# Net-Zero America - Iowa data

October 29, 2021 (updated November 17, 2023)

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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# Contents

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) | | 32.4 | 0.025 | 0.023 | 0.019 | 0.013 | 0 |
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths) | | 11.2 | 6.23 | 2.9 | 2 | 1.29 | 0.62 |
| Premature deaths from air pollution - Mobile - On-Road (deaths) | | 39.2 | 36.1 | 27.1 | 15.5 | 6.99 | 2.75 |
| Premature deaths from air pollution - Gas Stations (deaths) | | 3.42 | 3.11 | 2.34 | 1.39 | 0.686 | 0.339 |
| Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths) | | 8.07 | 6.83 | 4.8 | 2.74 | 1.33 | 0.519 |
| Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths) | | 0.441 | 0.359 | 0.246 | 0.143 | 0.061 | 0.021 |
| Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths) | | 2.5 | 2.38 | 1.91 | 1.28 | 0.658 | 0.247 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths) | | 3.65 | 3.47 | 3.28 | 3.08 | 2.88 | 2.67 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths) | | 5.92 | 5.17 | 3.91 | 2.51 | 1.44 | 0.724 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths) | | 1.04 | 0.844 | 0.654 | 0.476 | 0.328 | 0.207 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths) | | 0.556 | 0.46 | 0.37 | 0.285 | 0.207 | 0.135 |
| Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths) | | 0.557 | 0.13 | 0.124 | 0.116 | 0.112 | 0.109 |
| Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths) | | 47.8 | 44.4 | 39.9 | 30.8 | 22.6 | 13.9 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million $2019) | | 287 | 0.217 | 0.207 | 0.172 | 0.115 | 0.003 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million $2019) | | 98.9 | 55.2 | 25.7 | 17.7 | 11.4 | 5.49 |
| Monetary damages from air pollution - Mobile - On-Road (million $2019) | | 349 | 321 | 241 | 137 | 62.1 | 24.5 |
| Monetary damages from air pollution - Gas Stations (million $2019) | | 30.3 | 27.6 | 20.7 | 12.3 | 6.08 | 3 |
| Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million $2019) | | 71.5 | 60.6 | 42.5 | 24.3 | 11.8 | 4.6 |
| Monetary damages from air pollution - Fuel Comb - Residential - Oil (million $2019) | | 3.91 | 3.18 | 2.18 | 1.27 | 0.54 | 0.182 |
| Monetary damages from air pollution - Fuel Comb - Residential - Other (million $2019) | | 22.1 | 21.1 | 17 | 11.3 | 5.83 | 2.18 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million $2019) | | 32.3 | 30.7 | 29 | 27.2 | 25.5 | 23.7 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million $2019) | | 52.4 | 45.8 | 34.6 | 22.3 | 12.7 | 6.41 |

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) | | 9.2 | 7.47 | 5.79 | 4.21 | 2.9 | 1.83 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million $2019) | | 4.93 | 4.07 | 3.28 | 2.53 | 1.83 | 1.19 |
| Monetary damages from air pollution - Industrial Processes - Coal Mining (million $2019) | | 4.91 | 1.15 | 1.1 | 1.02 | 0.992 | 0.962 |
| Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million $2019) | | 425 | 394 | 355 | 273 | 201 | 124 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| By economic sector - Agriculture (jobs) | | 6,919 | 6,945 | 6,697 | 3,630 | 2,029 | 3,643 |
| By economic sector - Construction (jobs) | | 13,022 | 21,457 | 26,723 | 34,589 | 41,941 | 59,355 |
| By economic sector - Manufacturing (jobs) | | 7,390 | 8,075 | 9,085 | 7,897 | 7,420 | 10,929 |
| By economic sector - Mining (jobs) | | 1,793 | 1,250 | 880 | 600 | 399 | 273 |
| By economic sector - Other (jobs) | | 1,081 | 2,009 | 2,699 | 4,030 | 5,052 | 8,320 |
| By economic sector - Pipeline (jobs) | | 418 | 869 | 411 | 239 | 206 | 316 |
| By economic sector - Professional (jobs) | | 9,005 | 13,586 | 18,944 | 24,994 | 32,662 | 47,555 |
| By economic sector - Trade (jobs) | | 6,868 | 8,745 | 11,118 | 13,831 | 17,119 | 25,145 |
| By economic sector - Utilities (jobs) | | 10,812 | 16,115 | 20,693 | 26,562 | 34,547 | 49,727 |
| By resource sector - Biomass (jobs) | | 16,205 | 15,818 | 14,909 | 8,483 | 7,722 | 16,690 |
| By resource sector - CO2 (jobs) | | 0 | 4,129 | 939 | 52.6 | 326 | 1,578 |
| By resource sector - Coal (jobs) | | 1,406 | 317 | 0 | 0 | 0 | 0 |
| By resource sector - Grid (jobs) | | 16,331 | 23,045 | 35,054 | 47,268 | 62,451 | 91,573 |
| By resource sector - Natural Gas (jobs) | | 3,506 | 3,071 | 2,722 | 2,297 | 2,336 | 2,111 |
| By resource sector - Nuclear (jobs) | | 0 | 0 | 0 | 0 | 0 | 0 |
| By resource sector - Oil (jobs) | | 3,740 | 3,174 | 2,517 | 1,961 | 1,552 | 1,239 |
| By resource sector - Solar (jobs) | | 1,627 | 4,704 | 4,101 | 7,500 | 7,732 | 18,668 |
| By resource sector - Wind (jobs) | | 14,494 | 24,794 | 37,008 | 48,808 | 59,255 | 73,404 |
| By education level - All sectors - High school diploma or less (jobs) | | 27,084 | 35,934 | 42,740 | 48,532 | 57,051 | 83,156 |
| By education level - All sectors - Associates degree or some college (jobs) | | 16,085 | 23,329 | 29,278 | 36,473 | 45,076 | 65,183 |
| By education level - All sectors - Bachelors degree (jobs) | | 10,921 | 15,220 | 19,304 | 23,912 | 29,840 | 43,266 |
| By education level - All sectors - Masters or professional degree (jobs) | | 2,791 | 3,946 | 5,102 | 6,395 | 8,054 | 11,694 |
| By education level - All sectors - Doctoral degree (jobs) | | 429 | 622 | 827 | 1,059 | 1,353 | 1,964 |
| Related work experience - All sectors - None (jobs) | | 8,793 | 11,926 | 14,426 | 16,892 | 20,296 | 29,589 |
| Related work experience - All sectors - Up to 1 year (jobs) | | 13,939 | 18,208 | 21,645 | 24,162 | 28,030 | 40,927 |
| Related work experience - All sectors - 1 to 4 years (jobs) | | 19,337 | 27,106 | 33,775 | 41,324 | 50,989 | 74,035 |
| Related work experience - All sectors - 4 to 10 years (jobs) | | 12,069 | 17,331 | 21,779 | 27,073 | 33,543 | 48,424 |
| Related work experience - All sectors - Over 10 years (jobs) | | 3,170 | 4,480 | 5,625 | 6,920 | 8,515 | 12,288 |
| On-the-Job Training - All sectors - None (jobs) | | 3,233 | 4,387 | 5,368 | 6,375 | 7,686 | 11,215 |
| On-the-Job Training - All sectors - Up to 1 year (jobs) | | 39,670 | 53,327 | 65,084 | 76,297 | 91,947 | 134,005 |

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) | | 10,522 | 15,444 | 19,400 | 24,316 | 30,121 | 43,385 |
| On-the-Job Training - All sectors - 4 to 10 years (jobs) | | 3,378 | 5,171 | 6,518 | 8,324 | 10,360 | 14,855 |
| On-the-Job Training - All sectors - Over 10 years (jobs) | | 506 | 722 | 881 | 1,059 | 1,260 | 1,803 |
| On-Site or In-Plant Training - All sectors - None (jobs) | | 9,133 | 12,715 | 15,750 | 19,030 | 23,278 | 33,822 |
| On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) | | 35,775 | 48,219 | 58,863 | 69,142 | 83,303 | 121,322 |
| On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) | | 8,392 | 12,127 | 15,139 | 18,763 | 23,119 | 33,368 |
| On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) | | 3,515 | 5,283 | 6,624 | 8,375 | 10,387 | 14,897 |
| On-Site or In-Plant Training - All sectors - Over 10 years (jobs) | | 494 | 707 | 874 | 1,060 | 1,287 | 1,854 |
| Wage income - All (million $2019) | | 2,984 | 4,210 | 5,295 | 6,496 | 8,064 | 11,837 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Oil consumption - Annual (million bbls) | | 84.1 | 77.8 | 66.8 | 56.1 | 47.5 | 40.4 |
| Oil consumption - Cumulative (million bbls) | | | | | | | 2,036 |
| Oil production - Annual (million bbls) | | 0 | 0 | 0 | 0 | 0 | 0 |
| Natural gas consumption - Annual (tcf) | | 343 | 289 | 232 | 175 | 110 | 76.2 |
| Natural gas consumption - Cumulative (tcf) | | | | | | | 6,984 |
| Natural gas production - Annual (tcf) | | 0 | 0 | 0 | 0 | 0 | 0 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Final energy use - Transportation (PJ) | 288 | 269 | 235 | 195 | 158 | 136 | 127 |
| Final energy use - Residential (PJ) | 158 | 149 | 141 | 125 | 107 | 92.3 | 82.5 |
| Final energy use - Commercial (PJ) | 119 | 116 | 111 | 104 | 96.2 | 90.2 | 86.6 |
| Final energy use - Industry (PJ) | 698 | 727 | 740 | 738 | 743 | 749 | 755 |

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) | | 3.02 | 3.15 | 5.47 | 5.86 | 5.07 | 5.32 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Vehicle stocks - LDV – EV (1000 units) | 8.7 | 311 | 613 | 1,671 | 2,729 | 3,574 | 4,420 |
| Vehicle stocks - LDV – All others (1000 units) | 3,685 | 3,509 | 3,333 | 2,429 | 1,525 | 863 | 201 |
| Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million $2018) | | 710 | 1,814 | 2,950 | 4,464 | 4,863 | 4,634 |
| Public EV charging plugs - DC Fast (1000 units) | 0.103 | | 1.41 | | 6.29 | | 10.2 |
| Public EV charging plugs - L2 (1000 units) | 0.26 | | 34 | | 151 | | 245 |

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 (%) | 4.32 | 9.3 | 34.2 | 83.1 | 91.9 | 92.5 | 92.3 |
| Sales of space heating units - Electric Resistance (%) | 10.7 | 14.9 | 11.7 | 5.07 | 3.86 | 3.82 | 4.03 |
| Sales of space heating units - Gas (%) | 74.1 | 58.4 | 41.4 | 7.68 | 1.69 | 1.31 | 1.28 |
| Sales of space heating units - Fossil (%) | 10.9 | 17.4 | 12.6 | 4.14 | 2.53 | 2.35 | 2.41 |
| Sales of water heating units - Electric Heat Pump (%) | 0 | 0.81 | 11.1 | 33.7 | 37.7 | 37.9 | 37.9 |
| Sales of water heating units - Electric Resistance (%) | 25.3 | 40.6 | 46.5 | 59.5 | 61.9 | 62.1 | 62 |
| Sales of water heating units - Gas Furnace (%) | 74.7 | 58.5 | 42.4 | 6.78 | 0.4 | 0 | 0 |
| Sales of water heating units - Other (%) | 0.023 | 0.026 | 0.026 | 0.026 | 0.025 | 0.025 | 0.025 |
| Sales of cooking units - Electric Resistance (%) | 62.2 | 70.3 | 94.9 | 99.7 | 100 | 100 | 100 |
| Sales of cooking units - Gas (%) | 37.8 | 29.7 | 5.08 | 0.256 | 0 | 0 | 0 |
| Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018) | | 2.73 | 3.43 | | | | |

