Net-Zero America - maine state report

2021-03-05

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)	0	2,622	2,862	0	0	0	0
Sales of cooking units - Electric Resistance (%)	36.9	49.9	81.2	87.4	87.7	87.7	87.7
Sales of cooking units - Gas (%)	63.1	50.1	18.8	12.6	12.3	12.3	12.3
Sales of space heating units - Electric Heat Pump (%)	2.33	11	39.5	71.3	77.4	77.8	78
Sales of space heating units - Electric Resistance (%)	1.31	4.27	16.7	21.3	22	22.2	22
Sales of space heating units - Fossil (%)	84.1	33.4	6.38	0.27	0	0	0
Sales of space heating units - Gas Furnace (%)	12.2	51.3	37.5	7.1	0.562	0.018	0
Sales of water heating units - Electric Heat Pump (%)	4.05	3.58	15.8	40	45.3	45.8	45.9
Sales of water heating units - Electric Resistance (%)	19.4	12.5	23.7	47.2	52.2	52.5	52.5
Sales of water heating units - Gas Furnace (%)	58.2	78.7	58.4	11.2	0.896	0.03	0
Sales of water heating units - Other (%)	18.4	5.18	2.06	1.6	1.59	1.59	1.61

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)		0.631	0.64	1.22	1.29	1.26	1.32

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	35.3	33	31.4	29.1	26.7	25.2	24.5
Final energy use - Industry (PJ)	90.9	89.1	85.7	82.2	79.8	103	102
Final energy use - Residential (PJ)	77.2	68.5	59.5	49.6	40.9	34.8	31.1
Final energy use - Transportation (PJ)	115	106	92.8	76.3	61.2	51.9	48

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	1.25	1.28	0	0	0	0
Sales of cooking units - Electric Resistance (%)	64.2	71.8	95.2	99.8	100	100	100
Sales of cooking units - Gas (%)	35.8	28.2	4.82	0.243	0	0	0
Sales of space heating units - Electric Heat Pump (%)	3	12.5	61.9	80.8	83.2	83.5	83.4
Sales of space heating units - Electric Resistance (%)	1.39	1.41	1.15	0.541	0.387	0.388	0.424
Sales of space heating units - Fossil (%)	88.9	82.5	34.4	18.2	16.4	16.1	16.2
Sales of space heating units - Gas (%)	6.74	3.55	2.57	0.511	0.068	0.03	0.029
Sales of water heating units - Electric Heat Pump (%)	0	2.79	18.7	33.9	36.7	36.9	37
Sales of water heating units - Electric Resistance (%)	25.5	44.1	55.6	61.8	62.9	63	62.9
Sales of water heating units - Gas Furnace (%)	31.8	28.3	20.9	4	0.319	0.011	0
Sales of water heating units - Other (%)	42.8	24.8	4.76	0.282	0.088	0.088	0.088

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	216	554	896	1,358	1,478	1,409
Public EV charging plugs - DC Fast (1000 units)	0.118	0	0.513	0	2.24	0	3.63
Public EV charging plugs - L2 (1000 units)	0.3	0	12.3	0	53.9	0	87.1
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 (%)	1.67	1.92	1.3	0.419	0.076	0.013	0
Vehicle sales - Light-duty - EV (%)	3.52	14	44.6	81.1	96.2	99.3	100
Vehicle sales - Light-duty - gasoline (%)	90.6	79.4	50.7	17.3	3.39	0.593	0
Vehicle sales - Light-duty - hybrid (%)	4.04	4.26	3.08	1.16	0.279	0.06	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.346	0.212	0.066	0.013	0.002	0
Vehicle sales - Light-duty - other (%)	0.107	0.103	0.069	0.024	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	0.184	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 - Offshore Wind - Base (billion $2018)	0	0	0	0	0	5.07	33.7
Capital invested - Solar PV - Base (billion $2018)	0	0	0	0	0	0	4.17
Capital invested - Solar PV - Constrained (billion $2018)	0	0.114	0	0	0	0.302	5.36
Capital invested - Wind - Base (billion $2018)	0	0	0	0	0	0	0.077
Capital invested - Wind - Constrained (billion $2018)	0	0	0	0	0	0	0
Installed (cumulative) - OffshoreWind - Base land use assumptions (MW)	0	0	0	0	0	3,098	28,516
Installed (cumulative) - Rooftop PV (MW)	86.1	150	176	205	239	277	319
Installed (cumulative) - Solar - Base land use assumptions (MW)	85.4	85.4	85.4	85.4	85.4	85.4	4,582
Installed (cumulative) - Wind - Base land use assumptions (MW)	1,011	1,011	1,011	1,011	1,011	1,011	1,052

