Net-Zero America - mississippi 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	8,123	9,222	0	0	0	0
Sales of cooking units - Electric Resistance (%)	43.5	55.3	83.4	88.9	89.2	89.2	89.1
Sales of cooking units - Gas (%)	56.5	44.7	16.6	11.1	10.8	10.8	10.9
Sales of space heating units - Electric Heat Pump (%)	9.46	29.3	77	90.8	91.9	92	92
Sales of space heating units - Electric Resistance (%)	4.72	4.61	4.92	6.26	6.57	6.57	6.55
Sales of space heating units - Fossil (%)	0	2.89	0.56	0.024	0	0	0
Sales of space heating units - Gas Furnace (%)	85.8	63.2	17.5	2.95	1.48	1.43	1.43
Sales of water heating units - Electric Heat Pump (%)	0.153	10.6	55.7	65.7	66.1	66.2	66.2
Sales of water heating units - Electric Resistance (%)	5.64	9.97	28	32.1	32.3	32.3	32.3
Sales of water heating units - Gas Furnace (%)	92.7	77.8	14.7	0.62	0	0	0
Sales of water heating units - Other (%)	1.56	1.58	1.58	1.58	1.58	1.57	1.56

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)		2.03	2.09	3.69	3.94	2.98	3.07

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	70.6	70.6	68.1	64.4	61.3	60.1	60.4
Final energy use - Industry (PJ)	201	206	208	206	206	204	203
Final energy use - Residential (PJ)	99.2	92.9	85.6	76.5	69.1	64.8	63
Final energy use - Transportation (PJ)	350	323	285	238	196	170	160

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	2.27	2.78	0	0	0	0
Sales of cooking units - Electric Resistance (%)	75.8	81	96.7	99.8	100	100	100
Sales of cooking units - Gas (%)	24.2	19	3.26	0.164	0	0	0
Sales of space heating units - Electric Heat Pump (%)	29.5	45.1	80.4	88.3	88.7	88.6	88.6
Sales of space heating units - Electric Resistance (%)	28.6	27.1	11.4	7.85	7.68	7.79	7.8
Sales of space heating units - Fossil (%)	11.7	11.3	3.21	1.36	1.27	1.25	1.25
Sales of space heating units - Gas (%)	30.2	16.4	4.98	2.47	2.38	2.36	2.35
Sales of water heating units - Electric Heat Pump (%)	0	12.1	64	75.6	76.1	76.1	76.1
Sales of water heating units - Electric Resistance (%)	67.2	69.3	30.5	21.8	21.4	21.4	21.4
Sales of water heating units - Gas Furnace (%)	29.2	16.1	3.02	0.128	0	0	0
Sales of water heating units - Other (%)	3.59	2.49	2.46	2.47	2.48	2.48	2.49

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	398	1,016	1,653	2,501	2,725	2,596
Public EV charging plugs - DC Fast (1000 units)	0.053	0	0.878	0	3.92	0	6.35
Public EV charging plugs - L2 (1000 units)	0.175	0	21.1	0	94.3	0	153
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 (%)	1.54	1.81	1.26	0.402	0.074	0.013	0
Vehicle sales - Light-duty - EV (%)	3.93	15.2	46.5	81.8	96.3	99.3	100
Vehicle sales - Light-duty - gasoline (%)	89.9	78	48.7	16.5	3.29	0.59	0
Vehicle sales - Light-duty - hybrid (%)	4.44	4.55	3.22	1.19	0.291	0.064	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.11	0.339	0.203	0.063	0.013	0.002	0
Vehicle sales - Light-duty - other (%)	0.102	0.097	0.064	0.022	0.004	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	0.002	0	0
Capital invested - Biomass w/ccu power plant (billion $2018)	0	0	2.86	0	0	2.52	0
Capital invested - Solar PV - Base (billion $2018)	0	1.43	1.39	5.45	9.46	9.29	10.8
Capital invested - Solar PV - Constrained (billion $2018)	0	0.876	2.23	4.75	5.05	7.97	9.84
Capital invested - Wind - Base (billion $2018)	0	0	0	0	0	0.529	1.14
Capital invested - Wind - Constrained (billion $2018)	0	0	0	0	15.8	0	0
Installed (cumulative) - OffshoreWind - Base land use assumptions (MW)	0	0	0	0	0	0	0
Installed (cumulative) - Rooftop PV (MW)	16.9	27.3	38.6	55	78.1	108	146
Installed (cumulative) - Solar - Base land use assumptions (MW)	49.1	1,116	2,278	7,216	16,315	25,778	37,471
Installed (cumulative) - Wind - Base land use assumptions (MW)	0	0	0	0	0	472	1,550

