Net-Zero America - west virginia state report

2021-03-05

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

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)	0	5,826	6,488	0	0	0	0
Sales of cooking units - Electric Resistance (%)	32	46	79.9	86.5	86.9	86.9	86.9
Sales of cooking units - Gas (%)	68	54	20.1	13.5	13.1	13.1	13.1
Sales of space heating units - Electric Heat Pump (%)	3.31	21.4	54	79.9	84	84.2	84.2
Sales of space heating units - Electric Resistance (%)	3.22	8.3	10.8	13.4	13.9	13.9	13.9
Sales of space heating units - Fossil (%)	4.12	4.08	0.778	0.033	0	0	0
Sales of space heating units - Gas Furnace (%)	89.4	66.3	34.4	6.61	2.15	1.91	1.9
Sales of water heating units - Electric Heat Pump (%)	0.114	6.44	36.5	54	56.3	56.5	56.5
Sales of water heating units - Electric Resistance (%)	2.92	9.46	24.7	38.5	40.7	40.8	40.8
Sales of water heating units - Gas Furnace (%)	94.5	80.1	35.8	4.81	0.265	0	0
Sales of water heating units - Other (%)	2.43	4.02	2.96	2.7	2.7	2.7	2.7

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)		0.954	0.978	1.95	2.08	1.75	1.83

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	48.6	48.7	47.1	44.5	42	41	41.4
Final energy use - Industry (PJ)	185	197	201	206	212	214	218
Final energy use - Residential (PJ)	38.4	36.1	33.5	30.6	27.6	25.7	24.7
Final energy use - Transportation (PJ)	151	141	123	101	81	68.6	63.6

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)	0	0.682	0.676	0	0	0	0
Sales of cooking units - Electric Resistance (%)	62.6	70.5	95	99.7	100	100	100
Sales of cooking units - Gas (%)	37.4	29.5	5.04	0.254	0	0	0
Sales of space heating units - Electric Heat Pump (%)	20.6	34.6	64.3	82.8	85.4	85.5	85.5
Sales of space heating units - Electric Resistance (%)	18.3	20.1	12	6.25	5.33	5.36	5.42
Sales of space heating units - Fossil (%)	10.8	15.7	9.07	6.34	6.05	5.96	5.93
Sales of space heating units - Gas (%)	50.2	29.6	14.6	4.64	3.25	3.16	3.14
Sales of water heating units - Electric Heat Pump (%)	0	5.29	30.4	43.3	45	45.1	45.2
Sales of water heating units - Electric Resistance (%)	45	59.7	53.2	53.1	53.2	53.3	53.2
Sales of water heating units - Gas Furnace (%)	52.2	33	14.7	1.99	0.11	0	0
Sales of water heating units - Other (%)	2.8	2.02	1.66	1.59	1.61	1.62	1.64

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)	0	326	832	1,355	2,050	2,233	2,128
Public EV charging plugs - DC Fast (1000 units)	0.06	0	0.708	0	3.17	0	5.13
Public EV charging plugs - L2 (1000 units)	0.164	0	17	0	76.1	0	123
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 (%)	1.78	2.02	1.35	0.436	0.079	0.013	0
Vehicle sales - Light-duty - EV (%)	3.13	12.8	42.7	80.3	96.1	99.3	100
Vehicle sales - Light-duty - gasoline (%)	91.2	80.7	52.7	18	3.49	0.596	0
Vehicle sales - Light-duty - hybrid (%)	3.66	3.99	2.95	1.12	0.268	0.057	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.353	0.222	0.07	0.014	0.002	0
Vehicle sales - Light-duty - other (%)	0.112	0.109	0.073	0.026	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	2.45	5.41	6.37	4.59
Capital invested - Solar PV - Constrained (billion $2018)	0	0	0	1.91	3.94	5.57	3.3
Capital invested - Wind - Base (billion $2018)	0	0	8.36	8.42	14.7	0.853	2.18
Capital invested - Wind - Constrained (billion $2018)	0	0	26.5	33.7	0.092	0	2.31
Installed (cumulative) - OffshoreWind - Base land use assumptions (MW)	0	0	0	0	0	0	0
Installed (cumulative) - Rooftop PV (MW)	10	15	19.9	26.4	34.1	42.9	53.1
Installed (cumulative) - Solar - Base land use assumptions (MW)	0	0	0	2,219	7,427	13,921	18,879
Installed (cumulative) - Wind - Base land use assumptions (MW)	740	740	7,019	13,807	26,216	26,977	29,033

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
Solar - Base land use assumptions (GWh)	0	0	0	3,967	9,289	11,351	8,667
Solar - Constrained land use assumptions (GWh)	0	0	507	3,609	4,703	5,766	4,412

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

Item	2020	2025	2030	2035	2040	2045	2050
Wind - Base land use assumptions (GWh)	3,100	0	21,919	21,918	37,304	2,135	5,444
Wind - Constrained land use assumptions (GWh)	3,100	0	61,846	70,396	251	0	2,728

