|------|
| Final energy use - Transportation (PJ) | 431 | 408 | 377 | 358 | 359 | 370 | 385 |
| Final energy use - Residential (PJ) | 177 | 167 | 164 | 162 | 163 | 166 | 169 |
| Final energy use - Commercial (PJ) | 121 | 123 | 124 | 125 | 127 | 132 | 141 |
| Final energy use - Industry (PJ) | 310 | 325 | 335 | 340 | 350 | 358 | 369 |

Table 67: REF scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|------|
| Electricity distribution capital invested - Cumulative 5-yr (billion \$2018) | | 2.84 | 2.89 | 4.38 | 4.61 | 4.42 | 4.6 |

Table 68: REF scenario - PILLAR 1: Efficiency/Electrification - Residential

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|------|
| Sales of space heating units - Electric Heat Pump (%) | 5.79 | 35.1 | 36.6 | 38.9 | 40.5 | 42.1 | 44.4 |
| Sales of space heating units - Electric Resistance (%) | 25.8 | 23.1 | 22.7 | 22.1 | 21.2 | 19.8 | 17.5 |
| Sales of space heating units - Gas (%) | 62.3 | 35.7 | 34.6 | 33 | 32.4 | 32.1 | 32.2 |
| Sales of space heating units - Fossil (%) | 6.03 | 6.01 | 6.08 | 6.04 | 5.95 | 5.95 | 5.96 |
| Sales of water heating units - Electric Heat Pump (%) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales of water heating units - Electric Resistance (%) | 30.5 | 42.6 | 42.5 | 42.6 | 42.5 | 42.5 | 42.4 |
| Sales of water heating units - Gas Furnace (%) | 68.2 | 56.1 | 56.2 | 56.2 | 56.3 | 56.3 | 56.4 |
| Sales of water heating units - Other (%) | 1.38 | 1.21 | 1.22 | 1.22 | 1.22 | 1.22 | 1.22 |
| Sales of cooking units - Electric Resistance (%) | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 | 39.7 |
| Sales of cooking units - Gas (%) | 60.3 | 60.3 | 60.3 | 60.3 | 60.3 | 60.3 | 60.3 |
| Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018) | | 3.09 | 3.21 | | | | |

Table 69: REF scenario - PILLAR 1: Efficiency/Electrification - Commercial

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|-------|-------|-------|-------|-------|-------|
| Sales of space heating units - Electric Heat Pump (%) | 1.94 | 29.6 | 70.8 | 79.1 | 79.5 | 79.5 | 79.5 |
| Sales of space heating units - Electric Resistance (%) | 2 | 6.3 | 12.1 | 15.9 | 18.7 | 19.1 | 19.2 |
| Sales of space heating units - Gas Furnace (%) | 96.1 | 64.1 | 17.1 | 5.05 | 1.83 | 1.38 | 1.33 |
| Sales of space heating units - Fossil (%) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales of water heating units - Electric Heat Pump (%) | 0.059 | 0.129 | 0.128 | 0.129 | 0.129 | 0.127 | 0.127 |
| Sales of water heating units - Electric Resistance (%) | 1.74 | 3.67 | 3.65 | 3.65 | 3.67 | 3.67 | 3.68 |
| Sales of water heating units - Gas Furnace (%) | 97.4 | 94.4 | 94.5 | 94.5 | 94.4 | 94.4 | 94.4 |

Table 69: REF scenario - PILLAR 1: Efficiency/Electrification - Commercial (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|-------|--------|--------|------|------|------|------|
| Sales of water heating units - Other (%) | 0.794 | 1.77 | 1.77 | 1.77 | 1.78 | 1.78 | 1.79 |
| Sales of cooking units - Electric Resistance (%) | 30.1 | 32.3 | 32.3 | 32.3 | 32.3 | 32.3 | 32.3 |
| Sales of cooking units - Gas (%) | 69.9 | 67.7 | 67.7 | 67.7 | 67.7 | 67.7 | 67.7 |
| Commercial HVAC investment in 2020s - Cumulative 5-yr (million \$2018) | | 13,857 | 14,543 | | | | |