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

Item	2020	2025	2030	2035	2040	2045	2050
Biomass power plant (GWh)	0	0	361	361	361	361	361
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 7: *E+ scenario - PILLAR 2: Clean Electricity - Generation (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
OffshoreWind - Base land use assumptions (GWh)	0	0	0	0	0	15,250	127,672
OffshoreWind - Constrained land use assumptions (GWh)	0	0	0	0	0	15,250	127,672
Solar - Base land use assumptions (GWh)	176	0	0	0	0	0	8,048
Solar - Constrained land use assumptions (GWh)	176	0	0	953	588	0	5,812
Wind - Base land use assumptions (GWh)	4,130	0	0	0	0	0	175
Wind - Constrained land use assumptions (GWh)	4,130	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Biomass purchases (million $2018/year)	0	0.025	14.3	14.3	14.3	14.3	126
Conversion capital investment - Cumulative 5-yr (million $2018)	0	0.039	205	0	0	0	2,372
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	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	1	1	1	1	1
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	1	1	1	1	1	1
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	3.32	3.42	6.58
Annual - BECCS (MMT)		0	0	0	0	0	3.05
Annual - Cement and lime (MMT)		0	0	0	3.32	3.42	3.53
Annual - NGCC (MMT)		0	0	0	0	0	0
Cumulative - All (MMT)		0	0	0	3.32	6.74	13.3
Cumulative - BECCS (MMT)		0	0	0	0	0	3.05
Cumulative - Cement and lime (MMT)		0	0	0	3.32	6.74	10.3
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	151	151	267	267	649
Cumulative investment - All (million $2018)		0	273	273	388	390	623
Cumulative investment - Spur (million $2018)		0	0	0	115	116	350
Cumulative investment - Trunk (million $2018)		0	273	273	273	273	273
Spur (km)		0	0	0	116	116	498
Trunk (km)		0	151	151	151	151	151

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)							-312
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-10.1
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-322
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-164
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-5.04
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-169
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)							173
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							18.3
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							191
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)							91.1
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							9.16
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							100

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)							-107
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-26,905
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-538
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-10,590
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-309
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-10,909
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-133
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-401
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-373
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-3,545
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-53.7
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-9,475
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-89.7
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-4,068
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-157
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-3,636
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-46.4
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-201
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-28.2
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,195
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-80.5
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-18,187
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-314
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-7,329
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-230
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-7,273
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-89.4
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-301
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-200
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,370

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)							17.5
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							72.9
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							5,400
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							114
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)							12.6
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							26.5
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							10.6
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,175
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,829
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							8.77
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							68.4
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							2,069
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							56.9
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)							6.63
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							13.3
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							1.84
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							711
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							2,936
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							13.2

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)							70.6
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,734
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							85.7
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)							9.61
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							19.9
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							13.3
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,432
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,379

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

Item	2020	2025	2030	2035	2040	2045	2050
Natural gas consumption - Annual (tcf)		36	30.3	24.3	18.3	11.5	7.99
Natural gas consumption - Cumulative (tcf)		0	0	0	0	0	732
Natural gas production - Annual (tcf)		0	0	0	0	0	0
Oil consumption - Annual (million bbls)		42	37.9	31.3	24.9	19.9	15.7
Oil consumption - Cumulative (million bbls)		0	0	0	0	0	956
Oil production - Annual (million bbls)		0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		124	0.147	0.146	0.14	0.083	0.004
Monetary damages from air pollution - Natural Gas (million 2019$)		35.1	19.8	12.6	11.6	7.15	3.33
Monetary damages from air pollution - Transportation (million 2019$)		163	149	111	62.7	27.6	10.1
Premature deaths from air pollution - Coal (deaths)		14	0.017	0.017	0.016	0.009	0
Premature deaths from air pollution - Natural Gas (deaths)		3.96	2.23	1.42	1.31	0.807	0.376
Premature deaths from air pollution - Transportation (deaths)		18.4	16.8	12.5	7.05	3.11	1.14

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		239	499	219	173	129	249
By economic sector - Construction (jobs)		1,355	1,129	1,060	1,250	3,284	25,058
By economic sector - Manufacturing (jobs)		1,081	1,609	1,419	1,554	2,377	6,655
By economic sector - Mining (jobs)		648	485	333	220	145	94.3