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 (%) | 2.46 | 7.62 | 30.1 | 77.9 | 86.5 | 87 | 87 |
| Sales of space heating units - Electric Resistance (%) | 4.11 | 5.76 | 8.25 | 11.9 | 12.5 | 12.5 | 12.5 |
| Sales of space heating units - Gas (%) | 90.9 | 84.7 | 61.3 | 10.2 | 1.03 | 0.455 | 0.455 |
| Sales of space heating units - Fossil (%) | 2.55 | 1.96 | 0.38 | 0.016 | 0 | 0 | 0 |
| Sales of water heating units - Electric Heat Pump (%) | 0.634 | 1.83 | 14.5 | 42 | 47 | 47.3 | 47.3 |
| Sales of water heating units - Electric Resistance (%) | 5.5 | 7.95 | 20.3 | 47 | 51.7 | 52 | 52 |
| Sales of water heating units - Gas (%) | 93 | 89.3 | 64.5 | 10.3 | 0.611 | 0 | 0 |
| Sales of water heating units - Other (%) | 0.862 | 0.936 | 0.728 | 0.68 | 0.676 | 0.678 | 0.678 |
| Sales of cooking units - Electric Resistance (%) | 44.8 | 57.1 | 84 | 89.3 | 89.6 | 89.6 | 89.6 |
| Sales of cooking units - Gas (%) | 55.2 | 42.9 | 16 | 10.7 | 10.4 | 10.4 | 10.4 |
| Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018) | | 9,055 | 9,857 | | | | |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Installed thermal - Coal (MW) | 5,784 | 2,387 | 0 | 0 | 0 | 0 | 0 |
| Installed thermal - Natural gas (MW) | 3,462 | 3,410 | 4,152 | 4,329 | 5,529 | 7,179 | 10,985 |
| Installed thermal - Nuclear (MW) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Installed renewables - Rooftop PV (MW) | 173 | 309 | 395 | 526 | 699 | 901 | 1,141 |
| Installed renewables - Solar - Base land use assumptions (MW) | 91.5 | 245 | 2,859 | 4,309 | 8,344 | 12,130 | 25,263 |
| Installed renewables - Wind - Base land use assumptions (MW) | 9,337 | 14,730 | 21,255 | 40,083 | 60,583 | 93,622 | 143,661 |
| Installed renewables - Solar - Constrained land use assumptions (MW) | 85.4 | 806 | 4,707 | 7,166 | 9,645 | 14,276 | 29,369 |
| Installed renewables - Wind - Constrained land use assumptions (MW) | 10,744 | 16,625 | 25,721 | 39,833 | 52,787 | 58,822 | 60,338 |
| Capital invested - Solar PV - Base (billion $2018) | | 0.206 | 3.13 | 1.6 | 4.19 | 3.71 | 12.2 |
| Capital invested - Wind - Base (billion $2018) | | 5.86 | 8.69 | 23.4 | 24.2 | 37 | 53 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Capital invested - Solar PV - Constrained (billion $2018) | | 1.52 | 5.68 | 4.23 | 7.07 | 2.88 | 9.72 |
| Capital invested - Wind - Constrained (billion $2018) | | 13.8 | 10.4 | 16.5 | 14.7 | 6.29 | 1.17 |
| Capital invested - Biomass power plant (billion $2018) | 0 | 0.005 | 0.145 | 0 | 0 | 0 | 0 |
| Capital invested - Biomass w/ccu allam power plant (billion $2018) | 0 | 0 | 0 | 0 | 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) | 195 | 486 | 5,419 | 8,152 | 15,708 | 22,773 | 47,178 |
| Wind - Base land use assumptions (GWh) | 41,883 | 55,716 | 78,202 | 142,280 | 210,951 | 320,274 | 482,424 |
| OffshoreWind - Base land use assumptions (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Solar - Constrained land use assumptions (GWh) | 182 | 1,543 | 8,890 | 13,536 | 18,197 | 26,844 | 54,921 |
| Wind - Constrained land use assumptions (GWh) | 41,883 | 61,841 | 92,114 | 137,870 | 178,181 | 196,403 | 200,810 |
| OffshoreWind - Constrained land use assumptions (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Biomass power plant (GWh) | 0 | 9.49 | 295 | 295 | 295 | 295 | 295 |
| Biomass w/ccu power plant (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Biomass w/ccu allam power plant (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Number of facilities - Power (quantity) | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of facilities - Power ccu (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - Allam power w ccu (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - Beccs hydrogen (quantity) | 0 | 0 | 0 | 0 | 0 | 19 | 31 |
| Number of facilities - Diesel (quantity) | 0 | 0 | 0 | 1 | 1 | 2 | 2 |
| Number of facilities - Diesel ccu (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of facilities - Pyrolysis (quantity) | 0 | 0 | 0 | 1 | 1 | 2 | 2 |
| Number of facilities - Pyrolysis ccu (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 28 |
| Number of facilities - Sng (quantity) | 0 | 1 | 1 | 1 | 1 | 2 | 2 |
| Number of facilities - Sng ccu (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Conversion capital investment - Cumulative 5-yr (million $2018) | | 5.45 | 162 | 25.9 | 0.269 | 17,934 | 48,036 |
| Biomass purchases (million $2018/y) | | 131 | 247 | 249 | 249 | 1,542 | 3,892 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Annual - All (MMT) | | 0 | 3.25 | 3.35 | 3.32 | 26.5 | 58 |
| Annual - BECCS (MMT) | | 0 | 0 | 0 | 0 | 23 | 54.5 |
| Annual - NGCC (MMT) | | 0 | 0.01 | 0 | 0 | 0 | 0 |
| Annual - Cement and lime (MMT) | | 0 | 3.24 | 3.35 | 3.32 | 3.42 | 3.53 |
| Cumulative - All (MMT) | | 0 | 3.25 | 6.6 | 9.92 | 36.4 | 94.4 |
| Cumulative - BECCS (MMT) | | 0 | 0 | 0 | 0 | 23 | 77.5 |
| Cumulative - NGCC (MMT) | | 0 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Cumulative - Cement and lime (MMT) | | 0 | 3.24 | 6.59 | 9.91 | 13.3 | 16.9 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Trunk (km) | | 0 | 617 | 790 | 790 | 790 | 790 |
| Spur (km) | | 0 | 47 | 167 | 96.9 | 1,192 | 3,474 |
| All (km) | | 0 | 664 | 957 | 887 | 1,982 | 4,263 |
| Cumulative investment - Trunk (million $2018) | | 0 | 4,153 | 5,051 | 5,051 | 5,051 | 5,051 |
| Cumulative investment - Spur (million $2018) | | 0 | 39.1 | 157 | 122 | 1,313 | 3,488 |
| Cumulative investment - All (million $2018) | | 0 | 4,192 | 5,208 | 5,173 | 6,364 | 8,539 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Annual (MMT) | | 0 | 0 | 0 | 0 | 0 | 0 |
| Injection wells (wells) | | 0 | 0 | 0 | 0 | 0 | 0 |
| Resource characterization, appraisal, permitting costs (million $2020) | | 0 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Wells and facilities construction costs (million $2020) | | 0 | 0 | 0.01 | 0.01 | 0.02 | 0.02 |

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) | | | | | | | -65.8 |
| Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y) | | | | | | | -256 |
| Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y) | | | | | | | -420 |
| Carbon sink potential - Low - Improve plantations (1000 tCO2e/y) | | | | | | | -20.3 |
| Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -244 |
| Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -1,245 |
| Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y) | | | | | | | -5,241 |
| Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y) | | | | | | | -536 |
| Carbon sink potential - Low - Restore productivity (1000 tCO2e/y) | | | | | | | -278 |
| Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -8,305 |
| Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -98.5 |
| Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y) | | | | | | | -895 |
| Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y) | | | | | | | -756 |
| Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y) | | | | | | | -29.7 |
| Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -488 |
| Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -2,400 |
| Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y) | | | | | | | -7,862 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y) | | | | | | | -3,805 |
| Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y) | | | | | | | -551 |
| Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -16,885 |
| Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -131 |
| Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y) | | | | | | | -1,534 |
| Carbon sink potential - High - Extend rotation length (1000 tCO2e/y) | | | | | | | -1,092 |
| Carbon sink potential - High - Improve plantations (1000 tCO2e/y) | | | | | | | -39.8 |
| Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -732 |
| Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -3,556 |
| Carbon sink potential - High - Reforest cropland (1000 tCO2e/y) | | | | | | | -10,483 |
| Carbon sink potential - High - Reforest pasture (1000 tCO2e/y) | | | | | | | -7,074 |
| Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -25,467 |
| Carbon sink potential - High - Restore productivity (1000 tCO2e/y) | | | | | | | -824 |
| Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) | | | | | | | 10.7 |
| Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 195 |
| Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) | | | | | | | 213 |
| Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) | | | | | | | 7.34 |
| 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) | | | | | | | 178 |
| Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) | | | | | | | 347 |
| Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares) | | | | | | | 34.8 |
| Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) | | | | | | | 165 |
| Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares) | | | | | | | 1,151 |
| Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) | | | | | | | 16.1 |
| Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 201 |

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 - Extend rotation length (1000 hectares) | | | | | | | 385 |
| Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares) | | | | | | | 11 |
| 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) | | | | | | | 258 |
| Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) | | | | | | | 520 |
| Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares) | | | | | | | 252 |
| Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) | | | | | | | 333 |
| Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares) | | | | | | | 1,976 |
| Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares) | | | | | | | 21.5 |
| Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 208 |
| Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares) | | | | | | | 557 |
| Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) | | | | | | | 14.7 |
| 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) | | | | | | | 338 |
| Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) | | | | | | | 693 |
| Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) | | | | | | | 201 |
| Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) | | | | | | | 273 |
| Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) | | | | | | | 2,306 |

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) | | | | | | | -4,209 |
| Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -7,458 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -236 |
| Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y) | | | | | | | -11,904 |
| Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) | | | | | | | -4,209 |
| Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -14,138 |
| Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -472 |
| Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y) | | | | | | | -18,820 |
| Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 2,095 |
| Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares) | | | | | | | 4,113 |
| Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares) | | | | | | | 429 |
| Land impacted for carbon sink - Moderate deployment - Total (1000 hectares) | | | | | | | 6,638 |
| Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 2,095 |
| Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) | | | | | | | 7,797 |
| Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) | | | | | | | 859 |
| Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) | | | | | | | 10,751 |

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) | | 32.4 | 0.025 | 0.023 | 0.019 | 0.013 | 0 |
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths) | | 11.1 | 5.39 | 2.19 | 1.01 | 0.408 | 0.329 |
| Premature deaths from air pollution - Mobile - On-Road (deaths) | | 39.8 | 39.6 | 38.1 | 34 | 26.9 | 18.3 |
| Premature deaths from air pollution - Gas Stations (deaths) | | 3.48 | 3.47 | 3.32 | 2.96 | 2.35 | 1.63 |
| Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths) | | 8.11 | 7.34 | 6.54 | 5.55 | 4.36 | 3.09 |
| Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths) | | 0.449 | 0.431 | 0.413 | 0.371 | 0.298 | 0.223 |
| Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths) | | 2.51 | 2.55 | 2.56 | 2.42 | 2 | 1.49 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths) | | 3.65 | 3.47 | 3.28 | 3.08 | 2.88 | 2.67 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths) | | 5.94 | 5.64 | 5.27 | 4.67 | 3.85 | 2.95 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths) | | 1.04 | 0.919 | 0.808 | 0.687 | 0.569 | 0.462 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths) | | 0.556 | 0.493 | 0.434 | 0.377 | 0.324 | 0.275 |
| Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths) | | 0.529 | 0.132 | 0.128 | 0.122 | 0.113 | 0.097 |
| Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths) | | 47.7 | 42.8 | 36.8 | 31.9 | 28 | 19.4 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million $2019) | | 287 | 0.217 | 0.207 | 0.172 | 0.115 | 0.003 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million $2019) | | 98.5 | 47.8 | 19.4 | 8.98 | 3.62 | 2.91 |
| Monetary damages from air pollution - Mobile - On-Road (million $2019) | | 354 | 352 | 339 | 303 | 239 | 163 |
| Monetary damages from air pollution - Gas Stations (million $2019) | | 30.9 | 30.7 | 29.4 | 26.2 | 20.8 | 14.4 |
| Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million $2019) | | 71.8 | 65.1 | 57.9 | 49.2 | 38.6 | 27.4 |
| Monetary damages from air pollution - Fuel Comb - Residential - Oil (million $2019) | | 3.98 | 3.82 | 3.66 | 3.28 | 2.64 | 1.97 |
| Monetary damages from air pollution - Fuel Comb - Residential - Other (million $2019) | | 22.3 | 22.6 | 22.7 | 21.4 | 17.8 | 13.2 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million $2019) | | 32.3 | 30.7 | 29 | 27.2 | 25.5 | 23.7 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million $2019) | | 52.6 | 49.9 | 46.6 | 41.3 | 34.1 | 26.1 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million $2019) | | 9.22 | 8.14 | 7.15 | 6.08 | 5.04 | 4.09 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million $2019) | | 4.93 | 4.37 | 3.85 | 3.34 | 2.87 | 2.43 |
| Monetary damages from air pollution - Industrial Processes - Coal Mining (million $2019) | | 4.67 | 1.16 | 1.13 | 1.08 | 0.997 | 0.852 |
| Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million $2019) | | 424 | 380 | 327 | 283 | 249 | 172 |

Table 18: *E- scenario - IMPACTS - Jobs*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| By economic sector - Agriculture (jobs) | | 6,920 | 6,999 | 6,713 | 3,642 | 2,629 | 3,641 |
| By economic sector - Construction (jobs) | | 13,232 | 23,043 | 25,467 | 33,220 | 46,961 | 69,136 |

