Net-Zero America - idaho state report

2021-03-18

These data underlie graphs and tables presented in the Princeton Net-Zero America study:

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Notes

- These data are all data from the study available at https://netzeroamerica.princeton.edu.
- The Net-Zero America study describes five pathways to reach net-zero emissions and one "no new policies" reference scenario. In this document, state-level results are grouped by scenario. For some scenarios, the study generated national, but not state-level results.
- Within results for a given scenario, data tables are organized into corresponding sections of the full net-zero study (e.g., Pillar 1, Pillar 2, etc.)
- For Pillar 6 (Land sinks), values shown are maximum carbon storage potentials.

Data by category and subcategory

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

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		4,239	4,716				
Sales of cooking units - Electric Resistance (%)	41.9	54.6	83	88.6	88.9	88.9	88.9
Sales of cooking units - Gas (%)	58.1	45.4	17	11.4	11.1	11.1	11.1
Sales of space heating units - Electric Heat Pump (%)	3.53	8.34	31.3	81.3	90.2	90.7	90.8
Sales of space heating units - Electric Resistance (%)	3.3	3.52	4.98	8.12	8.7	8.74	8.73
Sales of space heating units - Fossil (%)	1.07	0.221	0.042	0.002	0	0	0
Sales of space heating units - Gas Furnace (%)	92.1	87.9	63.7	10.6	1.11	0.511	0.508
Sales of water heating units - Electric Heat Pump (%)	0.03	1.08	14.4	43.7	48.9	49.2	49.2
Sales of water heating units - Electric Resistance (%)	1.46	2.52	15.8	44.9	50.1	50.4	50.4
Sales of water heating units - Gas Furnace (%)	98.1	96	69.4	11.1	0.657	0	0
Sales of water heating units - Other (%)	0.366	0.384	0.383	0.384	0.383	0.384	0.383

Table 2: *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)		1.28	1.35	2.22	2.38	2.18	2.3

Table 3: *E+ scenario - PILLAR 1: Efficiency/Electrification - Overview*

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	49	49.1	48.2	46	43.3	41.4	40.7
Final energy use - Industry (PJ)	165	175	179	179	180	185	191
Final energy use - Residential (PJ)	71.3	68.1	65.2	58.8	51.1	45.3	41.4
Final energy use - Transportation (PJ)	150	141	124	104	85.9	74.5	69.8

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

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018)		1.25	1.37				
Sales of cooking units - Electric Resistance (%)	61.7	69.9	94.8	99.7	100	100	100
Sales of cooking units - Gas (%)	38.3	30.1	5.15	0.259	0	0	0
Sales of space heating units - Electric Heat Pump (%)	9.46	20.4	40.3	80.7	88.3	89	88.8
Sales of space heating units - Electric Resistance (%)	10.7	17	13.5	5.83	4.48	4.43	4.48
Sales of space heating units - Fossil (%)	6.36	10.6	9.29	6.2	5.2	4.89	5.13
Sales of space heating units - Gas (%)	73.4	52.1	37	7.24	1.97	1.65	1.64
Sales of water heating units - Electric Heat Pump (%)	0	0.814	11.1	33.7	37.7	38	38
Sales of water heating units - Electric Resistance (%)	21.3	36.7	43.2	57.2	59.8	59.9	59.9
Sales of water heating units - Gas Furnace (%)	76.7	60.4	43.6	6.97	0.411	0	0
Sales of water heating units - Other (%)	1.97	2.09	2.1	2.1	2.1	2.1	2.1

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

Item	2020	2025	2030	2035	2040	2045	2050
Light-duty vehicle capital costs - Cumulative 5-yr (million $2018)		361	924	1,498	2,269	2,469	2,354
Public EV charging plugs - DC Fast (1000 units)	0.066		0.688		3.02		4.88
Public EV charging plugs - L2 (1000 units)	0.128		16.6		72.7		118
Vehicle sales - Heavy-duty - diesel (%)	97.2	92.1	67	23.3	4.22	0.628	0
Vehicle sales - Heavy-duty - EV (%)	0.588	3.81	19	45.6	57.4	59.6	60
Vehicle sales - Heavy-duty - gasoline (%)	0.227	0.227	0.176	0.066	0.013	0.002	0
Vehicle sales - Heavy-duty - hybrid (%)	0.082	0.09	0.077	0.031	0.007	0.001	0
Vehicle sales - Heavy-duty - hydrogen FC (%)	0.392	2.54	12.7	30.4	38.2	39.7	40
Vehicle sales - Heavy-duty - other (%)	1.5	1.23	1.07	0.568	0.163	0.038	0
Vehicle sales - Light-duty - diesel (%)	1.91	2.13	1.41	0.454	0.081	0.013	0
Vehicle sales - Light-duty - EV (%)	2.71	11.5	40.7	79.5	96	99.3	100
Vehicle sales - Light-duty - gasoline (%)	91.9	82.2	54.8	18.9	3.6	0.6	0
Vehicle sales - Light-duty - hybrid (%)	3.24	3.69	2.8	1.08	0.255	0.053	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.36	0.233	0.074	0.014	0.002	0
Vehicle sales - Light-duty - other (%)	0.118	0.114	0.079	0.028	0.005	0.001	0
Vehicle sales - Medium-duty - diesel (%)	64.7	59.7	42.3	14.4	2.59	0.384	0
Vehicle sales - Medium-duty - EV (%)	0.784	5.07	25.3	60.8	76.5	79.5	80
Vehicle sales - Medium-duty - gasoline (%)	33.7	33.3	25.5	9.32	1.77	0.277	0
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.402	0.341	0.14	0.03	0.005	0
Vehicle sales - Medium-duty - hydrogen FC (%)	0.196	1.27	6.33	15.2	19.1	19.9	20
Vehicle sales - Medium-duty - other (%)	0.253	0.255	0.205	0.083	0.019	0.004	0

Table 6: *E+ scenario - PILLAR 2: Clean Electricity - Generating capacity*

Item	2020	2025	2030	2035	2040	2045	2050
Capital invested - Biomass power plant (billion $2018)	0	0	0	0	0	0	0
Capital invested - Biomass w/ccu allam power plant (billion $2018)	0	0	0	0	0	0	0
Capital invested - Biomass w/ccu power plant (billion $2018)	0	0	0	0	0	0	0
Capital invested - Solar PV - Base (billion $2018)		0	0	0	0	0	0
Capital invested - Solar PV - Constrained (billion $2018)		0.002	0	0	0	0	0
Capital invested - Wind - Base (billion $2018)		0	17.1	6.28	5.04	5.17	0.609
Capital invested - Wind - Constrained (billion $2018)		0	14.8	7.01	7.45	5.78	0.297
Installed renewables - OffshoreWind - Base land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - OffshoreWind - Constrained land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - Rooftop PV (MW)	393	606	810	1,055	1,347	1,687	2,089
Installed renewables - Solar - Base land use assumptions (MW)	2	2	2	2	2	2	2
Installed renewables - Solar - Constrained land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - Wind - Base land use assumptions (MW)	952	952	13,786	18,850	23,115	27,723	28,298
Installed renewables - Wind - Constrained land use assumptions (MW)	1,034	1,034	12,987	18,481	25,008	30,182	30,390