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	0	136
Conversion capital investment - Cumulative 5-yr (million $2018)	0	0	0	0	0	0	2,949
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	4
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	7.32
Annual - BECCS (MMT)		0	0	0	0	0	3.79
Annual - Cement and lime (MMT)		0	0	0	0	0	3.53
Annual - NGCC (MMT)		0	0	0	0	0	0
Cumulative - All (MMT)		0	0	0	0	0	7.32
Cumulative - BECCS (MMT)		0	0	0	0	0	3.79
Cumulative - Cement and lime (MMT)		0	0	0	0	0	3.53
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	0	0	0	316
Cumulative investment - All (million $2018)		0	0	0	0	0	223
Cumulative investment - Spur (million $2018)		0	0	0	0	0	223
Cumulative investment - Trunk (million $2018)		0	0	0	0	0	0
Spur (km)		0	0	0	0	0	316
Trunk (km)		0	0	0	0	0	0

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)							-518
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-21.1
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-539
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-273
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-10.5
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-284
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)							345
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							38.3
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							384
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)							182
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							19.2
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							201

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)							-108
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-17,784
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-724
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-6,389
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-60.6
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4,441

Table 13: *E+ 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)							-197
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,114
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,750
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-53.9
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-5,372
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-121
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-2,454
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-30.8
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1,480
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-69.1
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-236
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-927
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-80.7
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-11,577
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-422
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-4,421
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-45.2
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-2,961
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-133
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-1,675
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-1,839
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							17.6
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							98.1
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							3,258
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							22.3

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 - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares)							18.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							88.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							912
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							4,415
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							8.8
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							92.1
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,248
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							11.2
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)							9.87
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							15.3
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							552
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,937
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							13.2
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							95.1
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,253
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							16.8
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)							14.3

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 - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							111
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,111
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							3,614

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

Item	2020	2025	2030	2035	2040	2045	2050
Natural gas consumption - Annual (tcf)		158	133	107	80.5	50.6	35.1
Natural gas consumption - Cumulative (tcf)		0	0	0	0	0	3,220
Natural gas production - Annual (tcf)		2,002	1,893	1,648	1,394	1,105	859
Oil consumption - Annual (million bbls)		31	26.8	20.4	14.4	9.6	5.68
Oil consumption - Cumulative (million bbls)		0	0	0	0	0	627
Oil production - Annual (million bbls)		15.1	15.1	15.1	12	9.71	6.46

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		442	0.447	0.442	0.404	0.296	0.027
Monetary damages from air pollution - Natural Gas (million 2019$)		60	42.9	24.9	19.5	10.8	3.95
Monetary damages from air pollution - Transportation (million 2019$)		354	313	226	124	53.7	20.3
Premature deaths from air pollution - Coal (deaths)		49.9	0.05	0.05	0.046	0.033	0.003
Premature deaths from air pollution - Natural Gas (deaths)		6.77	4.84	2.81	2.2	1.21	0.446
Premature deaths from air pollution - Transportation (deaths)		39.8	35.2	25.4	13.9	6.04	2.28

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		0	0	0	0	0	187
By economic sector - Construction (jobs)		3,000	4,786	8,330	13,768	13,606	14,092
By economic sector - Manufacturing (jobs)		8,241	9,292	11,903	11,721	9,648	11,803
By economic sector - Mining (jobs)		9,227	6,030	4,762	3,441	2,534	1,768
By economic sector - Other (jobs)		101	282	883	1,891	2,238	2,476
By economic sector - Pipeline (jobs)		576	498	405	305	202	170
By economic sector - Professional (jobs)		2,755	3,602	5,766	9,371	9,332	9,924
By economic sector - Trade (jobs)		3,088	2,895	3,916	5,799	5,886	6,180
By economic sector - Utilities (jobs)		3,826	3,995	5,997	9,625	9,272	10,485
By education level - All sectors - Associates degree or some college (jobs)		9,180	9,560	13,054	17,709	16,762	18,204
By education level - All sectors - Bachelors degree (jobs)		6,444	6,702	8,804	11,602	10,887	11,717
By education level - All sectors - Doctoral degree (jobs)		190	214	300	439	425	447
By education level - All sectors - High school diploma or less (jobs)		13,538	13,358	17,727	23,310	21,919	23,800