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	2.37	2.37	2.37
Biomass w/ccu power plant (GWh)	0	0	3,205	3,205	3,205	6,036	6,036
Solar - Base land use assumptions (GWh)	112	2,037	2,227	9,438	17,405	18,107	22,314
Solar - Constrained land use assumptions (GWh)	103	1,616	3,640	16,087	13,275	19,277	21,094

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

Item	2020	2025	2030	2035	2040	2045	2050
Wind - Base land use assumptions (GWh)	0	0	0	0	0	1,363	3,140
Wind - Constrained land use assumptions (GWh)	0	0	0	0	33,562	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	125	365	581	1,029	1,029
Conversion capital investment - Cumulative 5-yr (million $2018)	0	0	2,620	4,363	3,928	8,452	0
Number of facilities - Allam power w ccu (quantity)	0	0	0	0	1	1	1
Number of facilities - Beccs hydrogen (quantity)	0	0	0	4	7	14	14
Number of facilities - Diesel (quantity)	0	0	0	0	0	0	0
Number of facilities - Diesel ccu (quantity)	0	0	0	0	1	1	1
Number of facilities - Power (quantity)	0	0	0	0	0	0	0
Number of facilities - Power ccu (quantity)	0	0	2	2	2	4	4
Number of facilities - Pyrolysis (quantity)	0	0	0	0	0	0	0
Number of facilities - Pyrolysis ccu (quantity)	0	0	0	0	1	1	1
Number of facilities - Sng (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng ccu (quantity)	0	0	1	1	1	1	1

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	3.17	13.7	18.5	30.9	31.4
Annual - BECCS (MMT)		0	3.17	8.78	13.7	24.3	24.3
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Annual - NGCC (MMT)		0	0	4.93	4.83	6.52	7.04
Cumulative - All (MMT)		0	3.17	16.9	35.4	66.3	97.6
Cumulative - BECCS (MMT)		0	3.17	11.9	25.7	50	74.3
Cumulative - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - NGCC (MMT)		0	0	4.93	9.76	16.3	23.3

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

Item	2020	2025	2030	2035	2040	2045	2050
All (km)		0	589	2,034	2,607	3,243	3,577
Cumulative investment - All (million $2018)		0	2,939	6,495	6,986	7,602	7,791
Cumulative investment - Spur (million $2018)		0	84.9	787	1,278	1,895	2,084
Cumulative investment - Trunk (million $2018)		0	2,854	5,707	5,707	5,707	5,707
Spur (km)		0	103	1,060	1,633	2,269	2,604
Trunk (km)		0	487	973	973	973	973

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

Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (MMT)		0	6.58	21.1	37.9	60.2	80.1
Injection wells (wells)		0	6	24	42	70	86
Resource characterization, appraisal, permitting costs (million $2020)		32.8	590	935	935	935	935
Wells and facilities construction costs (million $2020)		0	181	705	1,257	2,102	2,610

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)							-172
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-6,293
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-68.6
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-6,534
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-172
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-3,250
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-34.3
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-3,456
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							69.5
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							1,815
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							125
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							2,009
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							69.5
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							939
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							62.4
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							1,070

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)							-746
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-50,122
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,278
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-8,378
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-5,109
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-15,703

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)							-809
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-6,522
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-6,558
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-5,019
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-374
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-17,371
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-213
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,218
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-2,599
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-5,234
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-283
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-3,261
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-497
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,692
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-560
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-33,702
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-746
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-5,798
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-3,809
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-10,469
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-546
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,891
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-3,528
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-3,356
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							122
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							173
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,272
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							1,882

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)							76.8
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							431
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							186
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,664
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							8,807
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							61.1
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							162
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,637
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							941
Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares)							40.4
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							216
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							32.3
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,007
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							4,096
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							91.6
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							168
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,954
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,416
Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)							58.6

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)							323
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							234
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,027
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							7,273

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

Item	2020	2025	2030	2035	2040	2045	2050
Natural gas consumption - Annual (tcf)		446	376	302	227	143	99.1
Natural gas consumption - Cumulative (tcf)		0	0	0	0	0	9,085
Natural gas production - Annual (tcf)		43.4	41	35.7	30.2	24	18.6
Oil consumption - Annual (million bbls)		75.7	66.7	53.5	41	31.1	23.1
Oil consumption - Cumulative (million bbls)		0	0	0	0	0	1,650
Oil production - Annual (million bbls)		30.3	30.5	30.4	24.1	19.6	13