Table 7: *E+ scenario - PILLAR 2: Clean Electricity - Generation*

Item	2020	2025	2030	2035	2040	2045	2050
Biomass power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu allam power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu power plant (GWh)	0	0	0	0	0	0	0
OffshoreWind - Base land use assumptions (GWh)	0	0	0	0	0	0	0
OffshoreWind - Constrained land use assumptions (GWh)	0	0	0	0	0	0	0
Solar - Base land use assumptions (GWh)	4.27	4.27	4.27	4.27	4.27	4.27	4.27
Solar - Constrained land use assumptions (GWh)	0	0	0	0	0	0	0
Wind - Base land use assumptions (GWh)	3,041	3,041	41,571	55,922	67,439	79,837	81,354
Wind - Constrained land use assumptions (GWh)	3,306	3,306	37,783	52,357	68,321	80,402	80,877

Table 8: *E+ scenario - PILLAR 3: Clean fuels - Bioenergy*

Item	2020	2025	2030	2035	2040	2045	2050
Biomass purchases (million $2018/year)		0	0	0	0	0	55.2
Conversion capital investment - Cumulative 5-yr (million $2018)		0	0	0	0	0	871
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	0	3
Number of facilities - Diesel (quantity)	0	0	0	0	0	0	0
Number of facilities - Diesel ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Power (quantity)	0	0	0	0	0	0	0
Number of facilities - Power ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Pyrolysis (quantity)	0	0	0	0	0	0	0
Number of facilities - Pyrolysis ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng ccu (quantity)	0	0	0	0	0	0	0

Table 9: *E+ scenario - PILLAR 4: CCUS - CO2 capture*

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0	0	0	0	1.08
Annual - BECCS (MMT)		0	0	0	0	0	1.08
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Annual - NGCC (MMT)		0	0	0	0	0	0
Cumulative - All (MMT)		0	0	0	0	0	1.08
Cumulative - BECCS (MMT)		0	0	0	0	0	1.08
Cumulative - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - NGCC (MMT)		0	0	0	0	0	0

Table 10: *E+ scenario - PILLAR 4: CCUS - CO2 pipelines*

Item	2020	2025	2030	2035	2040	2045	2050
All (km)		0	0	177	177	177	508
Cumulative investment - All (million $2018)		0	0	423	423	423	606
Cumulative investment - Spur (million $2018)		0	0	0	0	0	183
Cumulative investment - Trunk (million $2018)		0	0	423	423	423	423
Spur (km)		0	0	0	0	0	332
Trunk (km)		0	0	177	177	177	177

Table 11: *E+ scenario - PILLAR 4: CCUS - CO2 storage*

Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (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	0	0	0	0
Wells and facilities construction costs (million $2020)		0	0	0	0	0	0

Table 12: *E+ scenario - PILLAR 6: Land sinks - Agriculture*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-1,914
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-62.8
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-1,976
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-972
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-31.4
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-1,003
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							2,284
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							104
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							2,387
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							1,168
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							51.8
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							1,220

Table 13: *E+ scenario - PILLAR 6: Land sinks - Forests*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-4,423
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-31,032
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-793
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-4,659
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-290
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4,259
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-812
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,953
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,080
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-6,761
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-2,216
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-11,479
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-132
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-1,790
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-148
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1,420
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-284
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,977
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-233
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,279
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-3,320
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-21,253
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-463
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-3,224
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-217
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-2,839
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-548
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,465
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-1,656
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-4,520

Table 13: *E+ scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							724
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							107
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							2,376
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							107
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)							77.2
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							394
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							87.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,241
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,113
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							362
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							101
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							910
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							53.5
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)							40.6
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							197
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							15.2
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,356
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,035
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							543

Table 13: *E+ scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							104
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							1,643
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							80.5
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)							58.9
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							295
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							110
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,731
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,565

Table 14: *E+ scenario - IMPACTS - Fossil fuel industries*

Item	2020	2025	2030	2035	2040	2045	2050
Natural gas consumption - Annual (tcf)		86.5	72.9	58.5	44	27.7	19.2
Natural gas consumption - Cumulative (tcf)							1,761
Natural gas production - Annual (tcf)		2.13	2.02	1.76	1.48	1.18	0.915
Oil consumption - Annual (million bbls)		31.7	27.2	20.5	14.1	9.1	4.81
Oil consumption - Cumulative (million bbls)							629
Oil production - Annual (million bbls)		0.114	0.114	0.114	0.091	0.074	0.049

Table 15: *E+ scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		42.2	0.049	0.048	0.042	0.027	0
Monetary damages from air pollution - Natural Gas (million 2019$)		12.5	7.09	5.76	5.23	3.46	1.91
Monetary damages from air pollution - Transportation (million 2019$)		125	120	93.3	54.7	25	9.4
Premature deaths from air pollution - Coal (deaths)		4.77	0.005	0.005	0.005	0.003	0
Premature deaths from air pollution - Natural Gas (deaths)		1.41	0.8	0.651	0.591	0.39	0.216
Premature deaths from air pollution - Transportation (deaths)		14.1	13.5	10.5	6.15	2.81	1.06

Table 16: *E+ scenario - IMPACTS - Jobs*

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		143	185	130	77.8	26	66.9
By economic sector - Construction (jobs)		2,221	7,427	8,396	8,720	9,256	9,387
By economic sector - Manufacturing (jobs)		1,309	2,451	2,881	2,696	2,467	2,658
By economic sector - Mining (jobs)		581	414	265	155	83.3	39.4

Table 16: *E+ scenario - IMPACTS - Jobs (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Other (jobs)		267	741	905	1,047	1,208	1,521
By economic sector - Pipeline (jobs)		123	105	133	58.9	37.3	51.3
By economic sector - Professional (jobs)		1,077	4,833	5,675	6,291	7,026	7,209
By economic sector - Trade (jobs)		828	2,548	3,001	3,366	3,831	4,122
By economic sector - Utilities (jobs)		1,550	5,647	6,258	6,471	7,088	6,824
By education level - All sectors - Associates degree or some college (jobs)		2,479	7,748	8,866	9,295	10,016	10,294
By education level - All sectors - Bachelors degree (jobs)		1,682	5,081	5,777	6,080	6,583	6,749
By education level - All sectors - Doctoral degree (jobs)		60.1	214	246	266	293	302
By education level - All sectors - High school diploma or less (jobs)		3,471	9,990	11,249	11,637	12,374	12,734
By education level - All sectors - Masters or professional degree (jobs)		406	1,318	1,506	1,605	1,756	1,800
By resource sector - Biomass (jobs)		413	459	309	198	99.6	303
By resource sector - CO2 (jobs)		0	0	419	0	0	236
By resource sector - Coal (jobs)		2.46	0.823	0	0	0	0
By resource sector - Grid (jobs)		1,910	9,465	10,247	11,504	12,808	12,127
By resource sector - Natural Gas (jobs)		922	775	780	569	462	473
By resource sector - Nuclear (jobs)		303	298	173	0	0	0
By resource sector - Oil (jobs)		1,419	1,118	783	500	302	151
By resource sector - Solar (jobs)		2,066	2,102	2,734	2,943	3,155	5,306
By resource sector - Wind (jobs)		1,063	10,133	12,199	13,170	14,195	13,283
Median wages - Annual - All ($2019 per job)		54,810	56,192	56,868	57,799	58,888	59,480
On-Site or In-Plant Training - Total jobs - 1 to 4 years (jobs)		1,297	3,998	4,551	4,755	5,112	5,233
On-Site or In-Plant Training - Total jobs - 4 to 10 years (jobs)		535	1,754	2,002	2,100	2,271	2,311
On-Site or In-Plant Training - Total jobs - None (jobs)		1,324	4,005	4,560	4,772	5,130	5,291
On-Site or In-Plant Training - Total jobs - Over 10 years (jobs)		66.7	218	250	262	282	288
On-Site or In-Plant Training - Total jobs - Up to 1 year (jobs)		4,876	14,376	16,282	16,994	18,226	18,755
On-the-Job Training - All sectors - 1 to 4 years (jobs)		1,661	5,196	5,925	6,197	6,671	6,820
On-the-Job Training - All sectors - 4 to 10 years (jobs)		519	1,741	1,991	2,093	2,266	2,308
On-the-Job Training - All sectors - None (jobs)		454	1,325	1,502	1,571	1,690	1,752
On-the-Job Training - All sectors - Over 10 years (jobs)		81.6	233	265	272	287	296
On-the-Job Training - All sectors - Up to 1 year (jobs)		5,383	15,856	17,962	18,751	20,108	20,703
Related work experience - All sectors - 1 to 4 years (jobs)		2,897	8,751	9,935	10,405	11,205	11,506
Related work experience - All sectors - 4 to 10 years (jobs)		1,863	5,764	6,570	6,883	7,418	7,590
Related work experience - All sectors - None (jobs)		1,167	3,475	3,942	4,113	4,416	4,553
Related work experience - All sectors - Over 10 years (jobs)		499	1,494	1,699	1,772	1,901	1,944
Related work experience - All sectors - Up to 1 year (jobs)		1,673	4,867	5,498	5,710	6,082	6,286
Wage income - All (million $2019)		444	1,368	1,572	1,670	1,827	1,896