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

Item	2020	2025	2030	2035	2040	2045	2050
By education level - All sectors - Masters or professional degree (jobs)		1,462	1,547	2,077	2,861	2,725	2,918
By resource sector - Biomass (jobs)		0	0	0	0	0	800
By resource sector - CO2 (jobs)		0	0	0	0	0	414
By resource sector - Coal (jobs)		9,540	4,431	3,660	3,187	2,872	2,545
By resource sector - Grid (jobs)		1,781	3,819	8,462	15,816	16,344	19,155
By resource sector - Natural Gas (jobs)		7,105	5,936	4,650	3,639	2,141	1,247
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		6,960	6,170	5,397	3,868	2,839	1,735
By resource sector - Solar (jobs)		2,472	2,916	6,844	10,894	12,317	14,313
By resource sector - Wind (jobs)		2,956	8,109	12,949	18,516	16,204	16,877
Median wages - Annual - All ($2019 per job)		54,948	55,705	55,935	56,689	57,386	57,960
On-Site or In-Plant Training - Total jobs - 1 to 4 years (jobs)		4,850	4,991	6,734	9,081	8,574	9,252
On-Site or In-Plant Training - Total jobs - 4 to 10 years (jobs)		1,683	1,810	2,536	3,653	3,504	3,721
On-Site or In-Plant Training - Total jobs - None (jobs)		4,709	4,981	6,776	9,115	8,609	9,352
On-Site or In-Plant Training - Total jobs - Over 10 years (jobs)		213	236	335	472	449	488
On-Site or In-Plant Training - Total jobs - Up to 1 year (jobs)		19,359	19,363	25,582	33,599	31,582	34,271
On-the-Job Training - All sectors - 1 to 4 years (jobs)		6,120	6,350	8,609	11,691	11,048	11,911
On-the-Job Training - All sectors - 4 to 10 years (jobs)		1,571	1,705	2,436	3,581	3,455	3,673
On-the-Job Training - All sectors - None (jobs)		1,577	1,640	2,218	2,997	2,848	3,078
On-the-Job Training - All sectors - Over 10 years (jobs)		288	315	428	555	515	558
On-the-Job Training - All sectors - Up to 1 year (jobs)		21,258	21,372	28,271	37,096	34,853	37,866
Related work experience - All sectors - 1 to 4 years (jobs)		11,455	11,507	15,228	20,204	19,039	20,539
Related work experience - All sectors - 4 to 10 years (jobs)		6,894	7,194	9,684	13,032	12,283	13,252
Related work experience - All sectors - None (jobs)		4,172	4,299	5,820	7,861	7,450	8,105
Related work experience - All sectors - Over 10 years (jobs)		1,967	2,043	2,704	3,517	3,276	3,557
Related work experience - All sectors - Up to 1 year (jobs)		6,326	6,338	8,526	11,307	10,670	11,633
Wage income - All (million $2019)		1,693	1,748	2,347	3,170	3,026	3,309

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)	0	5,823	6,480	0	0	0	0
Sales of cooking units - Electric Resistance (%)	32	36.2	40.9	53.4	71	81.7	85.5
Sales of cooking units - Gas (%)	68	63.8	59.1	46.6	29	18.3	14.5
Sales of space heating units - Electric Heat Pump (%)	3.31	16.5	20.2	31.4	51.9	70.8	80
Sales of space heating units - Electric Resistance (%)	3.22	7.96	8.26	9.15	10.8	12.6	13.5
Sales of space heating units - Fossil (%)	4.12	4.72	4.38	3.31	1.62	0.515	0.135
Sales of space heating units - Gas Furnace (%)	89.4	70.9	67.2	56.1	35.6	16.1	6.3

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of water heating units - Electric Heat Pump (%)	0.114	1.49	4.92	15.1	32.6	47.1	53.7
Sales of water heating units - Electric Resistance (%)	2.92	7.34	9.03	14.3	24.3	33.8	38.6
Sales of water heating units - Gas Furnace (%)	94.5	86.9	81.8	66.8	39.9	16.2	4.96
Sales of water heating units - Other (%)	2.43	4.23	4.21	3.78	3.24	2.87	2.74

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)		0.829	0.837	1.16	1.2	1.73	1.83

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	48.6	48.8	48.2	47.6	46.4	45.3	44.7
Final energy use - Industry (PJ)	185	197	202	207	214	216	219
Final energy use - Residential (PJ)	38.4	36.2	35	33.8	32.2	30.3	28.1
Final energy use - Transportation (PJ)	151	143	129	118	110	100	89.1

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)	0	0.678	0.66	0	0	0	0
Sales of cooking units - Electric Resistance (%)	62.4	63.4	66.8	75.9	88.5	96.3	99
Sales of cooking units - Gas (%)	37.6	36.6	33.2	24.1	11.5	3.71	0.997
Sales of space heating units - Electric Heat Pump (%)	20.6	29.9	33.3	43.4	60.9	75.7	82.6
Sales of space heating units - Electric Resistance (%)	18.3	21.3	20.5	17.4	12.3	8.13	6.18
Sales of space heating units - Fossil (%)	10.8	16.9	16.2	14	10.4	7.61	6.49
Sales of space heating units - Gas (%)	50.2	31.9	30	25.2	16.5	8.57	4.78
Sales of water heating units - Electric Heat Pump (%)	0	1.02	3.88	12.4	26.6	38	43.1
Sales of water heating units - Electric Resistance (%)	45	61.1	60.3	58	54.9	53.5	53.2
Sales of water heating units - Gas Furnace (%)	52.2	35.8	33.7	27.7	16.7	6.76	2.07
Sales of water heating units - Other (%)	2.8	2.09	2.06	1.96	1.8	1.69	1.66

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	0	52.1	111	373	1,179	1,716
Public EV charging plugs - DC Fast (1000 units)	0.06	0	0.211	0	1.17	0	3.29
Public EV charging plugs - L2 (1000 units)	0.164	0	5.06	0	28.1	0	79
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 (%)	1.8	2.17	2.1	1.68	1.1	0.568	0.242