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		220	0.234	0.211	0.138	0.085	0.005
Monetary damages from air pollution - Natural Gas (million 2019$)		83.6	59.1	32.9	27	12.3	4.72
Monetary damages from air pollution - Transportation (million 2019$)		429	398	301	173	78.1	30.4
Premature deaths from air pollution - Coal (deaths)		24.9	0.026	0.024	0.016	0.01	0.001
Premature deaths from air pollution - Natural Gas (deaths)		9.43	6.67	3.71	3.05	1.39	0.533
Premature deaths from air pollution - Transportation (deaths)		48.3	44.8	33.9	19.4	8.78	3.42

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		189	382	879	1,095	1,486	1,221
By economic sector - Construction (jobs)		5,108	6,096	10,102	12,546	13,918	17,638
By economic sector - Manufacturing (jobs)		6,520	7,438	9,493	9,166	8,160	9,567
By economic sector - Mining (jobs)		4,845	4,039	3,230	2,135	1,564	986
By economic sector - Other (jobs)		375	424	1,169	2,154	2,578	3,730
By economic sector - Pipeline (jobs)		557	829	869	478	423	430
By economic sector - Professional (jobs)		2,896	2,895	4,772	6,444	7,924	9,510
By economic sector - Trade (jobs)		2,569	2,375	3,189	4,098	4,721	5,977
By economic sector - Utilities (jobs)		5,944	6,784	9,692	10,212	11,514	13,573
By education level - All sectors - Associates degree or some college (jobs)		8,761	9,590	13,506	15,104	16,333	19,865
By education level - All sectors - Bachelors degree (jobs)		6,583	6,789	8,936	9,747	10,478	12,320
By education level - All sectors - Doctoral degree (jobs)		205	204	283	339	387	453
By education level - All sectors - High school diploma or less (jobs)		11,912	13,109	18,563	20,775	22,486	26,929

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)		1,543	1,572	2,107	2,362	2,603	3,066
By resource sector - Biomass (jobs)		633	1,009	2,448	3,263	5,424	5,229
By resource sector - CO2 (jobs)		12.8	3,162	4,290	1,772	2,278	2,838
By resource sector - Coal (jobs)		218	0	0	0	0	0
By resource sector - Grid (jobs)		6,142	6,203	11,297	14,577	17,732	23,650
By resource sector - Natural Gas (jobs)		6,086	4,934	4,471	4,263	3,622	2,000
By resource sector - Nuclear (jobs)		727	715	704	693	402	0
By resource sector - Oil (jobs)		10,204	8,953	7,700	5,576	4,129	2,634
By resource sector - Solar (jobs)		3,340	3,975	9,403	15,361	16,457	23,050
By resource sector - Wind (jobs)		1,640	2,311	3,082	2,822	2,243	3,233
Median wages - Annual - All ($2019 per job)		54,192	54,236	53,714	53,644	54,302	54,459
On-Site or In-Plant Training - Total jobs - 1 to 4 years (jobs)		4,646	5,062	7,058	7,830	8,436	10,187
On-Site or In-Plant Training - Total jobs - 4 to 10 years (jobs)		1,804	1,988	2,832	3,188	3,502	4,250
On-Site or In-Plant Training - Total jobs - None (jobs)		4,671	5,018	7,002	7,866	8,519	10,200
On-Site or In-Plant Training - Total jobs - Over 10 years (jobs)		228	255	365	410	449	548
On-Site or In-Plant Training - Total jobs - Up to 1 year (jobs)		17,656	18,940	26,137	29,033	31,381	37,448
On-the-Job Training - All sectors - 1 to 4 years (jobs)		5,942	6,484	9,051	10,037	10,818	13,080
On-the-Job Training - All sectors - 4 to 10 years (jobs)		1,684	1,879	2,737	3,123	3,451	4,223
On-the-Job Training - All sectors - None (jobs)		1,580	1,664	2,301	2,611	2,840	3,419
On-the-Job Training - All sectors - Over 10 years (jobs)		287	314	432	474	495	597
On-the-Job Training - All sectors - Up to 1 year (jobs)		19,511	20,922	28,874	32,083	34,684	41,314
Related work experience - All sectors - 1 to 4 years (jobs)		10,647	11,395	15,661	17,356	18,744	22,368
Related work experience - All sectors - 4 to 10 years (jobs)		6,809	7,309	10,039	11,088	11,956	14,336
Related work experience - All sectors - None (jobs)		4,088	4,461	6,275	7,027	7,660	9,197
Related work experience - All sectors - Over 10 years (jobs)		1,903	2,027	2,730	2,967	3,149	3,761
Related work experience - All sectors - Up to 1 year (jobs)		5,558	6,070	8,690	9,888	10,778	12,970
Wage income - All (million $2019)		1,572	1,696	2,331	2,593	2,840	3,411