Table 17: *E- scenario - PILLAR 1: Efficiency/Electrification - Commercial*

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		4,239	4,714				
Sales of cooking units - Electric Resistance (%)	41.9	46.2	50.2	60.8	75.4	84.6	87.8
Sales of cooking units - Gas (%)	58.1	53.8	49.8	39.2	24.6	15.4	12.2
Sales of space heating units - Electric Heat Pump (%)	3.53	7.33	9.61	17.1	35.2	58.2	71.6
Sales of space heating units - Electric Resistance (%)	3.3	3.45	3.58	4.06	5.22	6.69	7.54
Sales of space heating units - Fossil (%)	1.07	0.256	0.242	0.19	0.113	0.063	0.046
Sales of space heating units - Gas Furnace (%)	92.1	89	86.6	78.7	59.5	35.1	20.8
Sales of water heating units - Electric Heat Pump (%)	0.03	0.512	1.83	6.23	16.9	30.4	38.3
Sales of water heating units - Electric Resistance (%)	1.46	1.95	3.27	7.65	18.2	31.6	39.5
Sales of water heating units - Gas Furnace (%)	98.1	97.2	94.5	85.7	64.5	37.6	21.8
Sales of water heating units - Other (%)	0.366	0.384	0.383	0.384	0.383	0.384	0.383

Table 18: *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)		1.09	1.13	1.39	1.45	2.09	2.22

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	49	49.1	48.9	48.7	48	47.1	46.1
Final energy use - Industry (PJ)	165	176	181	184	188	193	197
Final energy use - Residential (PJ)	71.3	68.1	66.1	64.1	61.5	57.8	53.1
Final energy use - Transportation (PJ)	150	142	130	120	112	103	93

Table 20: *E- scenario - PILLAR 1: Efficiency/Electrification - Residential*

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018)		1.25	1.37				
Sales of cooking units - Electric Resistance (%)	61.6	62.6	66.1	75.4	88.3	96.2	99
Sales of cooking units - Gas (%)	38.4	37.4	33.9	24.6	11.7	3.79	1.02
Sales of space heating units - Electric Heat Pump (%)	9.46	19.2	21.1	27.7	43.3	62.6	73.4
Sales of space heating units - Electric Resistance (%)	10.7	17.2	16.8	15.7	12.9	9.42	7.34
Sales of space heating units - Fossil (%)	6.36	10.7	10.8	9.99	8.15	6.52	6.16
Sales of space heating units - Gas (%)	73.4	53	51.3	46.6	35.6	21.5	13.1
Sales of water heating units - Electric Heat Pump (%)	0	0.373	1.39	4.79	13	23.4	29.5
Sales of water heating units - Electric Resistance (%)	21.3	36.4	37.1	39.3	44.4	50.9	54.7
Sales of water heating units - Gas Furnace (%)	76.7	61.1	59.4	53.8	40.4	23.6	13.6
Sales of water heating units - Other (%)	1.97	2.1	2.1	2.11	2.11	2.11	2.11

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

Item	2020	2025	2030	2035	2040	2045	2050
Light-duty vehicle capital costs - Cumulative 5-yr (million $2018)		0	58.3	123	414	1,303	1,898
Public EV charging plugs - DC Fast (1000 units)	0.066		0.213		1.12		3.13
Public EV charging plugs - L2 (1000 units)	0.128		5.12		27		75.3
Vehicle sales - Heavy-duty - diesel (%)	97.4	96	91.3	79.8	58.2	32.1	13.7
Vehicle sales - Heavy-duty - EV (%)	0.498	1.45	4.11	10.8	23.6	39.5	51
Vehicle sales - Heavy-duty - gasoline (%)	0.228	0.236	0.239	0.225	0.179	0.109	0.051
Vehicle sales - Heavy-duty - hybrid (%)	0.083	0.094	0.104	0.107	0.092	0.06	0.03
Vehicle sales - Heavy-duty - hydrogen FC (%)	0.332	0.969	2.74	7.17	15.7	26.3	34
Vehicle sales - Heavy-duty - other (%)	1.5	1.28	1.46	1.95	2.25	1.96	1.14
Vehicle sales - Light-duty - diesel (%)	1.92	2.27	2.13	1.71	1.13	0.586	0.249
Vehicle sales - Light-duty - EV (%)	1.46	3.76	9.89	22.7	44.8	69.7	86.6
Vehicle sales - Light-duty - gasoline (%)	93	89.2	82.7	70.7	50.2	27.4	11.9
Vehicle sales - Light-duty - hybrid (%)	3.34	4.23	4.82	4.56	3.59	2.23	1.12
Vehicle sales - Light-duty - hydrogen FC (%)	0.114	0.391	0.348	0.273	0.2	0.113	0.052
Vehicle sales - Light-duty - other (%)	0.119	0.122	0.114	0.1	0.074	0.041	0.019
Vehicle sales - Medium-duty - diesel (%)	64.8	62.2	57.7	49.4	35.6	19.6	8.37
Vehicle sales - Medium-duty - EV (%)	0.664	1.94	5.49	14.3	31.4	52.6	68
Vehicle sales - Medium-duty - gasoline (%)	33.8	34.7	34.7	31.9	24.4	14.2	6.33
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.418	0.464	0.478	0.414	0.275	0.141
Vehicle sales - Medium-duty - hydrogen FC (%)	0.166	0.485	1.37	3.58	7.86	13.2	17
Vehicle sales - Medium-duty - other (%)	0.253	0.266	0.279	0.286	0.258	0.184	0.102

Table 22: *E- scenario - PILLAR 6: Land sinks - Agriculture*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-1,914
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-62.8
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-1,976
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-972
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-31.4
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-1,003
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							2,284
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							104

Table 22: *E- scenario - PILLAR 6: Land sinks - Agriculture (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							2,387
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							1,168
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							51.8
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							1,220