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle sales - Light-duty - EV (%)	1.61	4.08	10.6	23.8	46.1	70.5	87
Vehicle sales - Light-duty - gasoline (%)	92.6	88.6	81.6	69.2	48.7	26.4	11.6
Vehicle sales - Light-duty - hybrid (%)	3.77	4.63	5.26	4.9	3.79	2.31	1.14
Vehicle sales - Light-duty - hydrogen FC (%)	0.113	0.387	0.34	0.265	0.191	0.108	0.05
Vehicle sales - Light-duty - other (%)	0.113	0.117	0.108	0.095	0.069	0.038	0.018
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)							-518
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-21.1
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-539
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-273
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-10.5
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-284
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)							345
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							38.3
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							384
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)							182
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							19.2

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							201

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)							-108
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-17,784
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-724
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-6,389
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-60.6
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4,441
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-197
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,114
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,750
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-53.9
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-5,372
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-121
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-2,454
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-30.8
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1,480
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-69.1
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-236
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-927
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-80.7
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-11,577
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-422
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-4,421
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-45.2
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-2,961
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-133

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-1,675
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-1,839
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							17.6
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							98.1
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							3,258
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							22.3
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)							18.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							88.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							912
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							4,415
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							8.8
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							92.1
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,248
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							11.2
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)							9.87
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							15.3
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							552

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 - Total impacted (over 30 years) (1000 hectares)							1,937
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							13.2
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							95.1
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,253
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							16.8
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)							14.3
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							111
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,111
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							3,614

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		442	0.447	0.442	0.404	0.296	0.027
Monetary damages from air pollution - Natural Gas (million 2019$)		54.9	34.5	13.4	5.22	1.61	0.892
Monetary damages from air pollution - Transportation (million 2019$)		359	343	317	271	205	134
Premature deaths from air pollution - Coal (deaths)		49.9	0.05	0.05	0.046	0.033	0.003
Premature deaths from air pollution - Natural Gas (deaths)		6.19	3.89	1.51	0.589	0.182	0.101
Premature deaths from air pollution - Transportation (deaths)		40.4	38.6	35.7	30.5	23.1	15.1

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)	0	5,826	6,488	0	0	0	0
Sales of cooking units - Electric Resistance (%)	32	46	79.9	86.5	86.9	86.9	86.9
Sales of cooking units - Gas (%)	68	54	20.1	13.5	13.1	13.1	13.1
Sales of space heating units - Electric Heat Pump (%)	3.31	21.4	54	79.9	84	84.2	84.2
Sales of space heating units - Electric Resistance (%)	3.22	8.3	10.8	13.4	13.9	13.9	13.9
Sales of space heating units - Fossil (%)	4.12	4.08	0.778	0.033	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Gas Furnace (%)	89.4	66.3	34.4	6.61	2.15	1.91	1.9
Sales of water heating units - Electric Heat Pump (%)	0.114	6.44	36.5	54	56.3	56.5	56.5
Sales of water heating units - Electric Resistance (%)	2.92	9.46	24.7	38.5	40.7	40.8	40.8
Sales of water heating units - Gas Furnace (%)	94.5	80.1	35.8	4.81	0.265	0	0
Sales of water heating units - Other (%)	2.43	4.02	2.96	2.7	2.7	2.7	2.7

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)		0.954	0.978	1.95	2.08	1.75	1.83

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	48.6	48.7	47.1	44.5	42	41	41.4
Final energy use - Industry (PJ)	185	197	201	206	212	214	218
Final energy use - Residential (PJ)	38.4	36.1	33.5	30.6	27.6	25.7	24.7
Final energy use - Transportation (PJ)	151	141	123	101	81	68.6	63.6

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)	0	0.682	0.676	0	0	0	0
Sales of cooking units - Electric Resistance (%)	62.6	70.5	95	99.7	100	100	100
Sales of cooking units - Gas (%)	37.4	29.5	5.04	0.254	0	0	0
Sales of space heating units - Electric Heat Pump (%)	20.6	34.6	64.3	82.8	85.4	85.5	85.5
Sales of space heating units - Electric Resistance (%)	18.3	20.1	12	6.25	5.33	5.36	5.42
Sales of space heating units - Fossil (%)	10.8	15.7	9.07	6.34	6.05	5.96	5.93
Sales of space heating units - Gas (%)	50.2	29.6	14.6	4.64	3.25	3.16	3.14
Sales of water heating units - Electric Heat Pump (%)	0	5.29	30.4	43.3	45	45.1	45.2
Sales of water heating units - Electric Resistance (%)	45	59.7	53.2	53.1	53.2	53.3	53.2
Sales of water heating units - Gas Furnace (%)	52.2	33	14.7	1.99	0.11	0	0
Sales of water heating units - Other (%)	2.8	2.02	1.66	1.59	1.61	1.62	1.64

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)	0	326	832	1,355	2,050	2,233	2,128
Public EV charging plugs - DC Fast (1000 units)	0.06	0	0.708	0	3.17	0	5.13
Public EV charging plugs - L2 (1000 units)	0.164	0	17	0	76.1	0	123
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