Table 18: *E- scenario - IMPACTS - Jobs (continued)*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| By economic sector - Manufacturing (jobs) | | 7,471 | 8,179 | 8,644 | 7,737 | 9,195 | 12,713 |
| By economic sector - Mining (jobs) | | 1,840 | 1,273 | 967 | 734 | 542 | 377 |
| By economic sector - Other (jobs) | | 1,100 | 2,070 | 2,542 | 3,817 | 5,566 | 9,427 |
| By economic sector - Pipeline (jobs) | | 419 | 1,220 | 490 | 268 | 287 | 502 |
| By economic sector - Professional (jobs) | | 9,181 | 14,015 | 18,161 | 24,205 | 37,387 | 55,360 |
| By economic sector - Trade (jobs) | | 6,989 | 8,955 | 10,769 | 13,468 | 19,401 | 29,479 |
| By economic sector - Utilities (jobs) | | 10,935 | 17,495 | 19,150 | 25,427 | 39,221 | 58,053 |
| By resource sector - Biomass (jobs) | | 16,207 | 15,961 | 14,974 | 8,556 | 11,185 | 16,163 |
| By resource sector - CO2 (jobs) | | 0 | 7,079 | 1,611 | 90.2 | 558 | 2,706 |
| By resource sector - Coal (jobs) | | 1,588 | 409 | 0 | 0 | 0 | 0 |
| By resource sector - Grid (jobs) | | 16,435 | 22,984 | 31,686 | 44,695 | 70,805 | 106,412 |
| By resource sector - Natural Gas (jobs) | | 3,504 | 2,788 | 2,270 | 2,570 | 2,799 | 2,130 |
| By resource sector - Nuclear (jobs) | | 0 | 0 | 0 | 0 | 0 | 0 |
| By resource sector - Oil (jobs) | | 3,769 | 3,335 | 2,944 | 2,546 | 2,137 | 1,700 |
| By resource sector - Solar (jobs) | | 1,665 | 4,930 | 3,591 | 6,599 | 8,252 | 19,046 |
| By resource sector - Wind (jobs) | | 14,919 | 25,763 | 35,828 | 47,461 | 65,451 | 90,531 |
| By education level - All sectors - High school diploma or less (jobs) | | 27,402 | 37,738 | 40,956 | 46,947 | 65,150 | 96,330 |
| By education level - All sectors - Associates degree or some college (jobs) | | 16,329 | 24,753 | 27,834 | 35,184 | 51,178 | 76,007 |
| By education level - All sectors - Bachelors degree (jobs) | | 11,089 | 15,983 | 18,444 | 23,166 | 34,115 | 50,436 |
| By education level - All sectors - Masters or professional degree (jobs) | | 2,833 | 4,128 | 4,876 | 6,193 | 9,198 | 13,628 |
| By education level - All sectors - Doctoral degree (jobs) | | 436 | 646 | 794 | 1,027 | 1,548 | 2,287 |
| Related work experience - All sectors - None (jobs) | | 8,901 | 12,561 | 13,799 | 16,335 | 23,155 | 34,351 |
| Related work experience - All sectors - Up to 1 year (jobs) | | 14,097 | 19,007 | 20,792 | 23,391 | 32,066 | 47,365 |
| Related work experience - All sectors - 1 to 4 years (jobs) | | 19,621 | 28,601 | 32,213 | 39,947 | 58,105 | 86,158 |
| Related work experience - All sectors - 4 to 10 years (jobs) | | 12,253 | 18,352 | 20,745 | 26,156 | 38,158 | 56,478 |
| Related work experience - All sectors - Over 10 years (jobs) | | 3,217 | 4,728 | 5,355 | 6,687 | 9,704 | 14,336 |
| On-the-Job Training - All sectors - None (jobs) | | 3,277 | 4,597 | 5,144 | 6,171 | 8,780 | 13,019 |
| On-the-Job Training - All sectors - Up to 1 year (jobs) | | 40,186 | 55,921 | 62,285 | 73,850 | 105,129 | 155,595 |
| On-the-Job Training - All sectors - 1 to 4 years (jobs) | | 10,682 | 16,428 | 18,438 | 23,454 | 34,153 | 50,626 |
| On-the-Job Training - All sectors - 4 to 10 years (jobs) | | 3,430 | 5,538 | 6,194 | 8,018 | 11,694 | 17,347 |
| On-the-Job Training - All sectors - Over 10 years (jobs) | | 514 | 765 | 843 | 1,024 | 1,432 | 2,102 |
| On-Site or In-Plant Training - All sectors - None (jobs) | | 9,262 | 13,385 | 15,055 | 18,402 | 26,547 | 39,321 |
| On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) | | 36,242 | 50,596 | 56,311 | 66,909 | 95,193 | 140,908 |
| On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) | | 8,516 | 12,871 | 14,402 | 18,105 | 26,242 | 38,902 |
| On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) | | 3,568 | 5,646 | 6,304 | 8,077 | 11,746 | 17,395 |
| On-Site or In-Plant Training - All sectors - Over 10 years (jobs) | | 501 | 750 | 832 | 1,023 | 1,461 | 2,163 |
| Wage income - All (million $2019) | | 3,025 | 4,440 | 5,053 | 6,282 | 9,192 | 13,782 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Final energy use - Transportation (PJ) | 289 | 271 | 246 | 226 | 211 | 194 | 173 |
| Final energy use - Residential (PJ) | 158 | 150 | 143 | 137 | 130 | 120 | 108 |
| Final energy use - Commercial (PJ) | 119 | 116 | 113 | 110 | 106 | 102 | 97.9 |
| Final energy use - Industry (PJ) | 698 | 728 | 742 | 746 | 756 | 762 | 767 |

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) | | 2.47 | 2.54 | 3.3 | 3.45 | 4.74 | 5.02 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Vehicle stocks - LDV – EV (1000 units) | 6.74 | 95.6 | 184 | 596 | 1,008 | 1,919 | 2,831 |
| Vehicle stocks - LDV – All others (1000 units) | 3,700 | 3,700 | 3,700 | 3,510 | 3,320 | 2,558 | 1,797 |
| Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million $2018) | | 0 | 114 | 242 | 813 | 2,567 | 3,737 |
| Public EV charging plugs - DC Fast (1000 units) | 0.103 | | 0.425 | | 2.32 | | 6.52 |
| Public EV charging plugs - L2 (1000 units) | 0.26 | | 10.2 | | 55.9 | | 157 |

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 (%) | 4.32 | 7.79 | 10.3 | 18.6 | 37.9 | 61.5 | 75.1 |
| Sales of space heating units - Electric Resistance (%) | 10.7 | 15 | 14.6 | 13.6 | 11.1 | 7.88 | 6.19 |
| Sales of space heating units - Gas (%) | 74.1 | 59.4 | 57.7 | 52.1 | 39 | 22.8 | 13.2 |
| Sales of space heating units - Fossil (%) | 10.9 | 17.8 | 17.4 | 15.8 | 12.1 | 7.79 | 5.49 |
| Sales of water heating units - Electric Heat Pump (%) | 0 | 0.379 | 1.42 | 4.88 | 13.3 | 23.9 | 30.1 |
| Sales of water heating units - Electric Resistance (%) | 25.3 | 40.4 | 40.9 | 42.9 | 47.7 | 53.9 | 57.5 |
| Sales of water heating units - Gas Furnace (%) | 74.7 | 59.2 | 57.6 | 52.2 | 39 | 22.2 | 12.3 |
| Sales of water heating units - Other (%) | 0.023 | 0.026 | 0.026 | 0.026 | 0.026 | 0.025 | 0.025 |
| Sales of cooking units - Electric Resistance (%) | 62.1 | 63.1 | 66.6 | 75.7 | 88.4 | 96.3 | 99 |
| Sales of cooking units - Gas (%) | 37.9 | 36.9 | 33.4 | 24.3 | 11.6 | 3.74 | 1.01 |
| Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018) | | 2.72 | 3.37 | | | | |

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 (%) | 2.46 | 6.56 | 8.85 | 16.3 | 34.3 | 56.8 | 70 |
| Sales of space heating units - Electric Resistance (%) | 4.11 | 5.51 | 5.75 | 6.55 | 8.23 | 10.1 | 11.1 |
| Sales of space heating units - Gas (%) | 90.9 | 85.6 | 83.2 | 75.4 | 56.5 | 32.5 | 18.5 |
| Sales of space heating units - Fossil (%) | 2.55 | 2.28 | 2.17 | 1.72 | 1.01 | 0.534 | 0.37 |
| Sales of water heating units - Electric Heat Pump (%) | 0.634 | 1.28 | 2.56 | 6.82 | 17.1 | 30.1 | 37.7 |
| Sales of water heating units - Electric Resistance (%) | 5.5 | 7.41 | 8.68 | 12.8 | 22.8 | 35.4 | 42.8 |
| Sales of water heating units - Gas (%) | 93 | 90.3 | 87.8 | 79.5 | 59.3 | 33.8 | 18.7 |
| Sales of water heating units - Other (%) | 0.862 | 0.976 | 0.957 | 0.895 | 0.802 | 0.745 | 0.724 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Sales of cooking units - Electric Resistance (%) | 44.8 | 49.3 | 53.1 | 63 | 76.9 | 85.5 | 88.5 |
| Sales of cooking units - Gas (%) | 55.2 | 50.7 | 46.9 | 37 | 23.1 | 14.5 | 11.5 |
| Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018) | | 9,055 | 9,867 | | | | |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Installed thermal - Coal (MW) | 5,784 | 2,387 | 0 | 0 | 0 | 0 | 0 |
| Installed thermal - Natural gas (MW) | 3,481 | 3,449 | 3,554 | 2,915 | 6,761 | 8,863 | 10,245 |
| Installed thermal - Nuclear (MW) | 0 | 0 | 0 | 0 | 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) | | | | | | | -65.8 |
| Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y) | | | | | | | -256 |
| Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y) | | | | | | | -420 |
| Carbon sink potential - Low - Improve plantations (1000 tCO2e/y) | | | | | | | -20.3 |
| Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -244 |
| Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -1,245 |
| Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y) | | | | | | | -5,241 |
| Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y) | | | | | | | -536 |
| Carbon sink potential - Low - Restore productivity (1000 tCO2e/y) | | | | | | | -278 |
| Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -8,305 |
| Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -98.5 |
| Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y) | | | | | | | -895 |
| Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y) | | | | | | | -756 |
| Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y) | | | | | | | -29.7 |
| Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -488 |
| Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -2,400 |
| Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y) | | | | | | | -7,862 |
| Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y) | | | | | | | -3,805 |
| Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y) | | | | | | | -551 |
| Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -16,885 |
| Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -131 |
| Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y) | | | | | | | -1,534 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Carbon sink potential - High - Extend rotation length (1000 tCO2e/y) | | | | | | | -1,092 |
| Carbon sink potential - High - Improve plantations (1000 tCO2e/y) | | | | | | | -39.8 |
| Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -732 |
| Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -3,556 |
| Carbon sink potential - High - Reforest cropland (1000 tCO2e/y) | | | | | | | -10,483 |
| Carbon sink potential - High - Reforest pasture (1000 tCO2e/y) | | | | | | | -7,074 |
| Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -25,467 |
| Carbon sink potential - High - Restore productivity (1000 tCO2e/y) | | | | | | | -824 |
| Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) | | | | | | | 10.7 |
| Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 195 |
| Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) | | | | | | | 213 |
| Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) | | | | | | | 7.34 |
| 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) | | | | | | | 178 |
| Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) | | | | | | | 347 |
| Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares) | | | | | | | 34.8 |
| Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) | | | | | | | 165 |
| Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares) | | | | | | | 1,151 |
| Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) | | | | | | | 16.1 |
| Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 201 |
| Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares) | | | | | | | 385 |
| Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares) | | | | | | | 11 |
| 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) | | | | | | | 258 |

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 - Reforest cropland (1000 hectares) | | | | | | | 520 |
| Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares) | | | | | | | 252 |
| Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) | | | | | | | 333 |
| Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares) | | | | | | | 1,976 |
| Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares) | | | | | | | 21.5 |
| Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 208 |
| Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares) | | | | | | | 557 |
| Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) | | | | | | | 14.7 |
| 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) | | | | | | | 338 |
| Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) | | | | | | | 693 |
| Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) | | | | | | | 201 |
| Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) | | | | | | | 273 |
| Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) | | | | | | | 2,306 |

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) | | | | | | | -4,209 |
| Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -7,458 |
| Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -236 |
| Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y) | | | | | | | -11,904 |
| Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) | | | | | | | -4,209 |
| Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -14,138 |

Table 26: *E- 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) | | | | | | | -472 |
| Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y) | | | | | | | -18,820 |
| Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 2,095 |
| Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares) | | | | | | | 4,113 |
| Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares) | | | | | | | 429 |
| Land impacted for carbon sink - Moderate deployment - Total (1000 hectares) | | | | | | | 6,638 |
| Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 2,095 |
| Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) | | | | | | | 7,797 |
| Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) | | | | | | | 859 |
| Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) | | | | | | | 10,751 |