Table 23: *E- scenario - PILLAR 6: Land sinks - Forests*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-4,423
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-31,032
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-793
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-4,659
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-290
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4,259
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-812
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,953
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,080
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-6,761
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-2,216
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-11,479
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-132
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-1,790
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-148
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1,420
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-284
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,977
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-233
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,279
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-3,320

Table 23: *E- scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-21,253
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-463
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-3,224
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-217
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-2,839
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-548
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,465
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-1,656
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-4,520
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							724
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							107
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							2,376
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							107
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)							77.2
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							394
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							87.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,241
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,113
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							362
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							101
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							910
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							53.5
Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares)							0

Table 23: *E- scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares)							40.6
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							197
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							15.2
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,356
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,035
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							543
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							104
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							1,643
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							80.5
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)							58.9
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							295
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							110
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,731
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,565

Table 24: *E- scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		42.2	0.049	0.048	0.042	0.027	0
Monetary damages from air pollution - Natural Gas (million 2019$)		13	6.27	4.16	2.62	1.49	1.11
Monetary damages from air pollution - Transportation (million 2019$)		127	131	131	120	97	67.5
Premature deaths from air pollution - Coal (deaths)		4.77	0.005	0.005	0.005	0.003	0
Premature deaths from air pollution - Natural Gas (deaths)		1.47	0.708	0.47	0.295	0.168	0.125
Premature deaths from air pollution - Transportation (deaths)		14.3	14.8	14.7	13.5	10.9	7.6

Table 25: *E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Commercial*

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		4,239	4,716				
Sales of cooking units - Electric Resistance (%)	41.9	54.6	83	88.6	88.9	88.9	88.9
Sales of cooking units - Gas (%)	58.1	45.4	17	11.4	11.1	11.1	11.1
Sales of space heating units - Electric Heat Pump (%)	3.53	8.34	31.3	81.3	90.2	90.7	90.8
Sales of space heating units - Electric Resistance (%)	3.3	3.52	4.98	8.12	8.7	8.74	8.73
Sales of space heating units - Fossil (%)	1.07	0.221	0.042	0.002	0	0	0
Sales of space heating units - Gas Furnace (%)	92.1	87.9	63.7	10.6	1.11	0.511	0.508
Sales of water heating units - Electric Heat Pump (%)	0.03	1.08	14.4	43.7	48.9	49.2	49.2
Sales of water heating units - Electric Resistance (%)	1.46	2.52	15.8	44.9	50.1	50.4	50.4
Sales of water heating units - Gas Furnace (%)	98.1	96	69.4	11.1	0.657	0	0
Sales of water heating units - Other (%)	0.366	0.384	0.383	0.384	0.383	0.384	0.383

Table 26: *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)		1.28	1.35	2.22	2.38	2.18	2.3

Table 27: *E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Overview*

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	49	49.1	48.2	46	43.3	41.4	40.7
Final energy use - Industry (PJ)	165	175	179	179	180	185	191
Final energy use - Residential (PJ)	71.3	68.1	65.2	58.8	51.1	45.3	41.4
Final energy use - Transportation (PJ)	150	141	124	104	85.9	74.5	69.8

Table 28: *E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Residential*

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018)		1.25	1.37				
Sales of cooking units - Electric Resistance (%)	61.7	69.9	94.8	99.7	100	100	100
Sales of cooking units - Gas (%)	38.3	30.1	5.15	0.259	0	0	0
Sales of space heating units - Electric Heat Pump (%)	9.46	20.4	40.3	80.7	88.3	89	88.8
Sales of space heating units - Electric Resistance (%)	10.7	17	13.5	5.83	4.48	4.43	4.48
Sales of space heating units - Fossil (%)	6.36	10.6	9.29	6.2	5.2	4.89	5.13
Sales of space heating units - Gas (%)	73.4	52.1	37	7.24	1.97	1.65	1.64
Sales of water heating units - Electric Heat Pump (%)	0	0.814	11.1	33.7	37.7	38	38
Sales of water heating units - Electric Resistance (%)	21.3	36.7	43.2	57.2	59.8	59.9	59.9
Sales of water heating units - Gas Furnace (%)	76.7	60.4	43.6	6.97	0.411	0	0
Sales of water heating units - Other (%)	1.97	2.09	2.1	2.1	2.1	2.1	2.1

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

Item	2020	2025	2030	2035	2040	2045	2050
Light-duty vehicle capital costs - Cumulative 5-yr (million $2018)		361	924	1,498	2,269	2,469	2,354
Public EV charging plugs - DC Fast (1000 units)	0.066		0.688		3.02		4.88
Public EV charging plugs - L2 (1000 units)	0.128		16.6		72.7		118
Vehicle sales - Heavy-duty - diesel (%)	97.2	92.1	67	23.3	4.22	0.628	0
Vehicle sales - Heavy-duty - EV (%)	0.588	3.81	19	45.6	57.4	59.6	60
Vehicle sales - Heavy-duty - gasoline (%)	0.227	0.227	0.176	0.066	0.013	0.002	0
Vehicle sales - Heavy-duty - hybrid (%)	0.082	0.09	0.077	0.031	0.007	0.001	0
Vehicle sales - Heavy-duty - hydrogen FC (%)	0.392	2.54	12.7	30.4	38.2	39.7	40
Vehicle sales - Heavy-duty - other (%)	1.5	1.23	1.07	0.568	0.163	0.038	0
Vehicle sales - Light-duty - diesel (%)	1.91	2.13	1.41	0.454	0.081	0.013	0
Vehicle sales - Light-duty - EV (%)	2.71	11.5	40.7	79.5	96	99.3	100
Vehicle sales - Light-duty - gasoline (%)	91.9	82.2	54.8	18.9	3.6	0.6	0
Vehicle sales - Light-duty - hybrid (%)	3.24	3.69	2.8	1.08	0.255	0.053	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.36	0.233	0.074	0.014	0.002	0
Vehicle sales - Light-duty - other (%)	0.118	0.114	0.079	0.028	0.005	0.001	0
Vehicle sales - Medium-duty - diesel (%)	64.7	59.7	42.3	14.4	2.59	0.384	0
Vehicle sales - Medium-duty - EV (%)	0.784	5.07	25.3	60.8	76.5	79.5	80
Vehicle sales - Medium-duty - gasoline (%)	33.7	33.3	25.5	9.32	1.77	0.277	0
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.402	0.341	0.14	0.03	0.005	0
Vehicle sales - Medium-duty - hydrogen FC (%)	0.196	1.27	6.33	15.2	19.1	19.9	20
Vehicle sales - Medium-duty - other (%)	0.253	0.255	0.205	0.083	0.019	0.004	0

Table 30: *E+RE+ scenario - PILLAR 2: Clean Electricity - Generating capacity*

Item	2020	2025	2030	2035	2040	2045	2050
Capital invested - Wind - Base (billion $2018)		0	17.8	9.95	14.3	8.47	14.1
Installed renewables - OffshoreWind - Base land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - OffshoreWind - Constrained land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - Solar - Base land use assumptions (MW)	2	2	2	2	2	2	2
Installed renewables - Solar - Constrained land use assumptions (MW)	4	4	4	4	4	4	13,054
Installed renewables - Wind - Base land use assumptions (MW)	952	952	14,294	22,314	34,448	42,003	55,310
Installed renewables - Wind - Constrained land use assumptions (MW)	2,635	2,635	26,959	46,429	66,415	79,003	115,932