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	8,119	9,209	0	0	0	0
Sales of cooking units - Electric Resistance (%)	43.5	47.1	51.3	61.6	76.1	85	88
Sales of cooking units - Gas (%)	56.5	52.9	48.7	38.4	23.9	15	12
Sales of space heating units - Electric Heat Pump (%)	9.46	20.2	25.6	41.4	66.1	83.2	89.6
Sales of space heating units - Electric Resistance (%)	4.72	4.61	4.65	4.77	5.23	5.91	6.33
Sales of space heating units - Fossil (%)	0	3.34	3.16	2.39	1.19	0.387	0.102
Sales of space heating units - Gas Furnace (%)	85.8	71.8	66.6	51.4	27.5	10.5	3.93

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 (%)	0.153	1.96	7.08	21.8	44.4	59.2	64.3
Sales of water heating units - Electric Resistance (%)	5.64	6.47	8.38	14.4	23.5	29.5	31.6
Sales of water heating units - Gas Furnace (%)	92.7	90	83	62.2	30.5	9.74	2.53
Sales of water heating units - Other (%)	1.56	1.58	1.58	1.58	1.58	1.57	1.56

Table 18: *E- scenario - PILLAR 1: Efficiency/Electrification - Electricity demand*

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested - Cumulative 5-yr (billion $2018)		1.69	1.71	2.12	2.18	3.13	3.3

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	70.6	70.8	69.9	68.7	66.7	64.8	63.6
Final energy use - Industry (PJ)	201	207	209	208	209	207	206
Final energy use - Residential (PJ)	99.2	93.3	89.2	84.7	79.1	73.1	68.2
Final energy use - Transportation (PJ)	351	326	298	275	258	238	214

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	2.25	2.65	0	0	0	0
Sales of cooking units - Electric Resistance (%)	75.7	76.4	78.6	84.4	92.6	97.6	99.4
Sales of cooking units - Gas (%)	24.3	23.6	21.4	15.6	7.42	2.39	0.644
Sales of space heating units - Electric Heat Pump (%)	29.5	38.3	42.3	54.1	71.8	83.3	87.2
Sales of space heating units - Electric Resistance (%)	28.6	30.1	28.3	23	15.1	10.1	8.37
Sales of space heating units - Fossil (%)	11.7	12.9	12.1	9.17	5.03	2.44	1.57
Sales of space heating units - Gas (%)	30.2	18.6	17.3	13.8	8.07	4.19	2.84
Sales of water heating units - Electric Heat Pump (%)	0	2.08	7.99	25	51.1	68.1	74
Sales of water heating units - Electric Resistance (%)	67.2	76.8	72.5	59.6	40.1	27.4	23
Sales of water heating units - Gas Furnace (%)	29.2	18.6	17	12.9	6.35	2.02	0.528
Sales of water heating units - Other (%)	3.59	2.49	2.47	2.49	2.51	2.49	2.49

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	63.7	135	456	1,438	2,094
Public EV charging plugs - DC Fast (1000 units)	0.053	0	0.263	0	1.45	0	4.06
Public EV charging plugs - L2 (1000 units)	0.175	0	6.32	0	34.8	0	97.8
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 (%)	1.56	1.97	2.06	1.64	1.05	0.537	0.23

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle sales - Light-duty - EV (%)	1.89	4.69	11.9	25.9	48.4	72.1	87.6
Vehicle sales - Light-duty - gasoline (%)	91.7	87.4	79.6	66.6	46.2	24.8	11
Vehicle sales - Light-duty - hybrid (%)	4.6	5.4	6.07	5.52	4.14	2.44	1.18
Vehicle sales - Light-duty - hydrogen FC (%)	0.113	0.38	0.326	0.249	0.176	0.098	0.045
Vehicle sales - Light-duty - other (%)	0.103	0.106	0.096	0.084	0.061	0.033	0.015
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)							-172
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-6,293
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-68.6
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-6,534
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-172
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-3,250
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-34.3
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-3,456
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							69.5
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							1,815
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							125
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							2,009
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							69.5
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							939
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							62.4