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle sales - Heavy-duty - other (%)	1.5	1.23	1.07	0.568	0.163	0.038	0
Vehicle sales - Light-duty - diesel (%)	1.78	2.02	1.35	0.436	0.079	0.013	0
Vehicle sales - Light-duty - EV (%)	3.13	12.8	42.7	80.3	96.1	99.3	100
Vehicle sales - Light-duty - gasoline (%)	91.2	80.7	52.7	18	3.49	0.596	0
Vehicle sales - Light-duty - hybrid (%)	3.66	3.99	2.95	1.12	0.268	0.057	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.353	0.222	0.07	0.014	0.002	0
Vehicle sales - Light-duty - other (%)	0.112	0.109	0.073	0.026	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 - Solar PV - Base (billion $2018)	0	0.106	0.219	7.29	6.45	15.1	0
Capital invested - Wind - Base (billion $2018)	0	0	10.9	16.1	27.2	10.4	0.041
Installed (cumulative) - OffshoreWind - Base land use assumptions (MW)	0	0	0	0	0	0	0
Installed (cumulative) - Solar - Base land use assumptions (MW)	0	0	0	0	0	0	0
Installed (cumulative) - Wind - Base land use assumptions (MW)	740	740	8,957	21,914	44,905	54,159	54,159

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	0	145	331	11,615	10,872	26,965	0
Solar - Constrained land use assumptions (GWh)	0	689	1,000	6,174	10,975	7,154	331
Wind - Base land use assumptions (GWh)	3,100	0	28,242	40,430	59,551	22,830	87.4
Wind - Constrained land use assumptions (GWh)	3,100	0	82,146	50,348	0	0	49,733

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)							-518
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-21.1
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-539
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-273

Table 32: *E+RE+ 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)							-10.5
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-284
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)							345
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							38.3
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							384
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)							182
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							19.2
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							201

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)							-108
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-17,784
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-724
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-6,389
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-60.6
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4,441
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-197
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,114
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,750
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-53.9
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-5,372
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-121
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-2,454

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-30.8
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1,480
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-69.1
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-236
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-927
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-80.7
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-11,577
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-422
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-4,421
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-45.2
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-2,961
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-133
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-1,675
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-1,839
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							17.6
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							98.1
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							3,258
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							22.3
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)							18.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							88.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							912
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							4,415

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 - Low - Accelerate regeneration (1000 hectares)							8.8
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							92.1
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,248
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							11.2
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)							9.87
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							15.3
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							552
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,937
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							13.2
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							95.1
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,253
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							16.8
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)							14.3
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							111
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,111
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							3,614

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		442	0.447	0.442	0.404	0.296	0.027

Table 34: *E+RE+ scenario - IMPACTS - Health (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Natural Gas (million 2019$)		52.6	36.9	19.5	11.6	3.39	0.845
Monetary damages from air pollution - Transportation (million 2019$)		354	313	226	124	53.7	20.3
Premature deaths from air pollution - Coal (deaths)		49.9	0.05	0.05	0.046	0.033	0.003
Premature deaths from air pollution - Natural Gas (deaths)		5.93	4.17	2.2	1.31	0.382	0.095
Premature deaths from air pollution - Transportation (deaths)		39.8	35.2	25.4	13.9	6.04	2.28

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)	0	5,826	6,488	0	0	0	0
Sales of cooking units - Electric Resistance (%)	32	46	79.9	86.5	86.9	86.9	86.9
Sales of cooking units - Gas (%)	68	54	20.1	13.5	13.1	13.1	13.1
Sales of space heating units - Electric Heat Pump (%)	3.31	21.4	54	79.9	84	84.2	84.2
Sales of space heating units - Electric Resistance (%)	3.22	8.3	10.8	13.4	13.9	13.9	13.9
Sales of space heating units - Fossil (%)	4.12	4.08	0.778	0.033	0	0	0
Sales of space heating units - Gas Furnace (%)	89.4	66.3	34.4	6.61	2.15	1.91	1.9
Sales of water heating units - Electric Heat Pump (%)	0.114	6.44	36.5	54	56.3	56.5	56.5
Sales of water heating units - Electric Resistance (%)	2.92	9.46	24.7	38.5	40.7	40.8	40.8
Sales of water heating units - Gas Furnace (%)	94.5	80.1	35.8	4.81	0.265	0	0
Sales of water heating units - Other (%)	2.43	4.02	2.96	2.7	2.7	2.7	2.7

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)		0.954	0.978	1.95	2.08	1.75	1.83

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	48.6	48.7	47.1	44.5	42	41	41.4
Final energy use - Industry (PJ)	185	197	201	206	212	214	218
Final energy use - Residential (PJ)	38.4	36.1	33.5	30.6	27.6	25.7	24.7
Final energy use - Transportation (PJ)	151	141	123	101	81	68.6	63.6

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)	0	0.682	0.676	0	0	0	0
Sales of cooking units - Electric Resistance (%)	62.6	70.5	95	99.7	100	100	100
Sales of cooking units - Gas (%)	37.4	29.5	5.04	0.254	0	0	0
Sales of space heating units - Electric Heat Pump (%)	20.6	34.6	64.3	82.8	85.4	85.5	85.5
Sales of space heating units - Electric Resistance (%)	18.3	20.1	12	6.25	5.33	5.36	5.42