Table 31: *E+RE+ scenario - PILLAR 2: Clean Electricity - Generation*

Item	2020	2025	2030	2035	2040	2045	2050
OffshoreWind - Base land use assumptions (GWh)	0	0	0	0	0	0	0
OffshoreWind - Constrained land use assumptions (GWh)	0	0	0	0	0	0	0
Solar - Base land use assumptions (GWh)	4.27	4.27	4.27	4.27	4.27	4.27	4.27
Solar - Constrained land use assumptions (GWh)	8.54	8.54	8.54	8.54	8.54	8.54	23,418
Wind - Base land use assumptions (GWh)	3,041	3,041	43,012	65,295	97,655	117,079	150,061
Wind - Constrained land use assumptions (GWh)	8,434	8,434	78,211	128,207	174,357	201,000	269,797

Table 32: *E+RE+ scenario - PILLAR 6: Land sinks - Agriculture*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-1,914
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-62.8
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-1,976
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-972
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-31.4
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-1,003
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							2,284
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							104
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							2,387
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							1,168
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							51.8
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							1,220

Table 33: *E+RE+ scenario - PILLAR 6: Land sinks - Forests*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-4,423
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-31,032
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-793
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-4,659
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-290
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4,259

Table 33: *E+RE+ scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-812
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,953
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,080
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-6,761
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-2,216
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-11,479
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-132
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-1,790
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-148
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1,420
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-284
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,977
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-233
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,279
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-3,320
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-21,253
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-463
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-3,224
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-217
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-2,839
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-548
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,465
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-1,656
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-4,520
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							724
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							107
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							2,376
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							107

Table 33: *E+RE+ scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
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)							77.2
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							394
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							87.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,241
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,113
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							362
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							101
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							910
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							53.5
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)							40.6
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							197
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							15.2
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,356
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,035
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							543
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							104
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							1,643
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							80.5
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)							58.9

Table 33: *E+RE+ 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)							295
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							110
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,731
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,565

Table 34: *E+RE+ scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		42.2	0.049	0.048	0.042	0.027	0
Monetary damages from air pollution - Natural Gas (million 2019$)		11.3	5.84	3.23	2.52	1.5	0.779
Monetary damages from air pollution - Transportation (million 2019$)		125	120	93.3	54.7	25	9.4
Premature deaths from air pollution - Coal (deaths)		4.77	0.005	0.005	0.005	0.003	0
Premature deaths from air pollution - Natural Gas (deaths)		1.28	0.659	0.364	0.285	0.169	0.088
Premature deaths from air pollution - Transportation (deaths)		14.1	13.5	10.5	6.15	2.81	1.06

Table 35: *E+RE- scenario - PILLAR 1: Efficiency/Electrification - Commercial*

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		4,239	4,716				
Sales of cooking units - Electric Resistance (%)	41.9	54.6	83	88.6	88.9	88.9	88.9
Sales of cooking units - Gas (%)	58.1	45.4	17	11.4	11.1	11.1	11.1
Sales of space heating units - Electric Heat Pump (%)	3.53	8.34	31.3	81.3	90.2	90.7	90.8
Sales of space heating units - Electric Resistance (%)	3.3	3.52	4.98	8.12	8.7	8.74	8.73
Sales of space heating units - Fossil (%)	1.07	0.221	0.042	0.002	0	0	0
Sales of space heating units - Gas Furnace (%)	92.1	87.9	63.7	10.6	1.11	0.511	0.508
Sales of water heating units - Electric Heat Pump (%)	0.03	1.08	14.4	43.7	48.9	49.2	49.2
Sales of water heating units - Electric Resistance (%)	1.46	2.52	15.8	44.9	50.1	50.4	50.4
Sales of water heating units - Gas Furnace (%)	98.1	96	69.4	11.1	0.657	0	0
Sales of water heating units - Other (%)	0.366	0.384	0.383	0.384	0.383	0.384	0.383

Table 36: *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)		1.28	1.35	2.22	2.38	2.18	2.3

Table 37: *E+RE- scenario - PILLAR 1: Efficiency/Electrification - Overview*

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	49	49.1	48.2	46	43.3	41.4	40.7

Table 37: *E+RE- scenario - PILLAR 1: Efficiency/Electrification - Overview (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Industry (PJ)	165	175	179	179	180	185	191
Final energy use - Residential (PJ)	71.3	68.1	65.2	58.8	51.1	45.3	41.4
Final energy use - Transportation (PJ)	150	141	124	104	85.9	74.5	69.8

Table 38: *E+RE- scenario - PILLAR 1: Efficiency/Electrification - Residential*

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018)		1.25	1.37				
Sales of cooking units - Electric Resistance (%)	61.7	69.9	94.8	99.7	100	100	100
Sales of cooking units - Gas (%)	38.3	30.1	5.15	0.259	0	0	0
Sales of space heating units - Electric Heat Pump (%)	9.46	20.4	40.3	80.7	88.3	89	88.8
Sales of space heating units - Electric Resistance (%)	10.7	17	13.5	5.83	4.48	4.43	4.48
Sales of space heating units - Fossil (%)	6.36	10.6	9.29	6.2	5.2	4.89	5.13
Sales of space heating units - Gas (%)	73.4	52.1	37	7.24	1.97	1.65	1.64
Sales of water heating units - Electric Heat Pump (%)	0	0.814	11.1	33.7	37.7	38	38
Sales of water heating units - Electric Resistance (%)	21.3	36.7	43.2	57.2	59.8	59.9	59.9
Sales of water heating units - Gas Furnace (%)	76.7	60.4	43.6	6.97	0.411	0	0
Sales of water heating units - Other (%)	1.97	2.09	2.1	2.1	2.1	2.1	2.1

Table 39: *E+RE- scenario - PILLAR 1: Efficiency/Electrification - Transportation*

Item	2020	2025	2030	2035	2040	2045	2050
Light-duty vehicle capital costs - Cumulative 5-yr (million $2018)		361	924	1,498	2,269	2,469	2,354
Public EV charging plugs - DC Fast (1000 units)	0.066		0.688		3.02		4.88
Public EV charging plugs - L2 (1000 units)	0.128		16.6		72.7		118
Vehicle sales - Heavy-duty - diesel (%)	97.2	92.1	67	23.3	4.22	0.628	0
Vehicle sales - Heavy-duty - EV (%)	0.588	3.81	19	45.6	57.4	59.6	60
Vehicle sales - Heavy-duty - gasoline (%)	0.227	0.227	0.176	0.066	0.013	0.002	0
Vehicle sales - Heavy-duty - hybrid (%)	0.082	0.09	0.077	0.031	0.007	0.001	0
Vehicle sales - Heavy-duty - hydrogen FC (%)	0.392	2.54	12.7	30.4	38.2	39.7	40
Vehicle sales - Heavy-duty - other (%)	1.5	1.23	1.07	0.568	0.163	0.038	0
Vehicle sales - Light-duty - diesel (%)	1.91	2.13	1.41	0.454	0.081	0.013	0
Vehicle sales - Light-duty - EV (%)	2.71	11.5	40.7	79.5	96	99.3	100
Vehicle sales - Light-duty - gasoline (%)	91.9	82.2	54.8	18.9	3.6	0.6	0
Vehicle sales - Light-duty - hybrid (%)	3.24	3.69	2.8	1.08	0.255	0.053	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.36	0.233	0.074	0.014	0.002	0
Vehicle sales - Light-duty - other (%)	0.118	0.114	0.079	0.028	0.005	0.001	0
Vehicle sales - Medium-duty - diesel (%)	64.7	59.7	42.3	14.4	2.59	0.384	0
Vehicle sales - Medium-duty - EV (%)	0.784	5.07	25.3	60.8	76.5	79.5	80
Vehicle sales - Medium-duty - gasoline (%)	33.7	33.3	25.5	9.32	1.77	0.277	0
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.402	0.341	0.14	0.03	0.005	0
Vehicle sales - Medium-duty - hydrogen FC (%)	0.196	1.27	6.33	15.2	19.1	19.9	20
Vehicle sales - Medium-duty - other (%)	0.253	0.255	0.205	0.083	0.019	0.004	0