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)							1,070

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)							-746
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-50,122
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,278
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-8,378
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-5,109
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-15,703
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-809
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-6,522
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-6,558
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-5,019
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-374
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-17,371
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-213
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,218
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-2,599
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-5,234
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-283
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-3,261
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-497
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,692
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-560
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-33,702
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-746
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-5,798
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-3,809
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-10,469
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-546

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)							-4,891
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-3,528
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-3,356
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							122
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							173
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,272
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							1,882
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)							76.8
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							431
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							186
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,664
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							8,807
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							61.1
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							162
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,637
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							941
Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares)							40.4
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							216
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							32.3
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,007

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)							4,096
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							91.6
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							168
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,954
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,416
Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)							58.6
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							323
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							234
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,027
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							7,273

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		220	0.234	0.211	0.138	0.085	0.005
Monetary damages from air pollution - Natural Gas (million 2019$)		78.8	47.2	20.4	7.86	2.97	2.04
Monetary damages from air pollution - Transportation (million 2019$)		436	438	424	380	301	205
Premature deaths from air pollution - Coal (deaths)		24.9	0.026	0.024	0.016	0.01	0.001
Premature deaths from air pollution - Natural Gas (deaths)		8.9	5.33	2.31	0.888	0.335	0.23
Premature deaths from air pollution - Transportation (deaths)		49	49.2	47.7	42.8	33.9	23.1

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	8,123	9,222	0	0	0	0
Sales of cooking units - Electric Resistance (%)	43.5	55.3	83.4	88.9	89.2	89.2	89.1
Sales of cooking units - Gas (%)	56.5	44.7	16.6	11.1	10.8	10.8	10.9
Sales of space heating units - Electric Heat Pump (%)	9.46	29.3	77	90.8	91.9	92	92
Sales of space heating units - Electric Resistance (%)	4.72	4.61	4.92	6.26	6.57	6.57	6.55
Sales of space heating units - Fossil (%)	0	2.89	0.56	0.024	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 (%)	85.8	63.2	17.5	2.95	1.48	1.43	1.43
Sales of water heating units - Electric Heat Pump (%)	0.153	10.6	55.7	65.7	66.1	66.2	66.2
Sales of water heating units - Electric Resistance (%)	5.64	9.97	28	32.1	32.3	32.3	32.3
Sales of water heating units - Gas Furnace (%)	92.7	77.8	14.7	0.62	0	0	0
Sales of water heating units - Other (%)	1.56	1.58	1.58	1.58	1.58	1.57	1.56

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)		2.03	2.09	3.69	3.94	2.98	3.07

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	70.6	70.6	68.1	64.4	61.3	60.1	60.4
Final energy use - Industry (PJ)	201	206	208	206	206	204	203
Final energy use - Residential (PJ)	99.2	92.9	85.6	76.5	69.1	64.8	63
Final energy use - Transportation (PJ)	350	323	285	238	196	170	160

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	2.27	2.78	0	0	0	0
Sales of cooking units - Electric Resistance (%)	75.8	81	96.7	99.8	100	100	100
Sales of cooking units - Gas (%)	24.2	19	3.26	0.164	0	0	0
Sales of space heating units - Electric Heat Pump (%)	29.5	45.1	80.4	88.3	88.7	88.6	88.6
Sales of space heating units - Electric Resistance (%)	28.6	27.1	11.4	7.85	7.68	7.79	7.8
Sales of space heating units - Fossil (%)	11.7	11.3	3.21	1.36	1.27	1.25	1.25
Sales of space heating units - Gas (%)	30.2	16.4	4.98	2.47	2.38	2.36	2.35
Sales of water heating units - Electric Heat Pump (%)	0	12.1	64	75.6	76.1	76.1	76.1
Sales of water heating units - Electric Resistance (%)	67.2	69.3	30.5	21.8	21.4	21.4	21.4
Sales of water heating units - Gas Furnace (%)	29.2	16.1	3.02	0.128	0	0	0
Sales of water heating units - Other (%)	3.59	2.49	2.46	2.47	2.48	2.48	2.49