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) | | 32.4 | 0.025 | 0.023 | 0.019 | 0.013 | 0 |
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths) | | 10.4 | 5.65 | 1.82 | 1.11 | 0.487 | 0.303 |
| Premature deaths from air pollution - Mobile - On-Road (deaths) | | 39.2 | 36.1 | 27.1 | 15.5 | 6.99 | 2.75 |
| Premature deaths from air pollution - Gas Stations (deaths) | | 3.42 | 3.11 | 2.34 | 1.39 | 0.686 | 0.339 |
| Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths) | | 8.07 | 6.83 | 4.8 | 2.74 | 1.33 | 0.519 |
| Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths) | | 0.441 | 0.359 | 0.246 | 0.143 | 0.061 | 0.021 |
| Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths) | | 2.5 | 2.38 | 1.91 | 1.28 | 0.658 | 0.247 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths) | | 3.65 | 3.47 | 3.28 | 3.08 | 2.88 | 2.67 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths) | | 5.92 | 5.17 | 3.91 | 2.51 | 1.44 | 0.724 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths) | | 1.04 | 0.844 | 0.654 | 0.476 | 0.328 | 0.207 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths) | | 0.556 | 0.46 | 0.37 | 0.285 | 0.207 | 0.135 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths) | | 0.627 | 0.131 | 0.124 | 0.115 | 0.112 | 0.081 |
| Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths) | | 47 | 43.7 | 37.4 | 26.6 | 16.2 | 2.41 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million $2019) | | 287 | 0.217 | 0.207 | 0.172 | 0.115 | 0.003 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million $2019) | | 92.4 | 50.1 | 16.2 | 9.87 | 4.32 | 2.69 |
| Monetary damages from air pollution - Mobile - On-Road (million $2019) | | 349 | 321 | 241 | 137 | 62.1 | 24.5 |
| Monetary damages from air pollution - Gas Stations (million $2019) | | 30.3 | 27.6 | 20.7 | 12.3 | 6.08 | 3 |
| Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million $2019) | | 71.5 | 60.6 | 42.5 | 24.3 | 11.8 | 4.6 |
| Monetary damages from air pollution - Fuel Comb - Residential - Oil (million $2019) | | 3.91 | 3.18 | 2.18 | 1.27 | 0.54 | 0.182 |
| Monetary damages from air pollution - Fuel Comb - Residential - Other (million $2019) | | 22.1 | 21.1 | 17 | 11.3 | 5.83 | 2.18 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million $2019) | | 32.3 | 30.7 | 29 | 27.2 | 25.5 | 23.7 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million $2019) | | 52.4 | 45.8 | 34.6 | 22.3 | 12.7 | 6.41 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million $2019) | | 9.2 | 7.47 | 5.79 | 4.21 | 2.9 | 1.83 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million $2019) | | 4.93 | 4.07 | 3.28 | 2.53 | 1.83 | 1.19 |
| Monetary damages from air pollution - Industrial Processes - Coal Mining (million $2019) | | 5.54 | 1.15 | 1.09 | 1.02 | 0.987 | 0.715 |
| Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million $2019) | | 418 | 388 | 332 | 236 | 144 | 21.4 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| By economic sector - Agriculture (jobs) | | 6,919 | 6,927 | 6,695 | 3,628 | 1,810 | 3,657 |
| By economic sector - Construction (jobs) | | 13,532 | 28,011 | 38,812 | 55,662 | 71,394 | 95,789 |
| By economic sector - Manufacturing (jobs) | | 7,592 | 8,829 | 10,854 | 10,981 | 12,637 | 17,179 |
| By economic sector - Mining (jobs) | | 1,813 | 1,226 | 825 | 534 | 320 | 24.4 |
| By economic sector - Other (jobs) | | 1,111 | 3,579 | 4,760 | 7,370 | 9,351 | 13,000 |
| By economic sector - Pipeline (jobs) | | 407 | 349 | 258 | 184 | 122 | 34.4 |
| By economic sector - Professional (jobs) | | 9,449 | 17,164 | 26,056 | 38,265 | 53,250 | 77,829 |
| By economic sector - Trade (jobs) | | 7,096 | 10,918 | 15,086 | 21,227 | 28,583 | 41,533 |
| By economic sector - Utilities (jobs) | | 11,228 | 17,134 | 27,163 | 40,915 | 57,497 | 80,216 |
| By resource sector - Biomass (jobs) | | 16,203 | 15,770 | 14,900 | 8,481 | 7,009 | 17,222 |
| By resource sector - CO2 (jobs) | | 0 | 0 | 0 | 0 | 0 | 0 |
| By resource sector - Coal (jobs) | | 1,588 | 409 | 0 | 0 | 0 | 0 |
| By resource sector - Grid (jobs) | | 17,035 | 28,466 | 48,325 | 74,704 | 106,557 | 150,814 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| By resource sector - Natural Gas (jobs) | | 3,386 | 3,098 | 2,277 | 2,078 | 2,233 | 1,625 |
| By resource sector - Nuclear (jobs) | | 0 | 0 | 0 | 0 | 0 | 0 |
| By resource sector - Oil (jobs) | | 3,741 | 3,154 | 2,475 | 1,865 | 1,304 | 0.009 |
| By resource sector - Solar (jobs) | | 1,459 | 15,571 | 14,635 | 21,194 | 20,427 | 23,293 |
| By resource sector - Wind (jobs) | | 15,734 | 27,667 | 47,897 | 70,443 | 97,432 | 136,309 |
| By education level - All sectors - High school diploma or less (jobs) | | 27,814 | 42,331 | 56,466 | 73,987 | 94,608 | 131,833 |
| By education level - All sectors - Associates degree or some college (jobs) | | 16,671 | 28,075 | 40,013 | 56,711 | 75,505 | 105,324 |
| By education level - All sectors - Bachelors degree (jobs) | | 11,318 | 18,207 | 26,016 | 36,655 | 49,355 | 69,945 |
| By education level - All sectors - Masters or professional degree (jobs) | | 2,895 | 4,751 | 6,885 | 9,790 | 13,281 | 18,967 |
| By education level - All sectors - Doctoral degree (jobs) | | 447 | 773 | 1,130 | 1,622 | 2,214 | 3,194 |
| Related work experience - All sectors - None (jobs) | | 9,048 | 14,067 | 19,199 | 25,866 | 33,691 | 47,199 |
| Related work experience - All sectors - Up to 1 year (jobs) | | 14,302 | 21,483 | 28,404 | 36,597 | 46,385 | 64,955 |
| Related work experience - All sectors - 1 to 4 years (jobs) | | 20,002 | 32,453 | 45,683 | 63,759 | 84,776 | 118,980 |
| Related work experience - All sectors - 4 to 10 years (jobs) | | 12,509 | 20,780 | 29,617 | 41,878 | 55,908 | 78,252 |
| Related work experience - All sectors - Over 10 years (jobs) | | 3,284 | 5,353 | 7,607 | 10,666 | 14,204 | 19,876 |
| On-the-Job Training - All sectors - None (jobs) | | 3,332 | 5,297 | 7,229 | 9,807 | 12,782 | 17,953 |
| On-the-Job Training - All sectors - Up to 1 year (jobs) | | 40,872 | 63,110 | 86,482 | 116,434 | 152,255 | 214,194 |
| On-the-Job Training - All sectors - 1 to 4 years (jobs) | | 10,911 | 18,581 | 26,570 | 37,843 | 50,435 | 70,149 |
| On-the-Job Training - All sectors - 4 to 10 years (jobs) | | 3,507 | 6,270 | 9,025 | 13,039 | 17,375 | 24,061 |
| On-the-Job Training - All sectors - Over 10 years (jobs) | | 523 | 879 | 1,204 | 1,643 | 2,117 | 2,907 |
| On-Site or In-Plant Training - All sectors - None (jobs) | | 9,437 | 15,284 | 21,267 | 29,304 | 38,663 | 54,313 |
| On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) | | 36,863 | 57,089 | 78,306 | 105,625 | 138,093 | 194,025 |
| On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) | | 8,691 | 14,566 | 20,653 | 29,143 | 38,680 | 53,827 |
| On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) | | 3,644 | 6,364 | 9,110 | 13,061 | 17,377 | 24,103 |
| On-Site or In-Plant Training - All sectors - Over 10 years (jobs) | | 510 | 834 | 1,175 | 1,632 | 2,150 | 2,995 |
| Wage income - All (million $2019) | | 3,083 | 4,989 | 7,099 | 9,963 | 13,378 | 19,037 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Final energy use - Transportation (PJ) | 288 | 269 | 235 | 195 | 158 | 136 | 127 |
| Final energy use - Residential (PJ) | 158 | 149 | 141 | 125 | 107 | 92.3 | 82.5 |
| Final energy use - Commercial (PJ) | 119 | 116 | 111 | 104 | 96.2 | 90.2 | 86.6 |
| Final energy use - Industry (PJ) | 698 | 727 | 740 | 738 | 743 | 749 | 755 |

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) | | 3.02 | 3.15 | 5.47 | 5.86 | 5.07 | 5.32 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Vehicle stocks - LDV – EV (1000 units) | 8.7 | 311 | 613 | 1,671 | 2,729 | 3,574 | 4,420 |
| Vehicle stocks - LDV – All others (1000 units) | 3,685 | 3,509 | 3,333 | 2,429 | 1,525 | 863 | 201 |
| Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million $2018) | | 710 | 1,814 | 2,950 | 4,464 | 4,863 | 4,634 |
| Public EV charging plugs - DC Fast (1000 units) | 0.103 | | 1.41 | | 6.29 | | 10.2 |
| Public EV charging plugs - L2 (1000 units) | 0.26 | | 34 | | 151 | | 245 |

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 (%) | 4.32 | 9.3 | 34.2 | 83.1 | 91.9 | 92.5 | 92.3 |
| Sales of space heating units - Electric Resistance (%) | 10.7 | 14.9 | 11.7 | 5.07 | 3.86 | 3.82 | 4.03 |
| Sales of space heating units - Gas (%) | 74.1 | 58.4 | 41.4 | 7.68 | 1.69 | 1.31 | 1.28 |
| Sales of space heating units - Fossil (%) | 10.9 | 17.4 | 12.6 | 4.14 | 2.53 | 2.35 | 2.41 |
| Sales of water heating units - Electric Heat Pump (%) | 0 | 0.81 | 11.1 | 33.7 | 37.7 | 37.9 | 37.9 |
| Sales of water heating units - Electric Resistance (%) | 25.3 | 40.6 | 46.5 | 59.5 | 61.9 | 62.1 | 62 |
| Sales of water heating units - Gas Furnace (%) | 74.7 | 58.5 | 42.4 | 6.78 | 0.4 | 0 | 0 |
| Sales of water heating units - Other (%) | 0.023 | 0.026 | 0.026 | 0.026 | 0.025 | 0.025 | 0.025 |
| Sales of cooking units - Electric Resistance (%) | 62.2 | 70.3 | 94.9 | 99.7 | 100 | 100 | 100 |
| Sales of cooking units - Gas (%) | 37.8 | 29.7 | 5.08 | 0.256 | 0 | 0 | 0 |
| Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018) | | 2.73 | 3.43 | | | | |

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 (%) | 2.46 | 7.62 | 30.1 | 77.9 | 86.5 | 87 | 87 |
| Sales of space heating units - Electric Resistance (%) | 4.11 | 5.76 | 8.25 | 11.9 | 12.5 | 12.5 | 12.5 |
| Sales of space heating units - Gas (%) | 90.9 | 84.7 | 61.3 | 10.2 | 1.03 | 0.455 | 0.455 |
| Sales of space heating units - Fossil (%) | 2.55 | 1.96 | 0.38 | 0.016 | 0 | 0 | 0 |
| Sales of water heating units - Electric Heat Pump (%) | 0.634 | 1.83 | 14.5 | 42 | 47 | 47.3 | 47.3 |
| Sales of water heating units - Electric Resistance (%) | 5.5 | 7.95 | 20.3 | 47 | 51.7 | 52 | 52 |
| Sales of water heating units - Gas (%) | 93 | 89.3 | 64.5 | 10.3 | 0.611 | 0 | 0 |
| Sales of water heating units - Other (%) | 0.862 | 0.936 | 0.728 | 0.68 | 0.676 | 0.678 | 0.678 |
| Sales of cooking units - Electric Resistance (%) | 44.8 | 57.1 | 84 | 89.3 | 89.6 | 89.6 | 89.6 |
| Sales of cooking units - Gas (%) | 55.2 | 42.9 | 16 | 10.7 | 10.4 | 10.4 | 10.4 |
| Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018) | | 9,055 | 9,857 | | | | |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Installed thermal - Coal (MW) | 5,784 | 3,083 | 0 | 0 | 0 | 0 | 0 |
| Installed thermal - Natural gas (MW) | 3,481 | 3,437 | 5,070 | 4,525 | 6,695 | 8,859 | 10,240 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Installed thermal - Nuclear (MW) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Installed renewables - Rooftop PV (MW) | 173 | 309 | 395 | 526 | 699 | 901 | 1,141 |
| Installed renewables - Solar - Base land use assumptions (MW) | 91.5 | 91.5 | 10,525 | 18,778 | 30,538 | 38,503 | 50,301 |
| Installed renewables - Wind - Base land use assumptions (MW) | 10,744 | 15,776 | 23,965 | 46,683 | 89,819 | 154,465 | 210,247 |
| Installed renewables - Solar - Constrained land use assumptions (MW) | 91.6 | 91.6 | 6,438 | 16,476 | 28,582 | 40,516 | 60,723 |
| Installed renewables - Wind - Constrained land use assumptions (MW) | 11,957 | 19,265 | 29,070 | 48,969 | 59,818 | 61,551 | 119,158 |
| Installed renewables - Offshore Wind - Constrained land use assumptions (MW) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capital invested - Solar PV - Base (billion $2018) | | 0 | 12.5 | 9.1 | 12.2 | 7.82 | 10.9 |
| Capital invested - Wind - Base (billion $2018) | | 7.4 | 11 | 28.2 | 51 | 72.5 | 59.1 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Solar - Base land use assumptions (GWh) | 195 | 195 | 19,777 | 35,039 | 56,724 | 71,448 | 93,207 |
| Wind - Base land use assumptions (GWh) | 41,883 | 59,332 | 87,562 | 164,486 | 307,797 | 516,732 | 689,511 |
| OffshoreWind - Base land use assumptions (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Solar - Constrained land use assumptions (GWh) | 390 | 390 | 24,171 | 61,417 | 106,168 | 150,245 | 224,399 |
| Wind - Constrained land use assumptions (GWh) | 83,766 | 133,262 | 198,265 | 325,109 | 391,517 | 401,621 | 789,938 |
| 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 tCO2e/y) | | | | | | | -65.8 |
| Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y) | | | | | | | -256 |
| Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y) | | | | | | | -420 |
| Carbon sink potential - Low - Improve plantations (1000 tCO2e/y) | | | | | | | -20.3 |
| Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -244 |
| Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -1,245 |
| Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y) | | | | | | | -5,241 |
| Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y) | | | | | | | -536 |
| Carbon sink potential - Low - Restore productivity (1000 tCO2e/y) | | | | | | | -278 |
| Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -8,305 |
| Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -98.5 |
| Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y) | | | | | | | -895 |
| Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y) | | | | | | | -756 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y) | | | | | | | -29.7 |
| Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -488 |
| Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -2,400 |
| Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y) | | | | | | | -7,862 |
| Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y) | | | | | | | -3,805 |
| Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y) | | | | | | | -551 |
| Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -16,885 |
| Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -131 |
| Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y) | | | | | | | -1,534 |
| Carbon sink potential - High - Extend rotation length (1000 tCO2e/y) | | | | | | | -1,092 |
| Carbon sink potential - High - Improve plantations (1000 tCO2e/y) | | | | | | | -39.8 |
| Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -732 |
| Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -3,556 |
| Carbon sink potential - High - Reforest cropland (1000 tCO2e/y) | | | | | | | -10,483 |
| Carbon sink potential - High - Reforest pasture (1000 tCO2e/y) | | | | | | | -7,074 |
| Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -25,467 |
| Carbon sink potential - High - Restore productivity (1000 tCO2e/y) | | | | | | | -824 |
| Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) | | | | | | | 10.7 |
| Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 195 |
| Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) | | | | | | | 213 |
| Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) | | | | | | | 7.34 |
| 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) | | | | | | | 178 |
| Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) | | | | | | | 347 |
| Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares) | | | | | | | 34.8 |
| Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) | | | | | | | 165 |

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 - Total impacted (over 30 years) (1000 hectares) | | | | | | | 1,151 |
| Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) | | | | | | | 16.1 |
| Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 201 |
| Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares) | | | | | | | 385 |
| Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares) | | | | | | | 11 |
| 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) | | | | | | | 258 |
| Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) | | | | | | | 520 |
| Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares) | | | | | | | 252 |
| Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) | | | | | | | 333 |
| Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares) | | | | | | | 1,976 |
| Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares) | | | | | | | 21.5 |
| Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 208 |
| Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares) | | | | | | | 557 |
| Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) | | | | | | | 14.7 |
| 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) | | | | | | | 338 |
| Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) | | | | | | | 693 |
| Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) | | | | | | | 201 |
| Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) | | | | | | | 273 |
| Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) | | | | | | | 2,306 |