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Other (jobs)		120	82.8	92.9	112	295	2,892
By economic sector - Pipeline (jobs)		98.9	121	72.1	70.3	56.4	70.6
By economic sector - Professional (jobs)		1,236	1,126	763	790	1,963	14,696
By economic sector - Trade (jobs)		771	608	502	491	1,100	8,347
By economic sector - Utilities (jobs)		896	767	786	1,279	3,800	28,080
By education level - All sectors - Associates degree or some college (jobs)		1,878	1,835	1,561	1,834	4,211	28,051
By education level - All sectors - Bachelors degree (jobs)		1,471	1,398	1,110	1,218	2,649	17,210
By education level - All sectors - Doctoral degree (jobs)		59.8	54.3	38.8	40	90.9	644
By education level - All sectors - High school diploma or less (jobs)		2,670	2,798	2,275	2,560	5,544	35,775
By education level - All sectors - Masters or professional degree (jobs)		366	341	263	288	655	4,462
By resource sector - Biomass (jobs)		1,028	1,375	623	520	472	1,063
By resource sector - CO2 (jobs)		0	272	0	112	111	313
By resource sector - Grid (jobs)		1,095	853	1,349	1,965	7,333	56,654
By resource sector - Natural Gas (jobs)		701	421	242	523	296	262
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		1,867	1,546	1,179	872	650	481
By resource sector - Solar (jobs)		985	948	666	878	1,418	6,882
By resource sector - Wind (jobs)		769	1,012	1,188	1,071	2,870	20,488
Median wages - Annual - All ($2019 per job)		57,717	57,407	57,892	58,493	59,594	60,830
On-Site or In-Plant Training - Total jobs - 1 to 4 years (jobs)		984	959	811	945	2,166	14,470
On-Site or In-Plant Training - Total jobs - 4 to 10 years (jobs)		392	356	305	366	894	6,362
On-Site or In-Plant Training - Total jobs - None (jobs)		1,076	1,080	864	966	2,107	13,716
On-Site or In-Plant Training - Total jobs - Over 10 years (jobs)		48.8	47	40.8	49.5	118	807
On-Site or In-Plant Training - Total jobs - Up to 1 year (jobs)		3,944	3,985	3,226	3,613	7,864	50,787
On-the-Job Training - All sectors - 1 to 4 years (jobs)		1,251	1,208	1,027	1,207	2,796	18,808
On-the-Job Training - All sectors - 4 to 10 years (jobs)		371	335	290	354	884	6,380
On-the-Job Training - All sectors - None (jobs)		366	353	285	314	683	4,496
On-the-Job Training - All sectors - Over 10 years (jobs)		60.4	60.5	51.4	57.8	122	751
On-the-Job Training - All sectors - Up to 1 year (jobs)		4,396	4,470	3,594	4,008	8,666	55,708
Related work experience - All sectors - 1 to 4 years (jobs)		2,351	2,323	1,890	2,132	4,726	31,063
Related work experience - All sectors - 4 to 10 years (jobs)		1,479	1,425	1,182	1,357	3,072	20,371
Related work experience - All sectors - None (jobs)		913	925	753	860	1,903	12,539
Related work experience - All sectors - Over 10 years (jobs)		394	387	325	371	820	5,254
Related work experience - All sectors - Up to 1 year (jobs)		1,308	1,366	1,096	1,219	2,629	16,916
Wage income - All (million $2019)		372	369	304	347	784	5,241

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	2,622	2,866	0	0	0	0
Sales of cooking units - Electric Resistance (%)	36.9	40.7	44.7	56.5	72.7	82.9	86.4
Sales of cooking units - Gas (%)	63.1	59.3	55.3	43.5	27.3	17.1	13.6
Sales of space heating units - Electric Heat Pump (%)	2.33	6.89	8.48	13.3	22.8	32.7	38.1
Sales of space heating units - Electric Resistance (%)	1.31	1.76	2.43	4.48	7.93	10.5	11.3
Sales of space heating units - Fossil (%)	84.1	39.2	38.1	33.9	26.8	22.3	21
Sales of space heating units - Gas Furnace (%)	12.2	52.1	51	48.4	42.5	34.6	29.5
Sales of water heating units - Electric Heat Pump (%)	4.05	2.68	3.38	5.63	11.1	17.9	22
Sales of water heating units - Electric Resistance (%)	19.4	11.6	11.9	14.5	19.6	26	29.9
Sales of water heating units - Gas Furnace (%)	58.2	79.9	79.4	75.1	65.2	52.6	44.8
Sales of water heating units - Other (%)	18.4	5.77	5.34	4.75	4.17	3.55	3.28

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)		0.484	0.475	0.654	0.668	1.11	1.17

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	35.3	33	32	31	30	29	28.3
Final energy use - Industry (PJ)	90.9	89.2	86.1	83	81.1	104	103
Final energy use - Residential (PJ)	77.2	68.8	62.6	57.4	52.4	47.4	42.8
Final energy use - Transportation (PJ)	115	107	97.2	89.2	82.9	75.5	66.9

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	1.25	1.38	0	0	0	0
Sales of cooking units - Electric Resistance (%)	64.1	65	68.3	77	89	96.5	99
Sales of cooking units - Gas (%)	35.9	35	31.7	23	11	3.54	0.953
Sales of space heating units - Electric Heat Pump (%)	3	2.62	5.43	13.6	26.9	36.8	40.8
Sales of space heating units - Electric Resistance (%)	1.39	1.43	1.43	1.44	1.28	1.11	1.03
Sales of space heating units - Fossil (%)	88.9	92.3	89.6	81.5	68.9	59.6	56.1
Sales of space heating units - Gas (%)	6.74	3.62	3.58	3.39	2.96	2.45	2.07
Sales of water heating units - Electric Heat Pump (%)	0	0.324	1.24	4.01	9.3	14.5	17.2
Sales of water heating units - Electric Resistance (%)	25.5	41.9	42.4	44.6	47.8	50.5	51.8
Sales of water heating units - Gas Furnace (%)	31.8	28.7	28.4	26.9	23.4	18.8	16
Sales of water heating units - Other (%)	42.8	29.1	28	24.5	19.5	16.2	15

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	35	73.4	248	780	1,136
Public EV charging plugs - DC Fast (1000 units)	0.118	0	0.159	0	0.833	0	2.32
Public EV charging plugs - L2 (1000 units)	0.3	0	3.82	0	20	0	55.8
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 (%)	1.68	2.07	2.08	1.66	1.07	0.552	0.236
Vehicle sales - Light-duty - EV (%)	1.75	4.38	11.2	24.8	47.3	71.3	87.3
Vehicle sales - Light-duty - gasoline (%)	92.2	88.1	80.6	67.9	47.5	25.6	11.3
Vehicle sales - Light-duty - hybrid (%)	4.18	5.01	5.66	5.21	3.96	2.37	1.16
Vehicle sales - Light-duty - hydrogen FC (%)	0.113	0.384	0.333	0.257	0.184	0.103	0.048
Vehicle sales - Light-duty - other (%)	0.108	0.111	0.102	0.089	0.065	0.036	0.016
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)							-312
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-10.1
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-322
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-164
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-5.04
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-169
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)							173
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							18.3