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	398	1,016	1,653	2,501	2,725	2,596
Public EV charging plugs - DC Fast (1000 units)	0.053	0	0.878	0	3.92	0	6.35
Public EV charging plugs - L2 (1000 units)	0.175	0	21.1	0	94.3	0	153
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 (%)	1.54	1.81	1.26	0.402	0.074	0.013	0
Vehicle sales - Light-duty - EV (%)	3.93	15.2	46.5	81.8	96.3	99.3	100
Vehicle sales - Light-duty - gasoline (%)	89.9	78	48.7	16.5	3.29	0.59	0
Vehicle sales - Light-duty - hybrid (%)	4.44	4.55	3.22	1.19	0.291	0.064	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.11	0.339	0.203	0.063	0.013	0.002	0
Vehicle sales - Light-duty - other (%)	0.102	0.097	0.064	0.022	0.004	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	2.71	4.34	7.5	19.5	24.7	31.9
Capital invested - Wind - Base (billion $2018)	0	0	0	0	0.242	1.56	33.8
Installed (cumulative) - OffshoreWind - Base land use assumptions (MW)	0	0	0	0	0	0	0
Installed (cumulative) - Solar - Base land use assumptions (MW)	49.1	2,076	5,698	12,500	31,216	56,368	90,754
Installed (cumulative) - Wind - Base land use assumptions (MW)	0	0	0	0	205	1,597	33,504

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	112	3,884	6,936	12,999	35,844	48,167	65,840
Solar - Constrained land use assumptions (GWh)	112	4,268	6,159	16,432	41,750	59,587	66,320
Wind - Base land use assumptions (GWh)	0	0	0	0	582	4,057	80,459
Wind - Constrained land use assumptions (GWh)	0	0	0	7,525	26,037	0	3,615

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)							-172
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-6,293
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-68.6
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-6,534
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-172
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-3,250

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)							-34.3
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-3,456
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							69.5
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							1,815
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							125
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							2,009
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							69.5
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							939
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							62.4
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							1,070

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)							-746
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-50,122
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,278
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-8,378
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-5,109
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-15,703
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-809
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-6,522
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-6,558
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-5,019
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-374
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-17,371
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-213
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,218

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)							-2,599
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-5,234
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-283
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-3,261
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-497
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,692
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-560
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-33,702
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-746
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-5,798
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-3,809
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-10,469
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-546
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,891
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-3,528
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-3,356
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							122
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							173
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,272
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							1,882
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)							76.8
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							431
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							186
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,664
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							8,807

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)							61.1
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							162
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,637
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							941
Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares)							40.4
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							216
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							32.3
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,007
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							4,096
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							91.6
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							168
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,954
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,416
Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)							58.6
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							323
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							234
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,027
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							7,273

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		220	0.234	0.211	0.138	0.085	0.005

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$)		89.4	62.1	33.1	21	5.74	2.37
Monetary damages from air pollution - Transportation (million 2019$)		429	398	301	173	78.1	30.4
Premature deaths from air pollution - Coal (deaths)		24.9	0.026	0.024	0.016	0.01	0.001
Premature deaths from air pollution - Natural Gas (deaths)		10.1	7.01	3.73	2.37	0.648	0.267
Premature deaths from air pollution - Transportation (deaths)		48.3	44.8	33.9	19.4	8.78	3.42

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	8,123	9,222	0	0	0	0
Sales of cooking units - Electric Resistance (%)	43.5	55.3	83.4	88.9	89.2	89.2	89.1
Sales of cooking units - Gas (%)	56.5	44.7	16.6	11.1	10.8	10.8	10.9
Sales of space heating units - Electric Heat Pump (%)	9.46	29.3	77	90.8	91.9	92	92
Sales of space heating units - Electric Resistance (%)	4.72	4.61	4.92	6.26	6.57	6.57	6.55
Sales of space heating units - Fossil (%)	0	2.89	0.56	0.024	0	0	0
Sales of space heating units - Gas Furnace (%)	85.8	63.2	17.5	2.95	1.48	1.43	1.43
Sales of water heating units - Electric Heat Pump (%)	0.153	10.6	55.7	65.7	66.1	66.2	66.2
Sales of water heating units - Electric Resistance (%)	5.64	9.97	28	32.1	32.3	32.3	32.3
Sales of water heating units - Gas Furnace (%)	92.7	77.8	14.7	0.62	0	0	0
Sales of water heating units - Other (%)	1.56	1.58	1.58	1.58	1.58	1.57	1.56

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)		2.03	2.09	3.69	3.94	2.98	3.07

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	70.6	70.6	68.1	64.4	61.3	60.1	60.4
Final energy use - Industry (PJ)	201	206	208	206	206	204	203
Final energy use - Residential (PJ)	99.2	92.9	85.6	76.5	69.1	64.8	63
Final energy use - Transportation (PJ)	350	323	285	238	196	170	160