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) | | | | | | | -4,209 |
| Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -7,458 |
| Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -236 |
| Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y) | | | | | | | -11,904 |
| Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) | | | | | | | -4,209 |
| Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -14,138 |
| Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -472 |
| Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y) | | | | | | | -18,820 |
| Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 2,095 |
| Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares) | | | | | | | 4,113 |
| Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares) | | | | | | | 429 |
| Land impacted for carbon sink - Moderate deployment - Total (1000 hectares) | | | | | | | 6,638 |
| Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 2,095 |
| Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) | | | | | | | 7,797 |
| Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) | | | | | | | 859 |
| Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) | | | | | | | 10,751 |

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) | | 32.4 | 0.025 | 0.023 | 0.019 | 0.013 | 0 |
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths) | | 11.7 | 5.61 | 6.06 | 4.18 | 1.7 | 0.78 |
| Premature deaths from air pollution - Mobile - On-Road (deaths) | | 39.2 | 36.1 | 27.1 | 15.5 | 6.99 | 2.75 |
| Premature deaths from air pollution - Gas Stations (deaths) | | 3.42 | 3.11 | 2.34 | 1.39 | 0.686 | 0.339 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths) | | 8.07 | 6.83 | 4.8 | 2.74 | 1.33 | 0.519 |
| Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths) | | 0.441 | 0.359 | 0.246 | 0.143 | 0.061 | 0.021 |
| Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths) | | 2.5 | 2.38 | 1.91 | 1.28 | 0.658 | 0.247 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths) | | 3.65 | 3.47 | 3.28 | 3.08 | 2.88 | 2.67 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths) | | 5.92 | 5.17 | 3.91 | 2.51 | 1.44 | 0.724 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths) | | 1.04 | 0.844 | 0.654 | 0.476 | 0.328 | 0.207 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths) | | 0.556 | 0.46 | 0.37 | 0.285 | 0.207 | 0.135 |
| Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths) | | 0.487 | 0.13 | 0.124 | 0.116 | 0.112 | 0.081 |
| Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths) | | 48.4 | 46.2 | 44.7 | 37.3 | 30.8 | 22.6 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million $2019) | | 287 | 0.217 | 0.207 | 0.172 | 0.115 | 0.003 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million $2019) | | 104 | 49.7 | 53.7 | 37 | 15.1 | 6.91 |
| Monetary damages from air pollution - Mobile - On-Road (million $2019) | | 349 | 321 | 241 | 137 | 62.1 | 24.5 |
| Monetary damages from air pollution - Gas Stations (million $2019) | | 30.3 | 27.6 | 20.7 | 12.3 | 6.08 | 3 |
| Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million $2019) | | 71.5 | 60.6 | 42.5 | 24.3 | 11.8 | 4.6 |
| Monetary damages from air pollution - Fuel Comb - Residential - Oil (million $2019) | | 3.91 | 3.18 | 2.18 | 1.27 | 0.54 | 0.182 |
| Monetary damages from air pollution - Fuel Comb - Residential - Other (million $2019) | | 22.1 | 21.1 | 17 | 11.3 | 5.83 | 2.18 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million $2019) | | 32.3 | 30.7 | 29 | 27.2 | 25.5 | 23.7 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million $2019) | | 52.4 | 45.8 | 34.6 | 22.3 | 12.7 | 6.41 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million $2019) | | 9.2 | 7.47 | 5.79 | 4.21 | 2.9 | 1.83 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million $2019) | | 4.93 | 4.07 | 3.28 | 2.53 | 1.83 | 1.19 |
| Monetary damages from air pollution - Industrial Processes - Coal Mining (million $2019) | | 4.3 | 1.15 | 1.09 | 1.02 | 0.993 | 0.715 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million $2019) | | 430 | 410 | 397 | 331 | 273 | 201 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| By economic sector - Agriculture (jobs) | | 6,919 | 7,005 | 6,713 | 3,636 | 2,217 | 3,631 |
| By economic sector - Construction (jobs) | | 12,941 | 18,472 | 18,167 | 19,691 | 22,418 | 25,214 |
| By economic sector - Manufacturing (jobs) | | 7,139 | 7,137 | 6,964 | 5,524 | 4,805 | 5,897 |
| By economic sector - Mining (jobs) | | 1,849 | 1,279 | 945 | 677 | 477 | 352 |
| By economic sector - Other (jobs) | | 1,153 | 1,471 | 1,865 | 2,117 | 2,493 | 2,803 |
| By economic sector - Pipeline (jobs) | | 429 | 1,364 | 574 | 322 | 332 | 582 |
| By economic sector - Professional (jobs) | | 8,699 | 10,509 | 11,728 | 13,427 | 17,632 | 21,935 |
| By economic sector - Trade (jobs) | | 6,812 | 7,207 | 7,633 | 7,823 | 8,971 | 10,475 |
| By economic sector - Utilities (jobs) | | 10,508 | 16,142 | 15,068 | 16,924 | 19,747 | 23,053 |
| By resource sector - Biomass (jobs) | | 16,203 | 15,967 | 14,980 | 8,521 | 8,858 | 16,226 |
| By resource sector - CO2 (jobs) | | 0 | 7,999 | 1,820 | 102 | 631 | 3,057 |
| By resource sector - Coal (jobs) | | 1,588 | 409 | 0 | 0 | 0 | 0 |
| By resource sector - Grid (jobs) | | 15,658 | 19,287 | 24,052 | 29,156 | 34,472 | 39,284 |
| By resource sector - Natural Gas (jobs) | | 3,640 | 3,966 | 3,437 | 3,423 | 2,904 | 2,323 |
| By resource sector - Nuclear (jobs) | | 0 | 0 | 0 | 0 | 0 | 0 |
| By resource sector - Oil (jobs) | | 3,739 | 3,174 | 2,517 | 1,961 | 1,573 | 1,344 |
| By resource sector - Solar (jobs) | | 2,687 | 3,002 | 4,283 | 3,540 | 3,526 | 3,635 |
| By resource sector - Wind (jobs) | | 12,935 | 16,782 | 18,568 | 23,438 | 27,127 | 28,074 |
| By education level - All sectors - High school diploma or less (jobs) | | 26,804 | 32,703 | 31,954 | 30,274 | 32,533 | 38,758 |
| By education level - All sectors - Associates degree or some college (jobs) | | 15,808 | 20,763 | 20,430 | 21,578 | 24,839 | 29,127 |
| By education level - All sectors - Bachelors degree (jobs) | | 10,694 | 13,235 | 13,275 | 14,003 | 16,544 | 19,806 |
| By education level - All sectors - Masters or professional degree (jobs) | | 2,727 | 3,379 | 3,462 | 3,699 | 4,438 | 5,347 |
| By education level - All sectors - Doctoral degree (jobs) | | 418 | 505 | 536 | 587 | 737 | 904 |
| Related work experience - All sectors - None (jobs) | | 8,680 | 10,810 | 10,571 | 10,357 | 11,456 | 13,648 |
| Related work experience - All sectors - Up to 1 year (jobs) | | 13,792 | 16,418 | 16,233 | 15,076 | 15,962 | 19,111 |
| Related work experience - All sectors - 1 to 4 years (jobs) | | 19,021 | 24,059 | 23,804 | 24,629 | 28,423 | 33,772 |
| Related work experience - All sectors - 4 to 10 years (jobs) | | 11,848 | 15,341 | 15,129 | 15,974 | 18,534 | 21,857 |
| Related work experience - All sectors - Over 10 years (jobs) | | 3,108 | 3,956 | 3,920 | 4,106 | 4,716 | 5,554 |
| On-the-Job Training - All sectors - None (jobs) | | 3,192 | 3,868 | 3,850 | 3,821 | 4,290 | 5,111 |
| On-the-Job Training - All sectors - Up to 1 year (jobs) | | 39,097 | 47,680 | 47,187 | 46,452 | 51,871 | 62,091 |
| On-the-Job Training - All sectors - 1 to 4 years (jobs) | | 10,338 | 13,771 | 13,495 | 14,367 | 16,583 | 19,377 |
| On-the-Job Training - All sectors - 4 to 10 years (jobs) | | 3,325 | 4,630 | 4,505 | 4,874 | 5,654 | 6,559 |
| On-the-Job Training - All sectors - Over 10 years (jobs) | | 499 | 637 | 621 | 628 | 694 | 805 |
| On-Site or In-Plant Training - All sectors - None (jobs) | | 8,986 | 11,219 | 11,122 | 11,313 | 12,970 | 15,475 |
| On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) | | 35,265 | 43,160 | 42,681 | 42,106 | 46,936 | 56,040 |

Table 39: *E+RE- 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) | | 8,254 | 10,830 | 10,625 | 11,156 | 12,780 | 14,969 |
| On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) | | 3,459 | 4,736 | 4,604 | 4,928 | 5,692 | 6,625 |
| On-Site or In-Plant Training - All sectors - Over 10 years (jobs) | | 486 | 641 | 625 | 639 | 713 | 834 |
| Wage income - All (million $2019) | | 2,934 | 3,762 | 3,764 | 3,905 | 4,505 | 5,419 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Final energy use - Transportation (PJ) | 288 | 269 | 235 | 195 | 158 | 136 | 127 |
| Final energy use - Residential (PJ) | 158 | 149 | 141 | 125 | 107 | 92.3 | 82.5 |
| Final energy use - Commercial (PJ) | 119 | 116 | 111 | 104 | 96.2 | 90.2 | 86.6 |
| Final energy use - Industry (PJ) | 698 | 727 | 740 | 738 | 743 | 749 | 755 |

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) | | 3.02 | 3.15 | 5.47 | 5.86 | 5.07 | 5.32 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Vehicle stocks - LDV – EV (1000 units) | 8.7 | 311 | 613 | 1,671 | 2,729 | 3,574 | 4,420 |
| Vehicle stocks - LDV – All others (1000 units) | 3,685 | 3,509 | 3,333 | 2,429 | 1,525 | 863 | 201 |
| Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million $2018) | | 710 | 1,814 | 2,950 | 4,464 | 4,863 | 4,634 |
| Public EV charging plugs - DC Fast (1000 units) | 0.103 | | 1.41 | | 6.29 | | 10.2 |
| Public EV charging plugs - L2 (1000 units) | 0.26 | | 34 | | 151 | | 245 |

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 (%) | 4.32 | 9.3 | 34.2 | 83.1 | 91.9 | 92.5 | 92.3 |
| Sales of space heating units - Electric Resistance (%) | 10.7 | 14.9 | 11.7 | 5.07 | 3.86 | 3.82 | 4.03 |
| Sales of space heating units - Gas (%) | 74.1 | 58.4 | 41.4 | 7.68 | 1.69 | 1.31 | 1.28 |
| Sales of space heating units - Fossil (%) | 10.9 | 17.4 | 12.6 | 4.14 | 2.53 | 2.35 | 2.41 |
| Sales of water heating units - Electric Heat Pump (%) | 0 | 0.81 | 11.1 | 33.7 | 37.7 | 37.9 | 37.9 |
| Sales of water heating units - Electric Resistance (%) | 25.3 | 40.6 | 46.5 | 59.5 | 61.9 | 62.1 | 62 |
| Sales of water heating units - Gas Furnace (%) | 74.7 | 58.5 | 42.4 | 6.78 | 0.4 | 0 | 0 |
| Sales of water heating units - Other (%) | 0.023 | 0.026 | 0.026 | 0.026 | 0.025 | 0.025 | 0.025 |
| Sales of cooking units - Electric Resistance (%) | 62.2 | 70.3 | 94.9 | 99.7 | 100 | 100 | 100 |
| Sales of cooking units - Gas (%) | 37.8 | 29.7 | 5.08 | 0.256 | 0 | 0 | 0 |
| Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018) | | 2.73 | 3.43 | | | | |