Table 70: REF scenario - PILLAR 2: Clean Electricity - Generating capacity

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|--------|--------|--------|--------|--------|--------|--------|
| Installed thermal - Coal (MW) | 4,259 | 3,093 | 1,516 | 350 | 350 | 0 | 0 |
| Installed thermal - Natural gas (MW) | 13,026 | 9,237 | 10,110 | 12,548 | 10,103 | 12,515 | 12,981 |
| Installed thermal - Nuclear (MW) | 0 | 0 | 0.001 | 0.003 | 0.005 | 0.008 | 0 |
| Installed renewables - Rooftop PV (MW) | 130 | 228 | 333 | 490 | 714 | 1,005 | 1,384 |
| Installed renewables - Solar - Base land use assumptions (MW) | 8.54 | 8.54 | 8.54 | 8.54 | 8.54 | 8.54 | 8.54 |
| Installed renewables - Wind - Base land use assumptions (MW) | 11,763 | 11,763 | 11,763 | 11,763 | 11,763 | 16,133 | 16,133 |
| Installed renewables - Solar - Constrained land use assumptions (MW) | 214 | 214 | 214 | 214 | 214 | 214 | 214 |

Table 71: REF scenario - PILLAR 2: Clean Electricity - Generation

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|--------|--------|--------|--------|--------|--------|--------|
| Solar - Base land use assumptions (GWh) | 551 | 551 | 551 | 551 | 551 | 551 | 551 |
| Wind - Base land use assumptions (GWh) | 48,113 | 48,113 | 48,113 | 48,113 | 48,113 | 64,574 | 64,574 |
| OffshoreWind - Base land use assumptions (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 72: REF scenario - PILLAR 6: Land sinks - Forests - REF only

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|--------|------|--------|------|------|------|--------|
| Business-as-usual carbon sink - Natural uptake (Mt CO2e/y) | -3.92 | | -9.16 | | | | -7.43 |
| Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y) | -0.482 | | -0.805 | | | | -0.847 |
| Business-as-usual carbon sink - Total (Mt CO2e/y) | -4.4 | | -9.97 | | | | -8.27 |

Table 73: REF scenario - PILLAR 6: Land sinks - Forests

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|--------|
| Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -477 |
| Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y) | | | | | | | -281 |
| Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y) | | | | | | | -1,783 |
| Carbon sink potential - Low - Improve plantations (1000 tCO2e/y) | | | | | | | -329 |
| Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -591 |
| Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -482 |
| Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y) | | | | | | | -4,866 |
| Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y) | | | | | | | -1,451 |
| Carbon sink potential - Low - Restore productivity (1000 tCO2e/y) | | | | | | | -1,120 |

Table 73: REF scenario - PILLAR 6: Land sinks - Forests (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|---------|
| Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -11,380 |
| Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -715 |
| Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y) | | | | | | | -984 |
| Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y) | | | | | | | -3,213 |
| Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y) | | | | | | | -482 |
| Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -1,182 |
| Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -930 |
| Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y) | | | | | | | -7,299 |
| Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y) | | | | | | | -10,302 |
| Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y) | | | | | | | -2,221 |
| Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -27,327 |
| Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -952 |
| Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y) | | | | | | | -1,687 |
| Carbon sink potential - High - Extend rotation length (1000 tCO2e/y) | | | | | | | -4,643 |
| Carbon sink potential - High - Improve plantations (1000 tCO2e/y) | | | | | | | -646 |
| Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -1,773 |
| Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -1,378 |
| Carbon sink potential - High - Reforest cropland (1000 tCO2e/y) | | | | | | | -9,732 |
| Carbon sink potential - High - Reforest pasture (1000 tCO2e/y) | | | | | | | -19,153 |
| Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -43,286 |
| Carbon sink potential - High - Restore productivity (1000 tCO2e/y) | | | | | | | -3,321 |
| Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) | | | | | | | 77.9 |
| Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 214 |
| Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) | | | | | | | 907 |
| Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) | | | | | | | 119 |
| Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) | | | | | | | 68.9 |

Table 73: REF scenario - PILLAR 6: Land sinks - Forests (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--|------|------|------|------|------|------|-------|
| Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) | | | | | | | 322 |
| Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares) | | | | | | | 94.3 |
| Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) | | | | | | | 666 |
| Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares) | | | | | | | 2,470 |
| Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) | | | | | | | 117 |
| Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 221 |
| Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares) | | | | | | | 1,637 |
| Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares) | | | | | | | 179 |
| Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares) | | | | | | | 99.9 |
| Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) | | | | | | | 483 |
| Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares) | | | | | | | 682 |
| Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) | | | | | | | 1,342 |
| Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares) | | | | | | | 4,761 |
| Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares) | | | | | | | 156 |
| Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 228 |
| Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares) | | | | | | | 2,368 |
| Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) | | | | | | | 238 |
| Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) | | | | | | | 0 |
| Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares) | | | | | | | 131 |
| Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) | | | | | | | 643 |
| Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) | | | | | | | 544 |

Table 73: REF scenario - PILLAR 6: Land sinks - Forests (continued)

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|------|------|------|------|------|------|-------|
| Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) | | | | | | | 1,101 |
| Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) | | | | | | | 5,409 |