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	2.27	2.78	0	0	0	0
Sales of cooking units - Electric Resistance (%)	75.8	81	96.7	99.8	100	100	100
Sales of cooking units - Gas (%)	24.2	19	3.26	0.164	0	0	0
Sales of space heating units - Electric Heat Pump (%)	29.5	45.1	80.4	88.3	88.7	88.6	88.6
Sales of space heating units - Electric Resistance (%)	28.6	27.1	11.4	7.85	7.68	7.79	7.8

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 (%)	11.7	11.3	3.21	1.36	1.27	1.25	1.25
Sales of space heating units - Gas (%)	30.2	16.4	4.98	2.47	2.38	2.36	2.35
Sales of water heating units - Electric Heat Pump (%)	0	12.1	64	75.6	76.1	76.1	76.1
Sales of water heating units - Electric Resistance (%)	67.2	69.3	30.5	21.8	21.4	21.4	21.4
Sales of water heating units - Gas Furnace (%)	29.2	16.1	3.02	0.128	0	0	0
Sales of water heating units - Other (%)	3.59	2.49	2.46	2.47	2.48	2.48	2.49

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	398	1,016	1,653	2,501	2,725	2,596
Public EV charging plugs - DC Fast (1000 units)	0.053	0	0.878	0	3.92	0	6.35
Public EV charging plugs - L2 (1000 units)	0.175	0	21.1	0	94.3	0	153
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 (%)	1.54	1.81	1.26	0.402	0.074	0.013	0
Vehicle sales - Light-duty - EV (%)	3.93	15.2	46.5	81.8	96.3	99.3	100
Vehicle sales - Light-duty - gasoline (%)	89.9	78	48.7	16.5	3.29	0.59	0
Vehicle sales - Light-duty - hybrid (%)	4.44	4.55	3.22	1.19	0.291	0.064	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.11	0.339	0.203	0.063	0.013	0.002	0
Vehicle sales - Light-duty - other (%)	0.102	0.097	0.064	0.022	0.004	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)		0.952	0.805	1.37	3.54	4.8	0
Capital invested - Solar PV - Constrained (billion $2018)		3.09	2.54	2.21	6.75	2.85	0.089
Capital invested - Wind - Constrained (billion $2018)		0	0	0	0	0	0.445

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	112	1,365	1,294	2,372	6,500	9,325	0
Solar - Constrained land use assumptions (GWh)	112	4,420	4,066	3,851	12,490	5,560	185
Wind - Constrained land use assumptions (GWh)	0	0	0	0	0	0	1,052

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)							-172
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-6,293
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-68.6
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-6,534
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-172
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-3,250
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-34.3
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-3,456
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							69.5
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							1,815
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							125
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							2,009
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							69.5
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							939
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							62.4
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							1,070

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)							-746
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-50,122
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,278
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-8,378
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-5,109
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-15,703

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)							-809
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-6,522
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-6,558
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-5,019
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-374
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-17,371
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-213
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,218
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-2,599
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-5,234
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-283
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-3,261
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-497
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,692
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-560
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-33,702
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-746
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-5,798
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-3,809
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-10,469
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-546
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,891
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-3,528
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-3,356
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							122
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							173
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,272
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							1,882

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)							76.8
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							431
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							186
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,664
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							8,807
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							61.1
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							162
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,637
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							941
Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares)							40.4
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							216
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							32.3
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,007
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							4,096
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							91.6
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							168
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,954
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,416
Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)							58.6

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)							323
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							234
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,027
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							7,273

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		220	0.234	0.211	0.138	0.085	0.005
Monetary damages from air pollution - Natural Gas (million 2019$)		84.9	54.3	50.1	40.1	15	4.65
Monetary damages from air pollution - Transportation (million 2019$)		429	398	301	173	78.1	30.4
Premature deaths from air pollution - Coal (deaths)		24.9	0.026	0.024	0.016	0.01	0.001
Premature deaths from air pollution - Natural Gas (deaths)		9.59	6.13	5.65	4.53	1.69	0.525
Premature deaths from air pollution - Transportation (deaths)		48.3	44.8	33.9	19.4	8.78	3.42