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 (%) | 2.46 | 7.62 | 30.1 | 77.9 | 86.5 | 87 | 87 |
| Sales of space heating units - Electric Resistance (%) | 4.11 | 5.76 | 8.25 | 11.9 | 12.5 | 12.5 | 12.5 |
| Sales of space heating units - Gas (%) | 90.9 | 84.7 | 61.3 | 10.2 | 1.03 | 0.455 | 0.455 |
| Sales of space heating units - Fossil (%) | 2.55 | 1.96 | 0.38 | 0.016 | 0 | 0 | 0 |
| Sales of water heating units - Electric Heat Pump (%) | 0.634 | 1.83 | 14.5 | 42 | 47 | 47.3 | 47.3 |
| Sales of water heating units - Electric Resistance (%) | 5.5 | 7.95 | 20.3 | 47 | 51.7 | 52 | 52 |
| Sales of water heating units - Gas (%) | 93 | 89.3 | 64.5 | 10.3 | 0.611 | 0 | 0 |
| Sales of water heating units - Other (%) | 0.862 | 0.936 | 0.728 | 0.68 | 0.676 | 0.678 | 0.678 |
| Sales of cooking units - Electric Resistance (%) | 44.8 | 57.1 | 84 | 89.3 | 89.6 | 89.6 | 89.6 |
| Sales of cooking units - Gas (%) | 55.2 | 42.9 | 16 | 10.7 | 10.4 | 10.4 | 10.4 |
| Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018) | | 9,055 | 9,857 | | | | |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Installed thermal - Coal (MW) | 5,784 | 3,083 | 0 | 0 | 0 | 0 | 0 |
| Installed thermal - Natural gas (MW) | 3,475 | 3,372 | 6,507 | 7,177 | 8,253 | 5,841 | 6,834 |
| Installed thermal - Nuclear (MW) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Installed renewables - Rooftop PV (MW) | 173 | 309 | 395 | 526 | 699 | 901 | 1,141 |
| Installed renewables - Solar - Base land use assumptions (MW) | 91.5 | 1,283 | 2,887 | 5,116 | 6,404 | 7,451 | 7,451 |
| Installed renewables - Wind - Base land use assumptions (MW) | 10,744 | 11,366 | 16,554 | 21,745 | 31,808 | 45,769 | 46,007 |
| Installed renewables - Solar - Constrained land use assumptions (MW) | 630 | 3,072 | 4,419 | 6,149 | 7,294 | 8,284 | 8,284 |
| Installed renewables - Wind - Constrained land use assumptions (MW) | 10,744 | 12,837 | 19,171 | 26,087 | 32,929 | 39,975 | 47,282 |
| Installed renewables - Offshore Wind - Constrained land use assumptions (MW) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capital invested - Solar PV - Base (billion $2018) | | 1.6 | 1.92 | 2.46 | 1.34 | 1.03 | 0 |
| Capital invested - Wind - Base (billion $2018) | | 0.916 | 6.86 | 6.44 | 11.9 | 15.7 | 0.297 |
| Capital invested - Solar PV - Constrained (billion $2018) | | 3.27 | 1.61 | 1.91 | 1.19 | 0.971 | 0 |
| Capital invested - Wind - Constrained (billion $2018) | | 3.08 | 8.43 | 8.58 | 8.09 | 7.9 | 7.74 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Solar - Base land use assumptions (GWh) | 195 | 2,437 | 5,463 | 9,628 | 12,029 | 13,967 | 13,967 |
| Wind - Base land use assumptions (GWh) | 41,883 | 44,041 | 61,913 | 79,746 | 114,129 | 161,498 | 162,421 |
| OffshoreWind - Base land use assumptions (GWh) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Solar - Constrained land use assumptions (GWh) | 1,214 | 5,805 | 8,316 | 11,567 | 13,697 | 15,525 | 15,525 |
| Wind - Constrained land use assumptions (GWh) | 41,883 | 49,047 | 70,382 | 93,314 | 115,649 | 138,138 | 161,130 |
| 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) | | | | | | | -65.8 |
| Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y) | | | | | | | -256 |
| Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y) | | | | | | | -420 |
| Carbon sink potential - Low - Improve plantations (1000 tCO2e/y) | | | | | | | -20.3 |
| Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -244 |
| Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -1,245 |
| Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y) | | | | | | | -5,241 |
| Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y) | | | | | | | -536 |
| Carbon sink potential - Low - Restore productivity (1000 tCO2e/y) | | | | | | | -278 |
| Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -8,305 |
| Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -98.5 |
| Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y) | | | | | | | -895 |
| Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y) | | | | | | | -756 |
| Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y) | | | | | | | -29.7 |
| Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -488 |
| Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -2,400 |
| Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y) | | | | | | | -7,862 |
| Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y) | | | | | | | -3,805 |
| Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y) | | | | | | | -551 |
| Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -16,885 |
| Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -131 |
| Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y) | | | | | | | -1,534 |
| Carbon sink potential - High - Extend rotation length (1000 tCO2e/y) | | | | | | | -1,092 |
| Carbon sink potential - High - Improve plantations (1000 tCO2e/y) | | | | | | | -39.8 |
| Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -732 |
| Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -3,556 |
| Carbon sink potential - High - Reforest cropland (1000 tCO2e/y) | | | | | | | -10,483 |
| Carbon sink potential - High - Reforest pasture (1000 tCO2e/y) | | | | | | | -7,074 |
| Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -25,467 |
| Carbon sink potential - High - Restore productivity (1000 tCO2e/y) | | | | | | | -824 |

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 - Low - Accelerate regeneration (1000 hectares) | | | | | | | 10.7 |
| Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 195 |
| Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) | | | | | | | 213 |
| Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) | | | | | | | 7.34 |
| 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) | | | | | | | 178 |
| Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) | | | | | | | 347 |
| Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares) | | | | | | | 34.8 |
| Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) | | | | | | | 165 |
| Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares) | | | | | | | 1,151 |
| Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) | | | | | | | 16.1 |
| Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 201 |
| Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares) | | | | | | | 385 |
| Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares) | | | | | | | 11 |
| 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) | | | | | | | 258 |
| Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) | | | | | | | 520 |
| Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares) | | | | | | | 252 |
| Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) | | | | | | | 333 |
| Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares) | | | | | | | 1,976 |
| Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares) | | | | | | | 21.5 |
| Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 208 |

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 - High - Extend rotation length (1000 hectares) | | | | | | | 557 |
| Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) | | | | | | | 14.7 |
| 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) | | | | | | | 338 |
| Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) | | | | | | | 693 |
| Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) | | | | | | | 201 |
| Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) | | | | | | | 273 |
| Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) | | | | | | | 2,306 |

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 tCO2e/y) | | | | | | | -4,209 |
| Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -7,458 |
| Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -236 |
| Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y) | | | | | | | -11,904 |
| Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) | | | | | | | -4,209 |
| Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -14,138 |
| Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -472 |
| Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y) | | | | | | | -18,820 |
| Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 2,095 |
| Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares) | | | | | | | 4,113 |
| Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares) | | | | | | | 429 |
| Land impacted for carbon sink - Moderate deployment - Total (1000 hectares) | | | | | | | 6,638 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 2,095 |
| Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) | | | | | | | 7,797 |
| Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) | | | | | | | 859 |
| Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) | | | | | | | 10,751 |

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) | | 32.4 | 0.025 | 0.023 | 0.019 | 0.013 | 0 |
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths) | | 11 | 4.87 | 2.72 | 1.65 | 0.737 | 0.382 |
| Premature deaths from air pollution - Mobile - On-Road (deaths) | | 39.8 | 39.6 | 38.1 | 34 | 26.9 | 18.3 |
| Premature deaths from air pollution - Gas Stations (deaths) | | 3.48 | 3.47 | 3.32 | 2.96 | 2.35 | 1.63 |
| Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths) | | 8.11 | 7.34 | 6.54 | 5.55 | 4.36 | 3.09 |
| Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths) | | 0.449 | 0.431 | 0.413 | 0.371 | 0.298 | 0.223 |
| Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths) | | 2.51 | 2.55 | 2.56 | 2.42 | 2 | 1.49 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths) | | 3.65 | 3.47 | 3.28 | 3.08 | 2.88 | 2.67 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths) | | 5.94 | 5.64 | 5.27 | 4.67 | 3.85 | 2.95 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths) | | 1.04 | 0.919 | 0.808 | 0.687 | 0.569 | 0.462 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths) | | 0.556 | 0.493 | 0.434 | 0.377 | 0.324 | 0.275 |
| Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths) | | 0.553 | 0.131 | 0.128 | 0.123 | 0.119 | 0.113 |
| Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths) | | 47.7 | 42.8 | 36.8 | 31.9 | 28 | 19.4 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million $2019) | | 287 | 0.217 | 0.207 | 0.172 | 0.115 | 0.003 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million $2019) | | 97.1 | 43.2 | 24.1 | 14.6 | 6.53 | 3.39 |
| Monetary damages from air pollution - Mobile - On-Road (million $2019) | | 354 | 352 | 339 | 303 | 239 | 163 |
| Monetary damages from air pollution - Gas Stations (million $2019) | | 30.9 | 30.7 | 29.4 | 26.2 | 20.8 | 14.4 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million $2019) | | 71.8 | 65.1 | 57.9 | 49.2 | 38.6 | 27.4 |
| Monetary damages from air pollution - Fuel Comb - Residential - Oil (million $2019) | | 3.98 | 3.82 | 3.66 | 3.28 | 2.64 | 1.97 |
| Monetary damages from air pollution - Fuel Comb - Residential - Other (million $2019) | | 22.3 | 22.6 | 22.7 | 21.4 | 17.8 | 13.2 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million $2019) | | 32.3 | 30.7 | 29 | 27.2 | 25.5 | 23.7 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million $2019) | | 52.6 | 49.9 | 46.6 | 41.3 | 34.1 | 26.1 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million $2019) | | 9.22 | 8.14 | 7.15 | 6.08 | 5.04 | 4.09 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million $2019) | | 4.93 | 4.37 | 3.85 | 3.34 | 2.87 | 2.43 |
| Monetary damages from air pollution - Industrial Processes - Coal Mining (million $2019) | | 4.88 | 1.16 | 1.13 | 1.08 | 1.05 | 0.995 |
| Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million $2019) | | 424 | 380 | 327 | 283 | 249 | 172 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| By economic sector - Agriculture (jobs) | | 6,919 | 6,949 | 6,691 | 5,787 | 3,251 | 5,764 |
| By economic sector - Construction (jobs) | | 13,290 | 23,410 | 24,509 | 28,644 | 36,344 | 56,292 |
| By economic sector - Manufacturing (jobs) | | 7,472 | 8,206 | 8,314 | 7,909 | 7,891 | 12,692 |
| By economic sector - Mining (jobs) | | 1,796 | 1,272 | 971 | 748 | 539 | 368 |
| By economic sector - Other (jobs) | | 1,107 | 2,093 | 2,427 | 3,193 | 4,208 | 7,678 |
| By economic sector - Pipeline (jobs) | | 415 | 1,242 | 499 | 273 | 285 | 504 |
| By economic sector - Professional (jobs) | | 9,230 | 14,190 | 17,464 | 23,773 | 30,614 | 48,450 |
| By economic sector - Trade (jobs) | | 6,975 | 9,058 | 10,423 | 12,407 | 15,429 | 24,393 |
| By economic sector - Utilities (jobs) | | 10,824 | 17,691 | 18,469 | 22,419 | 30,834 | 48,269 |
| By resource sector - Biomass (jobs) | | 16,206 | 15,828 | 14,901 | 17,562 | 14,830 | 28,297 |
| By resource sector - CO2 (jobs) | | 0 | 7,266 | 1,653 | 92.6 | 573 | 2,777 |
| By resource sector - Coal (jobs) | | 1,406 | 317 | 0 | 0 | 0 | 0 |
| By resource sector - Grid (jobs) | | 16,286 | 23,268 | 30,388 | 39,669 | 55,323 | 87,912 |
| By resource sector - Natural Gas (jobs) | | 3,461 | 2,745 | 2,291 | 2,070 | 2,505 | 2,235 |
| By resource sector - Nuclear (jobs) | | 0 | 0 | 0 | 0 | 0 | 0 |
| By resource sector - Oil (jobs) | | 3,770 | 3,335 | 2,944 | 2,598 | 2,143 | 1,670 |
| By resource sector - Solar (jobs) | | 1,655 | 4,870 | 3,251 | 5,039 | 5,919 | 17,471 |
| By resource sector - Wind (jobs) | | 15,243 | 26,483 | 34,338 | 38,124 | 48,103 | 64,048 |
| By education level - All sectors - High school diploma or less (jobs) | | 27,362 | 38,074 | 39,684 | 44,606 | 52,663 | 83,521 |
| By education level - All sectors - Associates degree or some college (jobs) | | 16,309 | 25,049 | 26,829 | 31,924 | 40,550 | 63,883 |
| By education level - All sectors - Bachelors degree (jobs) | | 11,084 | 16,160 | 17,787 | 21,770 | 27,495 | 43,301 |
| By education level - All sectors - Masters or professional degree (jobs) | | 2,835 | 4,174 | 4,702 | 5,859 | 7,425 | 11,712 |
| By education level - All sectors - Doctoral degree (jobs) | | 438 | 654 | 765 | 995 | 1,262 | 1,992 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Related work experience - All sectors - None (jobs) | | 8,890 | 12,682 | 13,353 | 15,379 | 18,646 | 29,567 |
| Related work experience - All sectors - Up to 1 year (jobs) | | 14,086 | 19,168 | 20,164 | 22,469 | 26,074 | 41,430 |
| Related work experience - All sectors - 1 to 4 years (jobs) | | 19,594 | 28,910 | 31,086 | 37,191 | 46,547 | 73,503 |
| Related work experience - All sectors - 4 to 10 years (jobs) | | 12,242 | 18,569 | 20,002 | 23,980 | 30,392 | 47,756 |
| Related work experience - All sectors - Over 10 years (jobs) | | 3,215 | 4,782 | 5,163 | 6,136 | 7,737 | 12,153 |
| On-the-Job Training - All sectors - None (jobs) | | 3,276 | 4,643 | 4,973 | 5,820 | 7,089 | 11,245 |
| On-the-Job Training - All sectors - Up to 1 year (jobs) | | 40,138 | 56,451 | 60,242 | 70,116 | 85,004 | 134,684 |
| On-the-Job Training - All sectors - 1 to 4 years (jobs) | | 10,671 | 16,630 | 17,770 | 21,164 | 26,989 | 42,354 |
| On-the-Job Training - All sectors - 4 to 10 years (jobs) | | 3,429 | 5,612 | 5,969 | 7,126 | 9,178 | 14,352 |
| On-the-Job Training - All sectors - Over 10 years (jobs) | | 514 | 774 | 813 | 927 | 1,135 | 1,773 |
| On-Site or In-Plant Training - All sectors - None (jobs) | | 9,260 | 13,526 | 14,534 | 17,282 | 21,342 | 33,743 |
| On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) | | 36,195 | 51,083 | 54,462 | 63,271 | 76,844 | 121,686 |
| On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) | | 8,506 | 13,024 | 13,888 | 16,444 | 20,796 | 32,694 |
| On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) | | 3,566 | 5,720 | 6,079 | 7,229 | 9,254 | 14,467 |
| On-Site or In-Plant Training - All sectors - Over 10 years (jobs) | | 500 | 759 | 804 | 928 | 1,159 | 1,819 |
| Wage income - All (million $2019) | | 3,021 | 4,488 | 4,881 | 5,849 | 7,371 | 11,768 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Final energy use - Transportation (PJ) | 289 | 271 | 246 | 226 | 211 | 194 | 173 |
| Final energy use - Residential (PJ) | 158 | 150 | 143 | 137 | 130 | 120 | 108 |
| Final energy use - Commercial (PJ) | 119 | 116 | 113 | 110 | 106 | 102 | 97.9 |
| Final energy use - Industry (PJ) | 698 | 728 | 742 | 746 | 756 | 762 | 767 |