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)							191
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)							91.1
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							9.16
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							100

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)							-107
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-26,905
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-538
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-10,590
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-309
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-10,909
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-133
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-401
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-373
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-3,545
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-53.7
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-9,475
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-89.7
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-4,068
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-157
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-3,636
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-46.4
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-201
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-28.2
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,195
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-80.5

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)							-18,187
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-314
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-7,329
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-230
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-7,273
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-89.4
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-301
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-200
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,370
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							17.5
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							72.9
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							5,400
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							114
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)							12.6
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							26.5
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							10.6
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,175
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,829
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							8.77
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							68.4
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							2,069
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							56.9
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)							6.63
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							13.3
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							1.84
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							711
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							2,936
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)							70.6
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,734
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							85.7
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)							9.61
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							19.9
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							13.3
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,432
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,379

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		124	0.147	0.146	0.14	0.083	0.004
Monetary damages from air pollution - Natural Gas (million 2019$)		34.2	16.1	6.12	2.58	0.799	0.888
Monetary damages from air pollution - Transportation (million 2019$)		166	164	156	138	107	71.8
Premature deaths from air pollution - Coal (deaths)		14	0.017	0.017	0.016	0.009	0
Premature deaths from air pollution - Natural Gas (deaths)		3.86	1.81	0.691	0.292	0.09	0.1
Premature deaths from air pollution - Transportation (deaths)		18.7	18.5	17.6	15.5	12.1	8.08

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	2,622	2,862	0	0	0	0
Sales of cooking units - Electric Resistance (%)	36.9	49.9	81.2	87.4	87.7	87.7	87.7
Sales of cooking units - Gas (%)	63.1	50.1	18.8	12.6	12.3	12.3	12.3
Sales of space heating units - Electric Heat Pump (%)	2.33	11	39.5	71.3	77.4	77.8	78
Sales of space heating units - Electric Resistance (%)	1.31	4.27	16.7	21.3	22	22.2	22
Sales of space heating units - Fossil (%)	84.1	33.4	6.38	0.27	0	0	0
Sales of space heating units - Gas Furnace (%)	12.2	51.3	37.5	7.1	0.562	0.018	0
Sales of water heating units - Electric Heat Pump (%)	4.05	3.58	15.8	40	45.3	45.8	45.9
Sales of water heating units - Electric Resistance (%)	19.4	12.5	23.7	47.2	52.2	52.5	52.5
Sales of water heating units - Gas Furnace (%)	58.2	78.7	58.4	11.2	0.896	0.03	0
Sales of water heating units - Other (%)	18.4	5.18	2.06	1.6	1.59	1.59	1.61

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)		0.631	0.64	1.22	1.29	1.26	1.32

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	35.3	33	31.4	29.1	26.7	25.2	24.5
Final energy use - Industry (PJ)	90.9	89.1	85.7	82.2	79.8	103	102
Final energy use - Residential (PJ)	77.2	68.5	59.5	49.6	40.9	34.8	31.1
Final energy use - Transportation (PJ)	115	106	92.8	76.3	61.2	51.9	48

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	1.25	1.28	0	0	0	0
Sales of cooking units - Electric Resistance (%)	64.2	71.8	95.2	99.8	100	100	100
Sales of cooking units - Gas (%)	35.8	28.2	4.82	0.243	0	0	0
Sales of space heating units - Electric Heat Pump (%)	3	12.5	61.9	80.8	83.2	83.5	83.4
Sales of space heating units - Electric Resistance (%)	1.39	1.41	1.15	0.541	0.387	0.388	0.424
Sales of space heating units - Fossil (%)	88.9	82.5	34.4	18.2	16.4	16.1	16.2
Sales of space heating units - Gas (%)	6.74	3.55	2.57	0.511	0.068	0.03	0.029
Sales of water heating units - Electric Heat Pump (%)	0	2.79	18.7	33.9	36.7	36.9	37
Sales of water heating units - Electric Resistance (%)	25.5	44.1	55.6	61.8	62.9	63	62.9
Sales of water heating units - Gas Furnace (%)	31.8	28.3	20.9	4	0.319	0.011	0
Sales of water heating units - Other (%)	42.8	24.8	4.76	0.282	0.088	0.088	0.088

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	216	554	896	1,358	1,478	1,409
Public EV charging plugs - DC Fast (1000 units)	0.118	0	0.513	0	2.24	0	3.63
Public EV charging plugs - L2 (1000 units)	0.3	0	12.3	0	53.9	0	87.1
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 (%)	1.67	1.92	1.3	0.419	0.076	0.013	0
Vehicle sales - Light-duty - EV (%)	3.52	14	44.6	81.1	96.2	99.3	100
Vehicle sales - Light-duty - gasoline (%)	90.6	79.4	50.7	17.3	3.39	0.593	0
Vehicle sales - Light-duty - hybrid (%)	4.04	4.26	3.08	1.16	0.279	0.06	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.346	0.212	0.066	0.013	0.002	0
Vehicle sales - Light-duty - other (%)	0.107	0.103	0.069	0.024	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 - Offshore Wind - Base (billion $2018)	0	0	0	0	0.583	20.6	44.7
Capital invested - Solar PV - Base (billion $2018)	0	0	0	0.434	0.33	3.49	8.83
Capital invested - Wind - Base (billion $2018)	0	0	0	0	0	0	0.077
Installed (cumulative) - OffshoreWind - Base land use assumptions (MW)	0	0	0	0	288	12,884	46,590
Installed (cumulative) - Solar - Base land use assumptions (MW)	85.4	85.4	85.4	479	796	4,351	13,882
Installed (cumulative) - Wind - Base land use assumptions (MW)	1,011	1,011	1,011	1,011	1,011	1,011	1,052