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Fossil (%)	10.8	15.7	9.07	6.34	6.05	5.96	5.93
Sales of space heating units - Gas (%)	50.2	29.6	14.6	4.64	3.25	3.16	3.14
Sales of water heating units - Electric Heat Pump (%)	0	5.29	30.4	43.3	45	45.1	45.2
Sales of water heating units - Electric Resistance (%)	45	59.7	53.2	53.1	53.2	53.3	53.2
Sales of water heating units - Gas Furnace (%)	52.2	33	14.7	1.99	0.11	0	0
Sales of water heating units - Other (%)	2.8	2.02	1.66	1.59	1.61	1.62	1.64

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)	0	326	832	1,355	2,050	2,233	2,128
Public EV charging plugs - DC Fast (1000 units)	0.06	0	0.708	0	3.17	0	5.13
Public EV charging plugs - L2 (1000 units)	0.164	0	17	0	76.1	0	123
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 (%)	1.78	2.02	1.35	0.436	0.079	0.013	0
Vehicle sales - Light-duty - EV (%)	3.13	12.8	42.7	80.3	96.1	99.3	100
Vehicle sales - Light-duty - gasoline (%)	91.2	80.7	52.7	18	3.49	0.596	0
Vehicle sales - Light-duty - hybrid (%)	3.66	3.99	2.95	1.12	0.268	0.057	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.353	0.222	0.07	0.014	0.002	0
Vehicle sales - Light-duty - other (%)	0.112	0.109	0.073	0.026	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 - Wind - Base (billion $2018)		1.11	3.75	0	0.593	0.045	0.132
Capital invested - Wind - Constrained (billion $2018)		2.36	8.13	0	1.61	0.493	0.71

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

Item	2020	2025	2030	2035	2040	2045	2050
Wind - Base land use assumptions (GWh)	3,100	2,823	9,934		1,720	147	415
Wind - Constrained land use assumptions (GWh)	3,100	5,775	20,686		4,421	1,404	2,126

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)							-518
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-21.1
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-539
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-273
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-10.5
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-284
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)							345
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							38.3
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							384
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)							182
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							19.2
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							201

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)							-108
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-17,784
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-724
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-6,389
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-60.6
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4,441

Table 43: *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)							-197
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,114
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,750
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-53.9
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-5,372
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-121
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-2,454
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-30.8
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1,480
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-69.1
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-236
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-927
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-80.7
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-11,577
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-422
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-4,421
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-45.2
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-2,961
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-133
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-1,675
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-1,839
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							17.6
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							98.1
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							3,258
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							22.3

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 - High - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares)							18.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							88.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							912
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							4,415
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							8.8
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							92.1
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,248
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							11.2
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)							9.87
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							15.3
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							552
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,937
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							13.2
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							95.1
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,253
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							16.8
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)							14.3

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 - Mid - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							111
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,111
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							3,614

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		442	0.447	0.442	0.404	0.296	0.027
Monetary damages from air pollution - Natural Gas (million 2019$)		61.9	42.7	60.6	43.8	15.3	4.49
Monetary damages from air pollution - Transportation (million 2019$)		354	313	226	124	53.7	20.3
Premature deaths from air pollution - Coal (deaths)		49.9	0.05	0.05	0.046	0.033	0.003
Premature deaths from air pollution - Natural Gas (deaths)		6.99	4.83	6.84	4.94	1.73	0.506
Premature deaths from air pollution - Transportation (deaths)		39.8	35.2	25.4	13.9	6.04	2.28

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)	0	5,823	6,480	0	0	0	0
Sales of cooking units - Electric Resistance (%)	32	36.2	40.9	53.4	71	81.7	85.5
Sales of cooking units - Gas (%)	68	63.8	59.1	46.6	29	18.3	14.5
Sales of space heating units - Electric Heat Pump (%)	3.31	16.5	20.2	31.4	51.9	70.8	80
Sales of space heating units - Electric Resistance (%)	3.22	7.96	8.26	9.15	10.8	12.6	13.5
Sales of space heating units - Fossil (%)	4.12	4.72	4.38	3.31	1.62	0.515	0.135
Sales of space heating units - Gas Furnace (%)	89.4	70.9	67.2	56.1	35.6	16.1	6.3
Sales of water heating units - Electric Heat Pump (%)	0.114	1.49	4.92	15.1	32.6	47.1	53.7
Sales of water heating units - Electric Resistance (%)	2.92	7.34	9.03	14.3	24.3	33.8	38.6
Sales of water heating units - Gas Furnace (%)	94.5	86.9	81.8	66.8	39.9	16.2	4.96
Sales of water heating units - Other (%)	2.43	4.23	4.21	3.78	3.24	2.87	2.74

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)		0.829	0.837	1.16	1.2	1.73	1.83

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	48.6	48.8	48.2	47.6	46.4	45.3	44.7

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Industry (PJ)	185	197	202	207	214	216	219
Final energy use - Residential (PJ)	38.4	36.2	35	33.8	32.2	30.3	28.1
Final energy use - Transportation (PJ)	151	143	129	118	110	100	89.1