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) | | 2.47 | 2.54 | 3.3 | 3.45 | 4.74 | 5.02 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Vehicle stocks - LDV – EV (1000 units) | 6.74 | 95.6 | 184 | 596 | 1,008 | 1,919 | 2,831 |
| Vehicle stocks - LDV – All others (1000 units) | 3,700 | 3,700 | 3,700 | 3,510 | 3,320 | 2,558 | 1,797 |
| Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million $2018) | | 0 | 114 | 242 | 813 | 2,567 | 3,737 |
| Public EV charging plugs - DC Fast (1000 units) | 0.103 | | 0.425 | | 2.32 | | 6.52 |
| Public EV charging plugs - L2 (1000 units) | 0.26 | | 10.2 | | 55.9 | | 157 |

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 (%) | 4.32 | 7.79 | 10.3 | 18.6 | 37.9 | 61.5 | 75.1 |
| Sales of space heating units - Electric Resistance (%) | 10.7 | 15 | 14.6 | 13.6 | 11.1 | 7.88 | 6.19 |
| Sales of space heating units - Gas (%) | 74.1 | 59.4 | 57.7 | 52.1 | 39 | 22.8 | 13.2 |
| Sales of space heating units - Fossil (%) | 10.9 | 17.8 | 17.4 | 15.8 | 12.1 | 7.79 | 5.49 |
| Sales of water heating units - Electric Heat Pump (%) | 0 | 0.379 | 1.42 | 4.88 | 13.3 | 23.9 | 30.1 |
| Sales of water heating units - Electric Resistance (%) | 25.3 | 40.4 | 40.9 | 42.9 | 47.7 | 53.9 | 57.5 |
| Sales of water heating units - Gas Furnace (%) | 74.7 | 59.2 | 57.6 | 52.2 | 39 | 22.2 | 12.3 |
| Sales of water heating units - Other (%) | 0.023 | 0.026 | 0.026 | 0.026 | 0.026 | 0.025 | 0.025 |
| Sales of cooking units - Electric Resistance (%) | 62.1 | 63.1 | 66.6 | 75.7 | 88.4 | 96.3 | 99 |
| Sales of cooking units - Gas (%) | 37.9 | 36.9 | 33.4 | 24.3 | 11.6 | 3.74 | 1.01 |
| Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018) | | 2.72 | 3.37 | | | | |

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 (%) | 2.46 | 6.56 | 8.85 | 16.3 | 34.3 | 56.8 | 70 |
| Sales of space heating units - Electric Resistance (%) | 4.11 | 5.51 | 5.75 | 6.55 | 8.23 | 10.1 | 11.1 |
| Sales of space heating units - Gas (%) | 90.9 | 85.6 | 83.2 | 75.4 | 56.5 | 32.5 | 18.5 |
| Sales of space heating units - Fossil (%) | 2.55 | 2.28 | 2.17 | 1.72 | 1.01 | 0.534 | 0.37 |
| Sales of water heating units - Electric Heat Pump (%) | 0.634 | 1.28 | 2.56 | 6.82 | 17.1 | 30.1 | 37.7 |
| Sales of water heating units - Electric Resistance (%) | 5.5 | 7.41 | 8.68 | 12.8 | 22.8 | 35.4 | 42.8 |
| Sales of water heating units - Gas (%) | 93 | 90.3 | 87.8 | 79.5 | 59.3 | 33.8 | 18.7 |
| Sales of water heating units - Other (%) | 0.862 | 0.976 | 0.957 | 0.895 | 0.802 | 0.745 | 0.724 |
| Sales of cooking units - Electric Resistance (%) | 44.8 | 49.3 | 53.1 | 63 | 76.9 | 85.5 | 88.5 |
| Sales of cooking units - Gas (%) | 55.2 | 50.7 | 46.9 | 37 | 23.1 | 14.5 | 11.5 |
| Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018) | | 9,055 | 9,867 | | | | |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Installed thermal - Coal (MW) | 5,784 | 3,083 | 0 | 0 | 0 | 0 | 0 |
| Installed thermal - Natural gas (MW) | 3,481 | 3,443 | 3,378 | 2,741 | 3,801 | 6,437 | 10,243 |
| Installed thermal - Nuclear (MW) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Capital invested - Biomass power plant (billion $2018) | 0 | 0.005 | 0.13 | 0 | 0 | 0 | 0 |
| Capital invested - Biomass w/ccu allam power plant (billion $2018) | 0 | 0 | 0 | 0 | 0.012 | 0 | 0 |
| Capital invested - Biomass w/ccu power plant (billion $2018) | 0 | 0 | 0 | 0 | 8.02 | 0.797 | 0 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Biomass power plant (GWh) | 0 | 9.52 | 264 | 264 | 264 | 264 | 264 |
| Biomass w/ccu power plant (GWh) | 0 | 0 | 0 | 0 | 9,003 | 9,897 | 9,897 |
| Biomass w/ccu allam power plant (GWh) | 0 | 0 | 0 | 0 | 11.5 | 11.5 | 11.5 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Number of facilities - Power (quantity) | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of facilities - Power ccu (quantity) | 0 | 0 | 0 | 0 | 7 | 8 | 8 |
| Number of facilities - Allam power w ccu (quantity) | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| Number of facilities - Beccs hydrogen (quantity) | 0 | 0 | 0 | 0 | 25 | 39 | 49 |
| Number of facilities - Diesel (quantity) | 0 | 0 | 0 | 1 | 2 | 2 | 2 |
| Number of facilities - Diesel ccu (quantity) | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| Number of facilities - Pyrolysis (quantity) | 0 | 0 | 0 | 1 | 2 | 2 | 2 |
| Number of facilities - Pyrolysis ccu (quantity) | 0 | 0 | 0 | 0 | 0 | 1 | 44 |
| Number of facilities - Sng (quantity) | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of facilities - Sng ccu (quantity) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Conversion capital investment - Cumulative 5-yr (million $2018) | | 5.5 | 145 | 27.7 | 29,846 | 11,171 | 70,993 |
| Biomass purchases (million $2018/y) | | 311 | 335 | 337 | 3,172 | 4,260 | 8,697 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Annual - All (MMT) | | 0 | 3.24 | 3.35 | 41.1 | 55.5 | 96.1 |
| Annual - BECCS (MMT) | | 0 | 0 | 0 | 37.8 | 52.1 | 92.6 |
| Annual - NGCC (MMT) | | 0 | 0.01 | 0 | 0 | 0 | 0 |
| Annual - Cement and lime (MMT) | | 0 | 3.24 | 3.35 | 3.32 | 3.42 | 3.53 |
| Cumulative - All (MMT) | | 0 | 3.24 | 6.59 | 47.7 | 103 | 199 |
| Cumulative - BECCS (MMT) | | 0 | 0 | 0 | 37.8 | 89.9 | 182 |
| Cumulative - NGCC (MMT) | | 0 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Cumulative - Cement and lime (MMT) | | 0 | 3.24 | 6.59 | 9.91 | 13.3 | 16.9 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Trunk (km) | | 0 | 617 | 790 | 1,407 | 1,407 | 1,407 |
| Spur (km) | | 0 | 47 | 96.9 | 1,400 | 2,882 | 4,746 |
| All (km) | | 0 | 664 | 887 | 2,807 | 4,289 | 6,153 |
| Cumulative investment - Trunk (million $2018) | | 0 | 4,230 | 5,220 | 8,425 | 8,425 | 8,425 |
| Cumulative investment - Spur (million $2018) | | 0 | 39.1 | 191 | 1,957 | 3,232 | 5,299 |
| Cumulative investment - All (million $2018) | | 0 | 4,269 | 5,411 | 10,382 | 11,657 | 13,724 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Annual (MMT) | | 0 | 0 | 0 | 0 | 0 | 0 |
| Injection wells (wells) | | 0 | 0 | 0 | 0 | 0 | 0 |
| Resource characterization, appraisal, permitting costs (million $2020) | | 0 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 |
| Wells and facilities construction costs (million $2020) | | 0 | 0 | 0.02 | 0.03 | 0.06 | 0.07 |

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) | | | | | | | -65.8 |
| Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y) | | | | | | | -256 |
| Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y) | | | | | | | -420 |
| Carbon sink potential - Low - Improve plantations (1000 tCO2e/y) | | | | | | | -20.3 |
| Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -244 |
| Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -1,245 |
| Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y) | | | | | | | -5,241 |
| Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y) | | | | | | | -536 |
| Carbon sink potential - Low - Restore productivity (1000 tCO2e/y) | | | | | | | -278 |
| Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -8,305 |
| Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -98.5 |
| Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y) | | | | | | | -895 |
| Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y) | | | | | | | -756 |
| Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y) | | | | | | | -29.7 |
| Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -488 |
| Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -2,400 |
| Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y) | | | | | | | -7,862 |
| Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y) | | | | | | | -3,805 |
| Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y) | | | | | | | -551 |
| Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -16,885 |
| Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -131 |
| Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y) | | | | | | | -1,534 |
| Carbon sink potential - High - Extend rotation length (1000 tCO2e/y) | | | | | | | -1,092 |
| Carbon sink potential - High - Improve plantations (1000 tCO2e/y) | | | | | | | -39.8 |
| Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -732 |
| Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -3,556 |
| Carbon sink potential - High - Reforest cropland (1000 tCO2e/y) | | | | | | | -10,483 |
| Carbon sink potential - High - Reforest pasture (1000 tCO2e/y) | | | | | | | -7,074 |
| Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -25,467 |
| Carbon sink potential - High - Restore productivity (1000 tCO2e/y) | | | | | | | -824 |

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 - Low - Accelerate regeneration (1000 hectares) | | | | | | | 10.7 |
| Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 195 |
| Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) | | | | | | | 213 |
| Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) | | | | | | | 7.34 |
| 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) | | | | | | | 178 |
| Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) | | | | | | | 347 |
| Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares) | | | | | | | 34.8 |
| Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) | | | | | | | 165 |
| Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares) | | | | | | | 1,151 |
| Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) | | | | | | | 16.1 |
| Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 201 |
| Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares) | | | | | | | 385 |
| Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares) | | | | | | | 11 |
| 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) | | | | | | | 258 |
| Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) | | | | | | | 520 |
| Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares) | | | | | | | 252 |
| Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) | | | | | | | 333 |
| Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares) | | | | | | | 1,976 |
| Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares) | | | | | | | 21.5 |
| Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 208 |

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 - High - Extend rotation length (1000 hectares) | | | | | | | 557 |
| Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) | | | | | | | 14.7 |
| 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) | | | | | | | 338 |
| Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) | | | | | | | 693 |
| Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) | | | | | | | 201 |
| Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) | | | | | | | 273 |
| Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) | | | | | | | 2,306 |

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) | | | | | | | -5,657 |
| Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -6,820 |
| Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -215 |
| 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) | | | | | | | -12,692 |
| Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) | | | | | | | -5,657 |
| Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y) | | | | | | | -12,929 |
| Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y) | | | | | | | -431 |
| 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) | | | | | | | -19,017 |

Table 63: *E-B+ 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) | | | | | | | 2,826 |
| Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares) | | | | | | | 3,755 |
| Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares) | | | | | | | 392 |
| Land impacted for carbon sink - Moderate deployment - Cropland to woody energy crops (1000 hectares) | | | | | | | 436 |
| Land impacted for carbon sink - Moderate deployment - Pasture to energy crops (1000 hectares) | | | | | | | 259 |
| Land impacted for carbon sink - Moderate deployment - Total (1000 hectares) | | | | | | | 7,668 |
| Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) | | | | | | | 2,826 |
| Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) | | | | | | | 17,578 |
| Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) | | | | | | | 784 |
| Land impacted for carbon sink - Aggressive deployment - Cropland to woody energy crops (1000 hectares) | | | | | | | 436 |
| Land impacted for carbon sink - Aggressive deployment - Pasture to energy crops (1000 hectares) | | | | | | | 259 |
| Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) | | | | | | | 21,883 |

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) | | 100 | 56.3 | 34.1 | 27.5 | 24.1 | 23.4 |
| Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths) | | 13 | 11.1 | 12.3 | 7.97 | 6.91 | 6.38 |
| Premature deaths from air pollution - Mobile - On-Road (deaths) | | 39.8 | 40.2 | 40.7 | 41.4 | 42.2 | 43 |
| Premature deaths from air pollution - Gas Stations (deaths) | | 3.47 | 3.5 | 3.53 | 3.58 | 3.62 | 3.66 |
| Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths) | | 8.04 | 7.31 | 6.7 | 6.3 | 6.08 | 5.91 |
| Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths) | | 0.439 | 0.376 | 0.273 | 0.174 | 0.095 | 0.05 |
| Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths) | | 2.42 | 2.43 | 2.47 | 2.51 | 2.47 | 2.4 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths) | | 3.82 | 3.79 | 3.76 | 3.71 | 3.66 | 3.61 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths) | | 6 | 5.77 | 5.23 | 4.62 | 4.28 | 4.21 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths) | | 1.08 | 1.05 | 1.02 | 0.966 | 0.927 | 0.903 |
| Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths) | | 0.581 | 0.585 | 0.591 | 0.595 | 0.599 | 0.606 |
| Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths) | | 1.37 | 0.895 | 0.689 | 0.636 | 0.599 | 0.547 |
| Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths) | | 48 | 49.8 | 50.3 | 47.6 | 46.8 | 43.4 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million $2019) | | 890 | 499 | 302 | 243 | 214 | 207 |
| Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million $2019) | | 115 | 98.7 | 109 | 70.6 | 61.2 | 56.5 |
| Monetary damages from air pollution - Mobile - On-Road (million $2019) | | 354 | 357 | 362 | 368 | 375 | 382 |
| Monetary damages from air pollution - Gas Stations (million $2019) | | 30.7 | 31 | 31.2 | 31.7 | 32.1 | 32.4 |
| Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million $2019) | | 71.2 | 64.8 | 59.4 | 55.8 | 53.9 | 52.3 |
| Monetary damages from air pollution - Fuel Comb - Residential - Oil (million $2019) | | 3.89 | 3.33 | 2.42 | 1.54 | 0.841 | 0.447 |
| Monetary damages from air pollution - Fuel Comb - Residential - Other (million $2019) | | 21.5 | 21.5 | 21.9 | 22.3 | 21.9 | 21.3 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million $2019) | | 33.8 | 33.6 | 33.3 | 32.9 | 32.4 | 31.9 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million $2019) | | 53.1 | 51.1 | 46.3 | 40.9 | 37.9 | 37.3 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million $2019) | | 9.57 | 9.33 | 9 | 8.55 | 8.2 | 8 |
| Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million $2019) | | 5.15 | 5.18 | 5.23 | 5.26 | 5.31 | 5.36 |
| Monetary damages from air pollution - Industrial Processes - Coal Mining (million $2019) | | 12.1 | 7.9 | 6.08 | 5.61 | 5.28 | 4.83 |
| Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million $2019) | | 426 | 442 | 447 | 423 | 416 | 385 |