Table 40: *E+RE- scenario - PILLAR 2: Clean Electricity - Generating capacity*

Item	2020	2025	2030	2035	2040	2045	2050
Capital invested - Solar PV - Base (billion $2018)		0	0	0	0	0	0
Capital invested - Solar PV - Constrained (billion $2018)		0	0	0	0	0.217	0.57
Capital invested - Wind - Base (billion $2018)		1.28	11	4.77	6.07	2.13	0
Capital invested - Wind - Constrained (billion $2018)		1.72	11.5	2.37	7.03	3.43	0
Installed renewables - OffshoreWind - Base land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - OffshoreWind - Constrained land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - Solar - Base land use assumptions (MW)	2	2	2	2	2	2	2
Installed renewables - Solar - Constrained land use assumptions (MW)	2	2	2	2	2	261	981
Installed renewables - Wind - Base land use assumptions (MW)	952	1,820	10,104	13,951	19,089	20,990	20,990
Installed renewables - Wind - Constrained land use assumptions (MW)	1,317	2,486	11,110	13,021	18,974	22,030	22,030

Table 41: *E+RE- scenario - PILLAR 2: Clean Electricity - Generation*

Item	2020	2025	2030	2035	2040	2045	2050
OffshoreWind - Base land use assumptions (GWh)	0	0	0	0	0	0	0
OffshoreWind - Constrained land use assumptions (GWh)	0	0	0	0	0	0	0
Solar - Base land use assumptions (GWh)	4.27	4.27	4.27	4.27	4.27	4.27	4.27
Solar - Constrained land use assumptions (GWh)	4.27	4.27	4.27	4.27	4.27	470	1,775
Wind - Base land use assumptions (GWh)	3,041	5,811	30,893	42,045	56,581	61,738	61,738
Wind - Constrained land use assumptions (GWh)	4,217	7,876	32,710	37,875	53,612	61,273	61,273

Table 42: *E+RE- scenario - PILLAR 6: Land sinks - Agriculture*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-1,914
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-62.8
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-1,976
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-972
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-31.4
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-1,003

Table 42: *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)							0
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							2,284
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							104
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							2,387
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							1,168
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							51.8
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							1,220

Table 43: *E+RE- scenario - PILLAR 6: Land sinks - Forests*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-4,423
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-31,032
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-793
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-4,659
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-290
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4,259
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-812
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,953
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,080
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-6,761
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-2,216
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-11,479
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-132
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-1,790
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-148
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1,420
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-284

Table 43: *E+RE- scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,977
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-233
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,279
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-3,320
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-21,253
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-463
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-3,224
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-217
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-2,839
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-548
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,465
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-1,656
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-4,520
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							724
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							107
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							2,376
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							107
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)							77.2
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							394
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							87.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,241
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,113
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							362
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							101

Table 43: *E+RE- scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							910
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							53.5
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)							40.6
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							197
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							15.2
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,356
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,035
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							543
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							104
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							1,643
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							80.5
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)							58.9
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							295
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							110
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,731
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,565

Table 44: *E+RE- scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		42.2	0.049	0.048	0.042	0.027	0
Monetary damages from air pollution - Natural Gas (million 2019$)		12.8	6.82	7.04	8.14	4.25	1.34
Monetary damages from air pollution - Transportation (million 2019$)		125	120	93.3	54.7	25	9.4
Premature deaths from air pollution - Coal (deaths)		4.77	0.005	0.005	0.005	0.003	0

Table 44: *E+RE- scenario - IMPACTS - Health (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Natural Gas (deaths)		1.45	0.77	0.794	0.919	0.48	0.151
Premature deaths from air pollution - Transportation (deaths)		14.1	13.5	10.5	6.15	2.81	1.06

Table 45: *E-B+ scenario - PILLAR 1: Efficiency/Electrification - Commercial*

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		4,239	4,714				
Sales of cooking units - Electric Resistance (%)	41.9	46.2	50.2	60.8	75.4	84.6	87.8
Sales of cooking units - Gas (%)	58.1	53.8	49.8	39.2	24.6	15.4	12.2
Sales of space heating units - Electric Heat Pump (%)	3.53	7.33	9.61	17.1	35.2	58.2	71.6
Sales of space heating units - Electric Resistance (%)	3.3	3.45	3.58	4.06	5.22	6.69	7.54
Sales of space heating units - Fossil (%)	1.07	0.256	0.242	0.19	0.113	0.063	0.046
Sales of space heating units - Gas Furnace (%)	92.1	89	86.6	78.7	59.5	35.1	20.8
Sales of water heating units - Electric Heat Pump (%)	0.03	0.512	1.83	6.23	16.9	30.4	38.3
Sales of water heating units - Electric Resistance (%)	1.46	1.95	3.27	7.65	18.2	31.6	39.5
Sales of water heating units - Gas Furnace (%)	98.1	97.2	94.5	85.7	64.5	37.6	21.8
Sales of water heating units - Other (%)	0.366	0.384	0.383	0.384	0.383	0.384	0.383

Table 46: *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)		1.09	1.13	1.39	1.45	2.09	2.22

Table 47: *E-B+ scenario - PILLAR 1: Efficiency/Electrification - Overview*

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	49	49.1	48.9	48.7	48	47.1	46.1
Final energy use - Industry (PJ)	165	176	181	184	188	193	197
Final energy use - Residential (PJ)	71.3	68.1	66.1	64.1	61.5	57.8	53.1
Final energy use - Transportation (PJ)	150	142	130	120	112	103	93

Table 48: *E-B+ scenario - PILLAR 1: Efficiency/Electrification - Residential*

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018)		1.25	1.37				
Sales of cooking units - Electric Resistance (%)	61.6	62.6	66.1	75.4	88.3	96.2	99
Sales of cooking units - Gas (%)	38.4	37.4	33.9	24.6	11.7	3.79	1.02
Sales of space heating units - Electric Heat Pump (%)	9.46	19.2	21.1	27.7	43.3	62.6	73.4
Sales of space heating units - Electric Resistance (%)	10.7	17.2	16.8	15.7	12.9	9.42	7.34
Sales of space heating units - Fossil (%)	6.36	10.7	10.8	9.99	8.15	6.52	6.16
Sales of space heating units - Gas (%)	73.4	53	51.3	46.6	35.6	21.5	13.1
Sales of water heating units - Electric Heat Pump (%)	0	0.373	1.39	4.79	13	23.4	29.5
Sales of water heating units - Electric Resistance (%)	21.3	36.4	37.1	39.3	44.4	50.9	54.7

Table 48: *E-B+ scenario - PILLAR 1: Efficiency/Electrification - Residential (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Sales of water heating units - Gas Furnace (%)	76.7	61.1	59.4	53.8	40.4	23.6	13.6
Sales of water heating units - Other (%)	1.97	2.1	2.1	2.11	2.11	2.11	2.11

Table 49: *E-B+ scenario - PILLAR 1: Efficiency/Electrification - Transportation*