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	1,440	62,717	170,052
OffshoreWind - Constrained land use assumptions (GWh)	0			0	0	0	256,402
Solar - Base land use assumptions (GWh)	176			712	570	6,318	16,676
Solar - Constrained land use assumptions (GWh)	176			0	570	7,514	16,795
Wind - Base land use assumptions (GWh)	4,130			0	0	0	175
Wind - Constrained land use assumptions (GWh)	4,130			0	0	0	0

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)							-312
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-10.1
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-322
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-164
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-5.04
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-169
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)							173
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							18.3
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							191
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)							91.1
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							9.16
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							100

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)							-107
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-26,905
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-538
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-10,590
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-309
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-10,909

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)							-133
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-401
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-373
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-3,545
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-53.7
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-9,475
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-89.7
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-4,068
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-157
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-3,636
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-46.4
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-201
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-28.2
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,195
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-80.5
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-18,187
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-314
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-7,329
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-230
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-7,273
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-89.4
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-301
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-200
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,370
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							17.5
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							72.9
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							5,400
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							114

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)							12.6
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							26.5
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							10.6
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,175
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,829
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							8.77
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							68.4
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							2,069
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							56.9
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)							6.63
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							13.3
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							1.84
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							711
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							2,936
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)							70.6
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,734
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							85.7
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)							9.61

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)							19.9
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							13.3
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,432
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,379

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		124	0.147	0.146	0.14	0.083	0.004
Monetary damages from air pollution - Natural Gas (million 2019$)		32.6	17.5	9.62	7.52	2.54	0.916
Monetary damages from air pollution - Transportation (million 2019$)		163	149	111	62.7	27.6	10.1
Premature deaths from air pollution - Coal (deaths)		14	0.017	0.017	0.016	0.009	0
Premature deaths from air pollution - Natural Gas (deaths)		3.68	1.98	1.09	0.848	0.287	0.103
Premature deaths from air pollution - Transportation (deaths)		18.4	16.8	12.5	7.05	3.11	1.14

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	2,622	2,862	0	0	0	0
Sales of cooking units - Electric Resistance (%)	36.9	49.9	81.2	87.4	87.7	87.7	87.7
Sales of cooking units - Gas (%)	63.1	50.1	18.8	12.6	12.3	12.3	12.3
Sales of space heating units - Electric Heat Pump (%)	2.33	11	39.5	71.3	77.4	77.8	78
Sales of space heating units - Electric Resistance (%)	1.31	4.27	16.7	21.3	22	22.2	22
Sales of space heating units - Fossil (%)	84.1	33.4	6.38	0.27	0	0	0
Sales of space heating units - Gas Furnace (%)	12.2	51.3	37.5	7.1	0.562	0.018	0
Sales of water heating units - Electric Heat Pump (%)	4.05	3.58	15.8	40	45.3	45.8	45.9
Sales of water heating units - Electric Resistance (%)	19.4	12.5	23.7	47.2	52.2	52.5	52.5
Sales of water heating units - Gas Furnace (%)	58.2	78.7	58.4	11.2	0.896	0.03	0
Sales of water heating units - Other (%)	18.4	5.18	2.06	1.6	1.59	1.59	1.61

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)		0.631	0.64	1.22	1.29	1.26	1.32

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	35.3	33	31.4	29.1	26.7	25.2	24.5

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Industry (PJ)	90.9	89.1	85.7	82.2	79.8	103	102
Final energy use - Residential (PJ)	77.2	68.5	59.5	49.6	40.9	34.8	31.1
Final energy use - Transportation (PJ)	115	106	92.8	76.3	61.2	51.9	48

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	1.25	1.28	0	0	0	0
Sales of cooking units - Electric Resistance (%)	64.2	71.8	95.2	99.8	100	100	100
Sales of cooking units - Gas (%)	35.8	28.2	4.82	0.243	0	0	0
Sales of space heating units - Electric Heat Pump (%)	3	12.5	61.9	80.8	83.2	83.5	83.4
Sales of space heating units - Electric Resistance (%)	1.39	1.41	1.15	0.541	0.387	0.388	0.424
Sales of space heating units - Fossil (%)	88.9	82.5	34.4	18.2	16.4	16.1	16.2
Sales of space heating units - Gas (%)	6.74	3.55	2.57	0.511	0.068	0.03	0.029
Sales of water heating units - Electric Heat Pump (%)	0	2.79	18.7	33.9	36.7	36.9	37
Sales of water heating units - Electric Resistance (%)	25.5	44.1	55.6	61.8	62.9	63	62.9
Sales of water heating units - Gas Furnace (%)	31.8	28.3	20.9	4	0.319	0.011	0
Sales of water heating units - Other (%)	42.8	24.8	4.76	0.282	0.088	0.088	0.088