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)	0	0.678	0.66	0	0	0	0
Sales of cooking units - Electric Resistance (%)	62.4	63.4	66.8	75.9	88.5	96.3	99
Sales of cooking units - Gas (%)	37.6	36.6	33.2	24.1	11.5	3.71	0.997
Sales of space heating units - Electric Heat Pump (%)	20.6	29.9	33.3	43.4	60.9	75.7	82.6
Sales of space heating units - Electric Resistance (%)	18.3	21.3	20.5	17.4	12.3	8.13	6.18
Sales of space heating units - Fossil (%)	10.8	16.9	16.2	14	10.4	7.61	6.49
Sales of space heating units - Gas (%)	50.2	31.9	30	25.2	16.5	8.57	4.78
Sales of water heating units - Electric Heat Pump (%)	0	1.02	3.88	12.4	26.6	38	43.1
Sales of water heating units - Electric Resistance (%)	45	61.1	60.3	58	54.9	53.5	53.2
Sales of water heating units - Gas Furnace (%)	52.2	35.8	33.7	27.7	16.7	6.76	2.07
Sales of water heating units - Other (%)	2.8	2.09	2.06	1.96	1.8	1.69	1.66

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	0	52.1	111	373	1,179	1,716
Public EV charging plugs - DC Fast (1000 units)	0.06	0	0.211	0	1.17	0	3.29
Public EV charging plugs - L2 (1000 units)	0.164	0	5.06	0	28.1	0	79
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 (%)	1.8	2.17	2.1	1.68	1.1	0.568	0.242
Vehicle sales - Light-duty - EV (%)	1.61	4.08	10.6	23.8	46.1	70.5	87
Vehicle sales - Light-duty - gasoline (%)	92.6	88.6	81.6	69.2	48.7	26.4	11.6
Vehicle sales - Light-duty - hybrid (%)	3.77	4.63	5.26	4.9	3.79	2.31	1.14
Vehicle sales - Light-duty - hydrogen FC (%)	0.113	0.387	0.34	0.265	0.191	0.108	0.05
Vehicle sales - Light-duty - other (%)	0.113	0.117	0.108	0.095	0.069	0.038	0.018
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	0
Capital invested - Biomass w/ccu power plant (billion $2018)	0	0	0	0	0	0	0

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	0	0
Biomass w/ccu power plant (GWh)	0	0	0	0	0	0	0

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	0	0
Conversion capital investment - Cumulative 5-yr (million $2018)	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	0	0
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 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	3.53
Annual - BECCS (MMT)		0	0	0	0	0	0
Annual - Cement and lime (MMT)		0	0	0	0	0	3.53
Annual - NGCC (MMT)		0	0	0	0	0	0
Cumulative - All (MMT)		0	0	0	0	0	3.53
Cumulative - BECCS (MMT)		0	0	0	0	0	0
Cumulative - Cement and lime (MMT)		0	0	0	0	0	3.53
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	0	0	0	30.7
Cumulative investment - All (million $2018)		0	0	0	0	0	36
Cumulative investment - Spur (million $2018)		0	0	0	0	0	36
Cumulative investment - Trunk (million $2018)		0	0	0	0	0	0
Spur (km)		0	0	0	0	0	30.7
Trunk (km)		0	0	0	0	0	0

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)							-17
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-509
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 - Permanent conservation cover (1000 tCO2e/y)							-20.7
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-546
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-17
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-268
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)							-10.4
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-296
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							6.53
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							838
Land impacted for carbon sink - Aggressive deployment - Cropland to woody energy crops (1000 hectares)							0.058
Land impacted for carbon sink - Aggressive deployment - Pasture to energy crops (1000 hectares)							110
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							37.7
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							993

Table 56: *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)							6.53
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							179
Land impacted for carbon sink - Moderate deployment - Cropland to woody energy crops (1000 hectares)							0.058
Land impacted for carbon sink - Moderate deployment - Pasture to energy crops (1000 hectares)							110
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							18.8
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							314

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)							-108
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-17,784
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-724
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-6,389
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-60.6
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4,441
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-197
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,114
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,750
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-53.9
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-5,372
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-121
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-2,454
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-30.8
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1,480
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-69.1
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-236
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-927

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-80.7
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-11,577
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-422
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-4,421
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-45.2
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-2,961
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-133
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-1,675
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-1,839
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							17.6
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							98.1
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							3,258
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							22.3
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)							18.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							88.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							912
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							4,415
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							8.8
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							92.1
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,248
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							11.2

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 - Low - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares)							9.87
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							15.3
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							552
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,937
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							13.2
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							95.1
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,253
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							16.8
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)							14.3
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							111
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,111
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							3,614

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		442	0.447	0.442	0.404	0.296	0.027
Monetary damages from air pollution - Natural Gas (million 2019$)		56.7	32.5	16.8	10.2	4.97	1.57
Monetary damages from air pollution - Transportation (million 2019$)		359	343	317	271	205	134
Premature deaths from air pollution - Coal (deaths)		49.9	0.05	0.05	0.046	0.033	0.003
Premature deaths from air pollution - Natural Gas (deaths)		6.4	3.67	1.9	1.15	0.561	0.178
Premature deaths from air pollution - Transportation (deaths)		40.4	38.6	35.7	30.5	23.1	15.1