Table 65: *REF scenario - IMPACTS - Jobs*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| By economic sector - Agriculture (jobs) | | 6,921 | 6,919 | 6,919 | 6,919 | 6,919 | 6,919 |
| By economic sector - Construction (jobs) | | 9,156 | 9,825 | 10,408 | 12,550 | 13,652 | 14,942 |
| By economic sector - Manufacturing (jobs) | | 6,326 | 6,391 | 6,381 | 6,679 | 6,653 | 6,715 |
| By economic sector - Mining (jobs) | | 1,987 | 1,567 | 1,246 | 1,025 | 871 | 708 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| By economic sector - Other (jobs) | | 660 | 793 | 932 | 1,222 | 1,393 | 1,710 |
| By economic sector - Pipeline (jobs) | | 428 | 451 | 460 | 437 | 443 | 441 |
| By economic sector - Professional (jobs) | | 6,533 | 6,814 | 7,141 | 8,889 | 9,946 | 11,022 |
| By economic sector - Trade (jobs) | | 5,856 | 5,564 | 5,434 | 6,150 | 6,589 | 7,143 |
| By economic sector - Utilities (jobs) | | 9,674 | 9,517 | 9,495 | 11,021 | 12,235 | 13,199 |
| By resource sector - Biomass (jobs) | | 16,207 | 15,756 | 15,351 | 14,985 | 14,658 | 14,361 |
| By resource sector - CO2 (jobs) | | 0 | 0 | 0 | 0 | 0 | 0 |
| By resource sector - Coal (jobs) | | 2,195 | 1,469 | 719 | 472 | 450 | 173 |
| By resource sector - Grid (jobs) | | 14,054 | 13,924 | 14,107 | 17,492 | 19,544 | 21,757 |
| By resource sector - Natural Gas (jobs) | | 3,947 | 4,043 | 4,269 | 3,840 | 4,143 | 4,026 |
| By resource sector - Nuclear (jobs) | | 0 | 0 | 0 | 0 | 0 | 0 |
| By resource sector - Oil (jobs) | | 3,794 | 3,396 | 3,087 | 2,902 | 2,773 | 2,687 |
| By resource sector - Solar (jobs) | | | 764 | 1,333 | 1,499 | 1,411 | 2,346 |
| By resource sector - Wind (jobs) | | 7,343 | 8,490 | 9,551 | 13,701 | 15,722 | 17,450 |
| By education level - All sectors - High school diploma or less (jobs) | | 23,152 | 23,220 | 23,398 | 25,906 | 27,320 | 28,895 |
| By education level - All sectors - Associates degree or some college (jobs) | | 12,950 | 13,139 | 13,400 | 15,541 | 16,836 | 18,211 |
| By education level - All sectors - Bachelors degree (jobs) | | 8,872 | 8,884 | 8,966 | 10,338 | 11,157 | 12,016 |
| By education level - All sectors - Masters or professional degree (jobs) | | 2,240 | 2,265 | 2,307 | 2,695 | 2,934 | 3,183 |
| By education level - All sectors - Doctoral degree (jobs) | | 326 | 334 | 344 | 412 | 452 | 494 |
| Related work experience - All sectors - None (jobs) | | 7,428 | 7,457 | 7,527 | 8,431 | 8,968 | 9,552 |
| Related work experience - All sectors - Up to 1 year (jobs) | | 11,945 | 12,006 | 12,118 | 13,376 | 14,073 | 14,861 |
| Related work experience - All sectors - 1 to 4 years (jobs) | | 15,870 | 15,950 | 16,141 | 18,484 | 19,878 | 21,365 |
| Related work experience - All sectors - 4 to 10 years (jobs) | | 9,730 | 9,833 | 9,994 | 11,566 | 12,511 | 13,501 |
| Related work experience - All sectors - Over 10 years (jobs) | | 2,568 | 2,595 | 2,635 | 3,035 | 3,271 | 3,520 |
| On-the-Job Training - All sectors - None (jobs) | | 2,681 | 2,686 | 2,707 | 3,049 | 3,242 | 3,460 |
| On-the-Job Training - All sectors - Up to 1 year (jobs) | | 33,397 | 33,465 | 33,737 | 37,871 | 40,270 | 42,876 |
| On-the-Job Training - All sectors - 1 to 4 years (jobs) | | 8,414 | 8,559 | 8,745 | 10,181 | 11,052 | 11,966 |
| On-the-Job Training - All sectors - 4 to 10 years (jobs) | | 2,647 | 2,721 | 2,806 | 3,310 | 3,624 | 3,949 |
| On-the-Job Training - All sectors - Over 10 years (jobs) | | 401 | 411 | 420 | 480 | 512 | 548 |
| On-Site or In-Plant Training - All sectors - None (jobs) | | 7,456 | 7,523 | 7,627 | 8,697 | 9,316 | 9,990 |
| On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) | | 30,110 | 30,178 | 30,432 | 34,186 | 36,372 | 38,744 |
| On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) | | 6,782 | 6,877 | 7,008 | 8,099 | 8,754 | 9,449 |
| On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) | | 2,786 | 2,850 | 2,926 | 3,424 | 3,734 | 4,052 |
| On-Site or In-Plant Training - All sectors - Over 10 years (jobs) | | 406 | 414 | 423 | 485 | 524 | 564 |
| Wage income - All (million $2019) | | 2,468 | 2,519 | 2,589 | 2,995 | 3,268 | 3,559 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Final energy use - Transportation (PJ) | 289 | 271 | 248 | 234 | 233 | 240 | 249 |

Table 66: *REF scenario - PILLAR 1: Efficiency/Electrification - Overview (continued)*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Final energy use - Residential (PJ) | 158 | 150 | 146 | 144 | 143 | 143 | 143 |
| Final energy use - Commercial (PJ) | 119 | 119 | 119 | 117 | 116 | 116 | 120 |
| Final energy use - Industry (PJ) | 698 | 736 | 756 | 769 | 790 | 805 | 826 |

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) | | 2.55 | 2.62 | 2.79 | 2.88 | 2.99 | 3.08 |

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 (%) | 3.44 | 11.4 | 11.7 | 12.3 | 12.7 | 13.2 | 13.9 |
| Sales of space heating units - Electric Resistance (%) | 10.9 | 14.5 | 14.3 | 14.1 | 13.9 | 13.4 | 12.8 |
| Sales of space heating units - Gas (%) | 74.6 | 57.6 | 57.9 | 57.8 | 57.8 | 58 | 57.7 |
| Sales of space heating units - Fossil (%) | 11.1 | 16.5 | 16.1 | 15.8 | 15.5 | 15.4 | 15.5 |
| Sales of water heating units - Electric Heat Pump (%) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sales of water heating units - Electric Resistance (%) | 25.3 | 40.2 | 40.1 | 40 | 40 | 40 | 40 |
| Sales of water heating units - Gas Furnace (%) | 74.7 | 59.8 | 59.9 | 59.9 | 59.9 | 60 | 60 |
| Sales of water heating units - Other (%) | 0.023 | 0.026 | 0.026 | 0.026 | 0.026 | 0.026 | 0.026 |
| Sales of cooking units - Electric Resistance (%) | 61.8 | 61.8 | 61.8 | 61.8 | 61.8 | 61.8 | 61.8 |
| Sales of cooking units - Gas (%) | 38.2 | 38.2 | 38.2 | 38.2 | 38.2 | 38.2 | 38.2 |
| Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018) | | 2.62 | 2.76 | | | | |

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 (%) | 2.46 | 13 | 44.6 | 70.4 | 74.7 | 75.1 | 75.2 |
| Sales of space heating units - Electric Resistance (%) | 4.11 | 6.34 | 10.8 | 18.4 | 23.5 | 24.3 | 24.4 |
| Sales of space heating units - Gas (%) | 90.9 | 78.4 | 43 | 10.4 | 1.69 | 0.519 | 0.457 |
| Sales of space heating units - Fossil (%) | 2.55 | 2.22 | 1.72 | 0.767 | 0.114 | 0.009 | 0 |
| Sales of water heating units - Electric Heat Pump (%) | 0.634 | 0.814 | 0.811 | 0.811 | 0.809 | 0.805 | 0.804 |
| Sales of water heating units - Electric Resistance (%) | 5.5 | 6.96 | 6.98 | 6.96 | 6.96 | 6.97 | 6.97 |
| Sales of water heating units - Gas (%) | 93 | 91.2 | 91.2 | 91.2 | 91.3 | 91.2 | 91.2 |
| Sales of water heating units - Other (%) | 0.862 | 0.984 | 0.985 | 0.982 | 0.981 | 0.985 | 0.986 |
| Sales of cooking units - Electric Resistance (%) | 44.8 | 47.8 | 47.9 | 47.8 | 47.9 | 47.9 | 48 |
| Sales of cooking units - Gas (%) | 55.2 | 52.2 | 52.1 | 52.2 | 52.1 | 52.1 | 52 |
| Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018) | | 8,949 | 9,212 | | | | |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Installed thermal - Coal (MW) | 5,784 | 5,406 | 3,113 | 1,400 | 1,400 | 1,400 | 0 |
| Installed thermal - Natural gas (MW) | 3,497 | 5,293 | 5,439 | 5,204 | 5,135 | 4,783 | 7,447 |
| Installed thermal - Nuclear (MW) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Installed renewables - Rooftop PV (MW) | 173 | 309 | 395 | 526 | 699 | 901 | 1,141 |

Table 70: *REF scenario - PILLAR 2: Clean Electricity - Generating capacity (continued)*

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Installed renewables - Solar - Base land use assumptions (MW) | 91.5 | 91.5 | 91.5 | 245 | 572 | 572 | 572 |
| Installed renewables - Wind - Base land use assumptions (MW) | 10,744 | 10,744 | 10,744 | 11,366 | 16,428 | 21,098 | 22,484 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Solar - Base land use assumptions (GWh) | 195 | 195 | 195 | 486 | 1,101 | 1,101 | 1,101 |
| Wind - Base land use assumptions (GWh) | 41,883 | 41,883 | 41,883 | 44,041 | 61,478 | 77,552 | 82,405 |
| 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) | 3.55 | | -2.54 | | | | -2.27 |
| Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y) | -0.199 | | -0.358 | | | | -0.373 |
| Business-as-usual carbon sink - Total (Mt CO2e/y) | 3.35 | | -2.9 | | | | -2.65 |

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) | | | | | | | -65.8 |
| Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y) | | | | | | | -256 |
| Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y) | | | | | | | -420 |
| Carbon sink potential - Low - Improve plantations (1000 tCO2e/y) | | | | | | | -20.3 |
| Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -244 |
| Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -1,245 |
| Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y) | | | | | | | -5,241 |
| Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y) | | | | | | | -536 |
| Carbon sink potential - Low - Restore productivity (1000 tCO2e/y) | | | | | | | -278 |
| Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -8,305 |
| Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -98.5 |
| Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y) | | | | | | | -895 |
| Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y) | | | | | | | -756 |
| Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y) | | | | | | | -29.7 |
| Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -488 |
| Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -2,400 |
| Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y) | | | | | | | -7,862 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y) | | | | | | | -3,805 |
| Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y) | | | | | | | -551 |
| Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -16,885 |
| Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y) | | | | | | | -131 |
| Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y) | | | | | | | -1,534 |
| Carbon sink potential - High - Extend rotation length (1000 tCO2e/y) | | | | | | | -1,092 |
| Carbon sink potential - High - Improve plantations (1000 tCO2e/y) | | | | | | | -39.8 |
| Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y) | | | | | | | -732 |
| Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y) | | | | | | | -3,556 |
| Carbon sink potential - High - Reforest cropland (1000 tCO2e/y) | | | | | | | -10,483 |
| Carbon sink potential - High - Reforest pasture (1000 tCO2e/y) | | | | | | | -7,074 |
| Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y) | | | | | | | -25,467 |
| Carbon sink potential - High - Restore productivity (1000 tCO2e/y) | | | | | | | -824 |
| Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) | | | | | | | 10.7 |
| Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 195 |
| Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) | | | | | | | 213 |
| Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) | | | | | | | 7.34 |
| 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) | | | | | | | 178 |
| Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) | | | | | | | 347 |
| Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares) | | | | | | | 34.8 |
| Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) | | | | | | | 165 |
| Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares) | | | | | | | 1,151 |
| Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) | | | | | | | 16.1 |
| Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 201 |

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

| Item | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|
| Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares) | | | | | | | 385 |
| Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares) | | | | | | | 11 |
| 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) | | | | | | | 258 |
| Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) | | | | | | | 520 |
| Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares) | | | | | | | 252 |
| Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) | | | | | | | 333 |
| Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares) | | | | | | | 1,976 |
| Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares) | | | | | | | 21.5 |
| Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) | | | | | | | 208 |
| Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares) | | | | | | | 557 |
| Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) | | | | | | | 14.7 |
| 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) | | | | | | | 338 |
| Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) | | | | | | | 693 |
| Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) | | | | | | | 201 |
| Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) | | | | | | | 273 |
| Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) | | | | | | | 2,306 |