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	216	554	896	1,358	1,478	1,409
Public EV charging plugs - DC Fast (1000 units)	0.118	0	0.513	0	2.24	0	3.63
Public EV charging plugs - L2 (1000 units)	0.3	0	12.3	0	53.9	0	87.1
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 (%)	1.67	1.92	1.3	0.419	0.076	0.013	0
Vehicle sales - Light-duty - EV (%)	3.52	14	44.6	81.1	96.2	99.3	100
Vehicle sales - Light-duty - gasoline (%)	90.6	79.4	50.7	17.3	3.39	0.593	0
Vehicle sales - Light-duty - hybrid (%)	4.04	4.26	3.08	1.16	0.279	0.06	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.346	0.212	0.066	0.013	0.002	0
Vehicle sales - Light-duty - other (%)	0.107	0.103	0.069	0.024	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	0
Capital invested - Wind - Base (billion $2018)		0	0	0	0	0	0
Capital invested - Wind - Constrained (billion $2018)		0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	176						
Solar - Constrained land use assumptions (GWh)	176						
Wind - Base land use assumptions (GWh)	4,130						
Wind - Constrained land use assumptions (GWh)	4,130						

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)							-312
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-10.1
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-322
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-164
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-5.04
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-169
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)							173
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							18.3
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							191
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							0

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							91.1
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							9.16
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							100

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)							-107
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-26,905
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-538
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-10,590
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-309
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-10,909
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-133
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-401
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-373
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-3,545
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-53.7
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-9,475
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-89.7
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-4,068
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-157
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-3,636
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-46.4
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-201
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-28.2
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,195
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-80.5
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-18,187
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-314
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-7,329

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-230
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-7,273
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-89.4
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-301
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-200
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,370
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							17.5
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							72.9
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							5,400
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							114
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)							12.6
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							26.5
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							10.6
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,175
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,829
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							8.77
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							68.4
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							2,069
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							56.9
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)							6.63
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							13.3

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 - Low - Reforest pasture (1000 hectares)							1.84
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							711
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							2,936
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)							70.6
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,734
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							85.7
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)							9.61
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							19.9
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							13.3
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,432
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,379

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		124	0.147	0.146	0.14	0.083	0.004
Monetary damages from air pollution - Natural Gas (million 2019$)		34.7	19.4	21	15.7	7.44	1.74
Monetary damages from air pollution - Transportation (million 2019$)		163	149	111	62.7	27.6	10.1
Premature deaths from air pollution - Coal (deaths)		14	0.017	0.017	0.016	0.009	0
Premature deaths from air pollution - Natural Gas (deaths)		3.92	2.19	2.37	1.77	0.84	0.197
Premature deaths from air pollution - Transportation (deaths)		18.4	16.8	12.5	7.05	3.11	1.14

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	2,622	2,866	0	0	0	0
Sales of cooking units - Electric Resistance (%)	36.9	40.7	44.7	56.5	72.7	82.9	86.4
Sales of cooking units - Gas (%)	63.1	59.3	55.3	43.5	27.3	17.1	13.6

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Electric Heat Pump (%)	2.33	6.89	8.48	13.3	22.8	32.7	38.1
Sales of space heating units - Electric Resistance (%)	1.31	1.76	2.43	4.48	7.93	10.5	11.3
Sales of space heating units - Fossil (%)	84.1	39.2	38.1	33.9	26.8	22.3	21
Sales of space heating units - Gas Furnace (%)	12.2	52.1	51	48.4	42.5	34.6	29.5
Sales of water heating units - Electric Heat Pump (%)	4.05	2.68	3.38	5.63	11.1	17.9	22
Sales of water heating units - Electric Resistance (%)	19.4	11.6	11.9	14.5	19.6	26	29.9
Sales of water heating units - Gas Furnace (%)	58.2	79.9	79.4	75.1	65.2	52.6	44.8
Sales of water heating units - Other (%)	18.4	5.77	5.34	4.75	4.17	3.55	3.28

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)		0.484	0.475	0.654	0.668	1.11	1.17

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	35.3	33	32	31	30	29	28.3
Final energy use - Industry (PJ)	90.9	89.2	86.1	83	81.1	104	103
Final energy use - Residential (PJ)	77.2	68.8	62.6	57.4	52.4	47.4	42.8
Final energy use - Transportation (PJ)	115	107	97.2	89.2	82.9	75.5	66.9

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	1.25	1.38	0	0	0	0
Sales of cooking units - Electric Resistance (%)	64.1	65	68.3	77	89	96.5	99
Sales of cooking units - Gas (%)	35.9	35	31.7	23	11	3.54	0.953
Sales of space heating units - Electric Heat Pump (%)	3	2.62	5.43	13.6	26.9	36.8	40.8
Sales of space heating units - Electric Resistance (%)	1.39	1.43	1.43	1.44	1.28	1.11	1.03
Sales of space heating units - Fossil (%)	88.9	92.3	89.6	81.5	68.9	59.6	56.1
Sales of space heating units - Gas (%)	6.74	3.62	3.58	3.39	2.96	2.45	2.07
Sales of water heating units - Electric Heat Pump (%)	0	0.324	1.24	4.01	9.3	14.5	17.2
Sales of water heating units - Electric Resistance (%)	25.5	41.9	42.4	44.6	47.8	50.5	51.8
Sales of water heating units - Gas Furnace (%)	31.8	28.7	28.4	26.9	23.4	18.8	16
Sales of water heating units - Other (%)	42.8	29.1	28	24.5	19.5	16.2	15