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)	0	5,743	5,973	0	0	0	0
Sales of cooking units - Electric Resistance (%)	32	34.3	34.3	34.3	34.4	34.3	34.3
Sales of cooking units - Gas (%)	68	65.7	65.7	65.7	65.6	65.7	65.7
Sales of space heating units - Electric Heat Pump (%)	3.31	21.2	47.1	68.4	72	72.3	72.3
Sales of space heating units - Electric Resistance (%)	3.22	8.68	12.7	19.9	24.9	25.7	25.8
Sales of space heating units - Fossil (%)	4.12	4.58	3.35	1.41	0.205	0.017	0
Sales of space heating units - Gas Furnace (%)	89.4	65.6	36.9	10.2	2.94	1.96	1.9
Sales of water heating units - Electric Heat Pump (%)	0.114	0.273	0.269	0.271	0.272	0.271	0.272
Sales of water heating units - Electric Resistance (%)	2.92	6.72	6.66	6.66	6.69	6.67	6.68
Sales of water heating units - Gas Furnace (%)	94.5	88.7	88.7	88.7	88.7	88.7	88.7
Sales of water heating units - Other (%)	2.43	4.27	4.39	4.32	4.36	4.39	4.37

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)		0.92	0.94	1.05	1.08	1.2	1.24

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	48.6	49.4	49.9	50.1	50.6	52.1	55
Final energy use - Industry (PJ)	186	200	210	215	221	226	233
Final energy use - Residential (PJ)	38.4	36.3	35.7	35.7	36	36.8	37.6
Final energy use - Transportation (PJ)	151	143	130	122	122	126	130

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)	0	0.676	0.631	0	0	0	0
Sales of cooking units - Electric Resistance (%)	62.1	62.1	62.1	62.1	62.1	62.1	62.1
Sales of cooking units - Gas (%)	37.9	37.9	37.9	37.9	37.9	37.9	37.9
Sales of space heating units - Electric Heat Pump (%)	19.1	38.2	38.9	39.9	40.6	41.6	42.9
Sales of space heating units - Electric Resistance (%)	18.7	19	18.9	18.2	17.3	16.5	15
Sales of space heating units - Fossil (%)	11	14.2	11.6	10.1	9.89	9.86	9.99
Sales of space heating units - Gas (%)	51.1	28.6	30.6	31.9	32.2	32.1	32
Sales of water heating units - Electric Heat Pump (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Resistance (%)	45	61.3	61.3	61	60.7	60.7	60.4
Sales of water heating units - Gas Furnace (%)	52.2	36.6	36.6	36.8	37.1	37.2	37.3
Sales of water heating units - Other (%)	2.8	2.1	2.11	2.14	2.17	2.19	2.21

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 (%)	1.79	2.17	2.23	2.07	1.87	1.75	1.66
Vehicle sales - Light-duty - EV (%)	2.78	4.6	5.28	6.43	7.88	9.28	10.4
Vehicle sales - Light-duty - gasoline (%)	91.5	88.2	86.4	84.9	83	81	79.4
Vehicle sales - Light-duty - hybrid (%)	3.67	4.56	5.61	6.19	6.81	7.49	8.11
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.385	0.36	0.323	0.323	0.325	0.336
Vehicle sales - Light-duty - other (%)	0.113	0.116	0.114	0.114	0.114	0.114	0.117
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
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)							-108
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-17,784
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-724
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-6,389
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-60.6
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4,441
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-197
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,114
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,750
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-53.9
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-5,372
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-121
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-2,454
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-30.8
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1,480
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-69.1
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							0

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-236
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-927
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-80.7
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-11,577
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-422
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-4,421
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-45.2
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-2,961
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-133
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-1,675
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-1,839
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							17.6
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							98.1
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							3,258
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							22.3
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)							18.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							88.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							912
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							4,415
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							8.8
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							92.1
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,248

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 - Improve plantations (1000 hectares)							11.2
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)							9.87
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							15.3
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							552
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,937
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							13.2
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							95.1
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,253
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							16.8
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)							14.3
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							111
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,111
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							3,614

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)	-5.21		-10.5				-9.4
Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y)	-1.21		-2.17				-2.26
Business-as-usual carbon sink - Total (Mt CO2e/y)	-6.42		-12.7				-11.7

Table 66: *REF scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		1,199	729	661	629	609	564
Monetary damages from air pollution - Natural Gas (million 2019$)		47.2	55.2	60.9	58.5	60.2	53.9
Monetary damages from air pollution - Transportation (million 2019$)		359	348	338	329	321	313
Premature deaths from air pollution - Coal (deaths)		135	82.3	74.7	71	68.8	63.8
Premature deaths from air pollution - Natural Gas (deaths)		5.33	6.23	6.87	6.6	6.8	6.09
Premature deaths from air pollution - Transportation (deaths)		40.4	39.1	38	37	36.1	35.2