Item	2020	2025	2030	2035	2040	2045	2050
Light-duty vehicle capital costs - Cumulative 5-yr (million $2018)		0	58.3	123	414	1,303	1,898
Public EV charging plugs - DC Fast (1000 units)	0.066		0.213		1.12		3.13
Public EV charging plugs - L2 (1000 units)	0.128		5.12		27		75.3
Vehicle sales - Heavy-duty - diesel (%)	97.4	96	91.3	79.8	58.2	32.1	13.7
Vehicle sales - Heavy-duty - EV (%)	0.498	1.45	4.11	10.8	23.6	39.5	51
Vehicle sales - Heavy-duty - gasoline (%)	0.228	0.236	0.239	0.225	0.179	0.109	0.051
Vehicle sales - Heavy-duty - hybrid (%)	0.083	0.094	0.104	0.107	0.092	0.06	0.03
Vehicle sales - Heavy-duty - hydrogen FC (%)	0.332	0.969	2.74	7.17	15.7	26.3	34
Vehicle sales - Heavy-duty - other (%)	1.5	1.28	1.46	1.95	2.25	1.96	1.14
Vehicle sales - Light-duty - diesel (%)	1.92	2.27	2.13	1.71	1.13	0.586	0.249
Vehicle sales - Light-duty - EV (%)	1.46	3.76	9.89	22.7	44.8	69.7	86.6
Vehicle sales - Light-duty - gasoline (%)	93	89.2	82.7	70.7	50.2	27.4	11.9
Vehicle sales - Light-duty - hybrid (%)	3.34	4.23	4.82	4.56	3.59	2.23	1.12
Vehicle sales - Light-duty - hydrogen FC (%)	0.114	0.391	0.348	0.273	0.2	0.113	0.052
Vehicle sales - Light-duty - other (%)	0.119	0.122	0.114	0.1	0.074	0.041	0.019
Vehicle sales - Medium-duty - diesel (%)	64.8	62.2	57.7	49.4	35.6	19.6	8.37
Vehicle sales - Medium-duty - EV (%)	0.664	1.94	5.49	14.3	31.4	52.6	68
Vehicle sales - Medium-duty - gasoline (%)	33.8	34.7	34.7	31.9	24.4	14.2	6.33
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.418	0.464	0.478	0.414	0.275	0.141
Vehicle sales - Medium-duty - hydrogen FC (%)	0.166	0.485	1.37	3.58	7.86	13.2	17
Vehicle sales - Medium-duty - other (%)	0.253	0.266	0.279	0.286	0.258	0.184	0.102

Table 50: *E-B+ scenario - PILLAR 2: Clean Electricity - Generating capacity*

Item	2020	2025	2030	2035	2040	2045	2050
Capital invested - Biomass power plant (billion $2018)	0	0	0	0	0	0	0
Capital invested - Biomass w/ccu allam power plant (billion $2018)		0	0	0	0	0	0.041
Capital invested - Biomass w/ccu power plant (billion $2018)	0	0	0	0	0	0	0.096

Table 51: *E-B+ scenario - PILLAR 2: Clean Electricity - Generation*

Item	2020	2025	2030	2035	2040	2045	2050
Biomass power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu allam power plant (GWh)		0	0	0	0	0	40.5
Biomass w/ccu power plant (GWh)	0	0	0	0	0	0	107

Table 52: *E-B+ scenario - PILLAR 3: Clean fuels - Bioenergy*

Item	2020	2025	2030	2035	2040	2045	2050
Biomass purchases (million $2018/year)		0	0	0	0	0	78.2
Conversion capital investment - Cumulative 5-yr (million $2018)		0	0	0	0	0	1,084
Number of facilities - Allam power w ccu (quantity)	0	0	0	0	0	0	1

Table 52: *E-B+ scenario - PILLAR 3: Clean fuels - Bioenergy (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Number of facilities - Beccs hydrogen (quantity)	0	0	0	0	0	0	2
Number of facilities - Diesel (quantity)	0	0	0	0	0	0	0
Number of facilities - Diesel ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Power (quantity)	0	0	0	0	0	0	0
Number of facilities - Power ccu (quantity)	0	0	0	0	0	0	1
Number of facilities - Pyrolysis (quantity)	0	0	0	0	0	0	0
Number of facilities - Pyrolysis ccu (quantity)	0	0	0	0	0	0	1
Number of facilities - Sng (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng ccu (quantity)	0	0	0	0	0	0	0

Table 53: *E-B+ scenario - PILLAR 4: CCUS - CO2 capture*

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0	0	0	0	1.16
Annual - BECCS (MMT)		0	0	0	0	0	1.16
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Annual - NGCC (MMT)		0	0	0	0	0	0
Cumulative - All (MMT)		0	0	0	0	0	1.16
Cumulative - BECCS (MMT)		0	0	0	0	0	1.16
Cumulative - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - NGCC (MMT)		0	0	0	0	0	0

Table 54: *E-B+ scenario - PILLAR 4: CCUS - CO2 pipelines*

Item	2020	2025	2030	2035	2040	2045	2050
All (km)		0	0	177	177	177	439
Cumulative investment - All (million $2018)		0	0	423	423	423	573
Cumulative investment - Spur (million $2018)		0	0	0	0	0	150
Cumulative investment - Trunk (million $2018)		0	0	423	423	423	423
Spur (km)		0	0	0	0	0	262
Trunk (km)		0	0	177	177	177	177

Table 55: *E-B+ scenario - PILLAR 4: CCUS - CO2 storage*

Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (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	0	0	0	0
Wells and facilities construction costs (million $2020)		0	0	0	0	0	0

Table 56: *E-B+ scenario - PILLAR 6: Land sinks - Agriculture*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-1,913
Carbon sink potential - Aggressive deployment - Cropland to woody energy crops (1000 tCO2e/y)							0

Table 56: *E-B+ scenario - PILLAR 6: Land sinks - Agriculture (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive deployment - Pasture to energy crops (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-62.8
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-1,976
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-972
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 - Permanent conservation cover (1000 tCO2e/y)							-31.4
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-1,003
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							5,638
Land impacted for carbon sink - Aggressive deployment - Cropland to woody energy crops (1000 hectares)							0.25
Land impacted for carbon sink - Aggressive deployment - Pasture to energy crops (1000 hectares)							4.37
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							104
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							5,746
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							1,168
Land impacted for carbon sink - Moderate deployment - Cropland to woody energy crops (1000 hectares)							0.25
Land impacted for carbon sink - Moderate deployment - Pasture to energy crops (1000 hectares)							4.37
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							51.8
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							1,224

Table 57: *E-B+ scenario - PILLAR 6: Land sinks - Forests*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-4,423
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-31,032
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-793
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-4,659
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-290
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4,259
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-812
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,953
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,080
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-6,761
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-2,216
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-11,479
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-132
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-1,790
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-148
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1,420
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-284
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,977
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-233
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,279
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-3,320
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-21,253
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-463
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-3,224
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-217
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-2,839
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-548
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,465
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-1,656
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-4,520

Table 57: *E-B+ scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							724
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							107
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							2,376
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							107
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)							77.2
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							394
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							87.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,241
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,113
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							362
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							101
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							910
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							53.5
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)							40.6
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							197
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							15.2
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,356
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,035
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							543

Table 57: *E-B+ scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							104
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							1,643
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							80.5
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)							58.9
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							295
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							110
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,731
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,565