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	35	73.4	248	780	1,136
Public EV charging plugs - DC Fast (1000 units)	0.118	0	0.159	0	0.833	0	2.32
Public EV charging plugs - L2 (1000 units)	0.3	0	3.82	0	20	0	55.8
Vehicle sales - Heavy-duty - diesel (%)	97.4	96	91.3	79.8	58.2	32.1	13.7

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

Item	2020	2025	2030	2035	2040	2045	2050
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 (%)	1.68	2.07	2.08	1.66	1.07	0.552	0.236
Vehicle sales - Light-duty - EV (%)	1.75	4.38	11.2	24.8	47.3	71.3	87.3
Vehicle sales - Light-duty - gasoline (%)	92.2	88.1	80.6	67.9	47.5	25.6	11.3
Vehicle sales - Light-duty - hybrid (%)	4.18	5.01	5.66	5.21	3.96	2.37	1.16
Vehicle sales - Light-duty - hydrogen FC (%)	0.113	0.384	0.333	0.257	0.184	0.103	0.048
Vehicle sales - Light-duty - other (%)	0.108	0.111	0.102	0.089	0.065	0.036	0.016
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	0.917	0	0	0	0
Capital invested - Biomass w/ccu allam power plant (billion $2018)	0	0	0	0	0	0	0.019
Capital invested - Biomass w/ccu power plant (billion $2018)	0	0	0	0	0	0	0.022

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

Item	2020	2025	2030	2035	2040	2045	2050
Biomass power plant (GWh)	0	0	1,801	1,801	1,801	1,801	1,801
Biomass w/ccu allam power plant (GWh)	0	0	0	0	0	0	18.7
Biomass w/ccu power plant (GWh)	0	0	0	0	0	0	24.7

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

Item	2020	2025	2030	2035	2040	2045	2050
Biomass purchases (million $2018/year)	0	0.052	136	136	136	136	457
Conversion capital investment - Cumulative 5-yr (million $2018)	0	0.047	1,023	0	0	0	3,664
Number of facilities - Allam power w ccu (quantity)	0	0	0	0	0	0	1
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	1
Number of facilities - Power (quantity)	0	0	2	2	2	2	2
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	1	1	1	1	1	1
Number of facilities - Sng ccu (quantity)	0	0	0	0	0	0	1

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0	0	3.32	3.42	8.05
Annual - BECCS (MMT)		0	0	0	0	0	4.52
Annual - Cement and lime (MMT)		0	0	0	3.32	3.42	3.53
Annual - NGCC (MMT)		0	0	0	0	0	0
Cumulative - All (MMT)		0	0	0	3.32	6.74	14.8
Cumulative - BECCS (MMT)		0	0	0	0	0	4.52
Cumulative - Cement and lime (MMT)		0	0	0	3.32	6.74	10.3
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	151	151	267	267	801
Cumulative investment - All (million $2018)		0	273	273	388	390	760
Cumulative investment - Spur (million $2018)		0	0	0	115	116	487
Cumulative investment - Trunk (million $2018)		0	273	273	273	273	273
Spur (km)		0	0	0	116	116	650
Trunk (km)		0	151	151	151	151	151

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)							-312
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)							-10.1
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-322
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-164
Carbon sink potential - Moderate 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 - Moderate deployment - Pasture to energy crops (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-5.04
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-169
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)							427
Land impacted for carbon sink - Aggressive deployment - Cropland to woody energy crops (1000 hectares)							0
Land impacted for carbon sink - Aggressive deployment - Pasture to energy crops (1000 hectares)							0.741
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							18.3
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							446
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)							91.1
Land impacted for carbon sink - Moderate deployment - Cropland to woody energy crops (1000 hectares)							0
Land impacted for carbon sink - Moderate deployment - Pasture to energy crops (1000 hectares)							0.742
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							9.16
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							101

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)							-107
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-26,905
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-538
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-10,590
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-309
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-10,909
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-133

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-401
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-373
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-3,545
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-53.7
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-9,475
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-89.7
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-4,068
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-157
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-3,636
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-46.4
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-201
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-28.2
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,195
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-80.5
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-18,187
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-314
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-7,329
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-230
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-7,273
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-89.4
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-301
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-200
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,370
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							17.5
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							72.9
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							5,400
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							114
Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares)							0

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 - Increase trees outside forests (1000 hectares)							12.6
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							26.5
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							10.6
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,175
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,829
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							8.77
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							68.4
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							2,069
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							56.9
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)							6.63
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							13.3
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							1.84
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							711
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							2,936
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)							70.6
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,734
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							85.7
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)							9.61
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							19.9

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 - Reforest pasture (1000 hectares)							13.3
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,432
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,379

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		124	0.147	0.146	0.14	0.083	0.004
Monetary damages from air pollution - Natural Gas (million 2019$)		34.2	15.1	7.22	5.43	3.18	1.26
Monetary damages from air pollution - Transportation (million 2019$)		166	164	156	138	107	71.8
Premature deaths from air pollution - Coal (deaths)		14	0.017	0.017	0.016	0.009	0
Premature deaths from air pollution - Natural Gas (deaths)		3.86	1.7	0.816	0.613	0.359	0.142
Premature deaths from air pollution - Transportation (deaths)		18.7	18.5	17.6	15.5	12.1	8.08

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	2,590	2,664	0	0	0	0
Sales of cooking units - Electric Resistance (%)	36.9	39	38.6	38.5	38.3	38.5	38.4
Sales of cooking units - Gas (%)	63.1	61	61.4	61.5	61.7	61.5	61.6
Sales of space heating units - Electric Heat Pump (%)	2.33	12.7	40.4	63.6	67.5	67.8	68
Sales of space heating units - Electric Resistance (%)	1.31	2.46	7.45	19.9	30.2	32	32
Sales of space heating units - Fossil (%)	84.1	37.3	26.1	10.2	1.47	0.119	0
Sales of space heating units - Gas Furnace (%)	12.2	47.5	26.1	6.26	0.817	0.051	0
Sales of water heating units - Electric Heat Pump (%)	4.05	2.42	2.41	2.36	2.35	2.4	2.4
Sales of water heating units - Electric Resistance (%)	19.4	11.4	11	11.4	11.3	11.2	11.2
Sales of water heating units - Gas Furnace (%)	58.2	80.4	81.1	80.9	80.9	81.3	81.5
Sales of water heating units - Other (%)	18.4	5.83	5.56	5.37	5.48	5.14	4.87

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)		0.574	0.576	0.751	0.773	0.756	0.774

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	35.3	33.5	33	32	31	30.8	31.4
Final energy use - Industry (PJ)	90.9	92.9	93.4	94.3	96.6	99.5	102
Final energy use - Residential (PJ)	77.2	69.1	63.2	58.6	55.2	52.5	50.1
Final energy use - Transportation (PJ)	115	107	98	92.4	92.1	94.8	98.3

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	1.23	1.26	0	0	0	0
Sales of cooking units - Electric Resistance (%)	63.8	63.8	63.8	63.8	63.8	63.8	63.8
Sales of cooking units - Gas (%)	36.2	36.2	36.2	36.2	36.2	36.2	36.2
Sales of space heating units - Electric Heat Pump (%)	2.88	4.65	4.91	5.31	5.38	5.44	5.51
Sales of space heating units - Electric Resistance (%)	1.4	1.38	1.39	1.43	1.39	1.36	1.32
Sales of space heating units - Fossil (%)	89	81.3	49.9	28.1	26.5	26.2	26.4
Sales of space heating units - Gas (%)	6.75	12.7	43.8	65.1	66.7	67	66.8
Sales of water heating units - Electric Heat Pump (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Resistance (%)	25.5	41.6	41.5	41.7	41.6	41.6	41.5
Sales of water heating units - Gas Furnace (%)	31.8	28.9	29	29	29.1	29.2	29.2
Sales of water heating units - Other (%)	42.8	29.5	29.5	29.3	29.3	29.2	29.2

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 (%)	1.67	2.07	2.2	2.05	1.85	1.73	1.64
Vehicle sales - Light-duty - EV (%)	3.17	5.09	5.83	7.14	8.73	10.2	11.3
Vehicle sales - Light-duty - gasoline (%)	90.9	87.4	85.5	83.8	81.8	79.8	78.2
Vehicle sales - Light-duty - hybrid (%)	4.05	4.92	6.04	6.61	7.21	7.84	8.37
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.381	0.353	0.315	0.313	0.315	0.326
Vehicle sales - Light-duty - other (%)	0.107	0.111	0.108	0.109	0.108	0.107	0.11
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)							-107
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-26,905
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-538
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-10,590
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-309
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-10,909
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-133

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-401
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-373
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-3,545
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-53.7
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-9,475
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-89.7
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-4,068
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-157
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-3,636
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-46.4
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-201
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-28.2
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,195
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-80.5
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-18,187
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-314
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-7,329
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-230
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-7,273
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-89.4
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-301
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-200
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,370
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							17.5
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							72.9
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							5,400
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							114
Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares)							0

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares)							12.6
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							26.5
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							10.6
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,175
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,829
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							8.77
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							68.4
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							2,069
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							56.9
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)							6.63
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							13.3
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							1.84
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							711
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							2,936
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)							70.6
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,734
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							85.7
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)							9.61
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							19.9

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							13.3
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,432
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,379

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)	-6.38		-15.3				-13.7
Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y)	-2.97		-5.34				-5.55
Business-as-usual carbon sink - Total (Mt CO2e/y)	-9.35		-20.6				-19.2

Table 66: *REF scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		350	220	203	199	195	169
Monetary damages from air pollution - Natural Gas (million 2019$)		26.9	21.7	27	27.6	25.4	23.6
Monetary damages from air pollution - Transportation (million 2019$)		166	166	167	167	168	168
Premature deaths from air pollution - Coal (deaths)		39.5	24.9	22.9	22.4	22	19.1
Premature deaths from air pollution - Natural Gas (deaths)		3.03	2.45	3.05	3.12	2.86	2.67
Premature deaths from air pollution - Transportation (deaths)		18.6	18.7	18.7	18.8	18.9	18.9