Table 58: *E-B+ scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		42.2	0.049	0.048	0.042	0.027	0
Monetary damages from air pollution - Natural Gas (million 2019$)		12.3	6.04	4.41	3.69	2.37	1.54
Monetary damages from air pollution - Transportation (million 2019$)		127	131	131	120	97	67.5
Premature deaths from air pollution - Coal (deaths)		4.77	0.005	0.005	0.005	0.003	0
Premature deaths from air pollution - Natural Gas (deaths)		1.39	0.682	0.497	0.416	0.267	0.174
Premature deaths from air pollution - Transportation (deaths)		14.3	14.8	14.7	13.5	10.9	7.6

Table 59: *REF scenario - PILLAR 1: Efficiency/Electrification - Commercial*

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		4,185	4,377				
Sales of cooking units - Electric Resistance (%)	41.9	44.7	44.7	44.6	44.4	44.5	44.6
Sales of cooking units - Gas (%)	58.1	55.3	55.3	55.4	55.6	55.5	55.4
Sales of space heating units - Electric Heat Pump (%)	3.53	14.1	47	73.9	78.3	78.8	78.8
Sales of space heating units - Electric Resistance (%)	3.3	4.34	8.76	15.7	20	20.6	20.7
Sales of space heating units - Fossil (%)	1.07	0.24	0.141	0.039	0.005	0	0
Sales of space heating units - Gas Furnace (%)	92.1	81.3	44.1	10.4	1.72	0.57	0.509
Sales of water heating units - Electric Heat Pump (%)	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Sales of water heating units - Electric Resistance (%)	1.46	1.47	1.47	1.48	1.47	1.48	1.47

Table 59: *REF scenario - PILLAR 1: Efficiency/Electrification - Commercial (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Sales of water heating units - Gas Furnace (%)	98.1	98.1	98.1	98.1	98.1	98.1	98.1
Sales of water heating units - Other (%)	0.366	0.384	0.383	0.384	0.383	0.384	0.383

Table 60: *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)		1.18	1.23	1.36	1.42	1.52	1.58

Table 61: *REF scenario - PILLAR 1: Efficiency/Electrification - Overview*

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	49	50.1	51.1	51.5	51.9	53.3	55.8
Final energy use - Industry (PJ)	165	182	194	206	220	239	257
Final energy use - Residential (PJ)	71.3	68.6	67.8	67.5	68	68.9	69.7
Final energy use - Transportation (PJ)	150	142	131	124	124	127	132

Table 62: *REF scenario - PILLAR 1: Efficiency/Electrification - Residential*

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018)		1.22	1.24				
Sales of cooking units - Electric Resistance (%)	61.2	61.2	61.2	61.2	61.2	61.2	61.2
Sales of cooking units - Gas (%)	38.8	38.8	38.8	38.8	38.8	38.8	38.8
Sales of space heating units - Electric Heat Pump (%)	8.94	22	22.3	22.8	23.5	24.2	24.8
Sales of space heating units - Electric Resistance (%)	10.9	16.6	16.4	16.3	16.1	15.6	14.8
Sales of space heating units - Fossil (%)	6.39	10.3	10.4	10.2	9.34	8.82	9.31
Sales of space heating units - Gas (%)	73.8	51.2	50.9	50.7	51.1	51.4	51
Sales of water heating units - Electric Heat Pump (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Resistance (%)	21.3	36.2	36.3	36.3	36.4	36.4	36.5
Sales of water heating units - Gas Furnace (%)	76.7	61.7	61.6	61.6	61.5	61.4	61.4
Sales of water heating units - Other (%)	1.97	2.1	2.11	2.11	2.12	2.12	2.12

Table 63: *REF scenario - PILLAR 1: Efficiency/Electrification - Transportation*

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle sales - Heavy-duty - diesel (%)	98.1	98.2	97.9	97	95.6	93.5	91.6
Vehicle sales - Heavy-duty - EV (%)	0	0	0	0	0	0	0
Vehicle sales - Heavy-duty - gasoline (%)	0.229	0.242	0.257	0.274	0.294	0.317	0.343
Vehicle sales - Heavy-duty - hybrid (%)	0.083	0.096	0.112	0.13	0.15	0.174	0.202
Vehicle sales - Heavy-duty - hydrogen FC (%)	0.119	0.138	0.16	0.186	0.216	0.25	0.29
Vehicle sales - Heavy-duty - other (%)	1.51	1.31	1.57	2.37	3.69	5.71	7.57
Vehicle sales - Light-duty - diesel (%)	1.92	2.27	2.25	2.09	1.9	1.77	1.69
Vehicle sales - Light-duty - EV (%)	2.37	4.07	4.67	5.64	6.94	8.25	9.35
Vehicle sales - Light-duty - gasoline (%)	92.2	89	87.5	86.1	84.4	82.4	80.7
Vehicle sales - Light-duty - hybrid (%)	3.26	4.17	5.13	5.71	6.36	7.09	7.8
Vehicle sales - Light-duty - hydrogen FC (%)	0.113	0.39	0.367	0.332	0.333	0.337	0.348
Vehicle sales - Light-duty - other (%)	0.118	0.122	0.12	0.121	0.121	0.121	0.124
Vehicle sales - Medium-duty - diesel (%)	65.2	63.5	61.6	59.6	58	56.5	55.2
Vehicle sales - Medium-duty - EV (%)	0.027	0.105	0.329	0.671	0.895	0.973	0.993
Vehicle sales - Medium-duty - gasoline (%)	34	35.5	37	38.5	39.7	40.8	41.7

Table 63: *REF scenario - PILLAR 1: Efficiency/Electrification - Transportation (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle sales - Medium-duty - hybrid (%)	0.365	0.427	0.496	0.577	0.674	0.793	0.929
Vehicle sales - Medium-duty - hydrogen FC (%)	0.175	0.208	0.242	0.285	0.339	0.409	0.487
Vehicle sales - Medium-duty - other (%)	0.255	0.271	0.298	0.345	0.42	0.528	0.671

Table 64: *REF scenario - PILLAR 6: Land sinks - Forests*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-4,423
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-31,032
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-793
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-4,659
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-290
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4,259
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-812
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,953
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,080
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-6,761
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-2,216
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-11,479
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-132
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-1,790
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-148
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1,420
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-284
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,977
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-233
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,279
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-3,320
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-21,253
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-463
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-3,224
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-217
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-2,839

Table 64: *REF scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-548
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,465
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-1,656
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-4,520
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							724
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							107
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							2,376
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							107
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)							77.2
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							394
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							87.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,241
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,113
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							362
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							101
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							910
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							53.5
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)							40.6
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							197
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							15.2
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,356

Table 64: *REF 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)							3,035
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							543
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							104
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							1,643
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							80.5
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)							58.9
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							295
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							110
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,731
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,565

Table 65: *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)	-22		4.29				1.23
Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y)	-1.16		-2.41				-2.53
Business-as-usual carbon sink - Total (Mt CO2e/y)	-23.1		1.88				-1.3

Table 66: *REF scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		70.2	46.2	22.8	18	16.5	15.5
Monetary damages from air pollution - Natural Gas (million 2019$)		13.8	12.6	14.5	10.6	10	8.51
Monetary damages from air pollution - Transportation (million 2019$)		127	133	139	145	152	158
Premature deaths from air pollution - Coal (deaths)		7.93	5.22	2.58	2.03	1.87	1.75
Premature deaths from air pollution - Natural Gas (deaths)		1.56	1.42	1.63	1.2	1.13	0.961
Premature deaths from air pollution - Transportation (deaths)		14.3	15	15.6	16.3	17.1	17.8