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	8,119	9,209	0	0	0	0
Sales of cooking units - Electric Resistance (%)	43.5	47.1	51.3	61.6	76.1	85	88
Sales of cooking units - Gas (%)	56.5	52.9	48.7	38.4	23.9	15	12
Sales of space heating units - Electric Heat Pump (%)	9.46	20.2	25.6	41.4	66.1	83.2	89.6
Sales of space heating units - Electric Resistance (%)	4.72	4.61	4.65	4.77	5.23	5.91	6.33
Sales of space heating units - Fossil (%)	0	3.34	3.16	2.39	1.19	0.387	0.102
Sales of space heating units - Gas Furnace (%)	85.8	71.8	66.6	51.4	27.5	10.5	3.93
Sales of water heating units - Electric Heat Pump (%)	0.153	1.96	7.08	21.8	44.4	59.2	64.3
Sales of water heating units - Electric Resistance (%)	5.64	6.47	8.38	14.4	23.5	29.5	31.6
Sales of water heating units - Gas Furnace (%)	92.7	90	83	62.2	30.5	9.74	2.53
Sales of water heating units - Other (%)	1.56	1.58	1.58	1.58	1.58	1.57	1.56

Table 46: *E-B+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand*

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested - Cumulative 5-yr (billion $2018)		1.69	1.71	2.12	2.18	3.13	3.3

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	70.6	70.8	69.9	68.7	66.7	64.8	63.6

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Industry (PJ)	201	207	209	208	209	207	206
Final energy use - Residential (PJ)	99.2	93.3	89.2	84.7	79.1	73.1	68.2
Final energy use - Transportation (PJ)	351	326	298	275	258	238	214

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	2.25	2.65	0	0	0	0
Sales of cooking units - Electric Resistance (%)	75.7	76.4	78.6	84.4	92.6	97.6	99.4
Sales of cooking units - Gas (%)	24.3	23.6	21.4	15.6	7.42	2.39	0.644
Sales of space heating units - Electric Heat Pump (%)	29.5	38.3	42.3	54.1	71.8	83.3	87.2
Sales of space heating units - Electric Resistance (%)	28.6	30.1	28.3	23	15.1	10.1	8.37
Sales of space heating units - Fossil (%)	11.7	12.9	12.1	9.17	5.03	2.44	1.57
Sales of space heating units - Gas (%)	30.2	18.6	17.3	13.8	8.07	4.19	2.84
Sales of water heating units - Electric Heat Pump (%)	0	2.08	7.99	25	51.1	68.1	74
Sales of water heating units - Electric Resistance (%)	67.2	76.8	72.5	59.6	40.1	27.4	23
Sales of water heating units - Gas Furnace (%)	29.2	18.6	17	12.9	6.35	2.02	0.528
Sales of water heating units - Other (%)	3.59	2.49	2.47	2.49	2.51	2.49	2.49

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	63.7	135	456	1,438	2,094
Public EV charging plugs - DC Fast (1000 units)	0.053	0	0.263	0	1.45	0	4.06
Public EV charging plugs - L2 (1000 units)	0.175	0	6.32	0	34.8	0	97.8
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 (%)	1.56	1.97	2.06	1.64	1.05	0.537	0.23
Vehicle sales - Light-duty - EV (%)	1.89	4.69	11.9	25.9	48.4	72.1	87.6
Vehicle sales - Light-duty - gasoline (%)	91.7	87.4	79.6	66.6	46.2	24.8	11
Vehicle sales - Light-duty - hybrid (%)	4.6	5.4	6.07	5.52	4.14	2.44	1.18
Vehicle sales - Light-duty - hydrogen FC (%)	0.113	0.38	0.326	0.249	0.176	0.098	0.045
Vehicle sales - Light-duty - other (%)	0.103	0.106	0.096	0.084	0.061	0.033	0.015
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	10.1	11.5	24	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	11,378	24,305	51,189	51,189	51,189

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	701	1,498	3,156	3,563	3,563
Conversion capital investment - Cumulative 5-yr (million $2018)	0	0	9,299	10,565	21,971	4,675	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	5	5
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	9	19	40	40	40
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	11.3	24.1	50.7	56.7	57
Annual - BECCS (MMT)		0	11.3	24	50.6	56.7	56.5
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Annual - NGCC (MMT)		0	0	0.1	0.08	0.07	0.56
Cumulative - All (MMT)		0	11.3	35.4	86.1	143	200
Cumulative - BECCS (MMT)		0	11.3	35.3	86	143	199
Cumulative - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - NGCC (MMT)		0	0	0.1	0.18	0.25	0.81

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

Item	2020	2025	2030	2035	2040	2045	2050
All (km)		0	837	1,795	3,172	3,780	3,685
Cumulative investment - All (million $2018)		0	3,530	7,100	10,298	10,924	10,789
Cumulative investment - Spur (million $2018)		0	434	909	2,297	2,923	2,787
Cumulative investment - Trunk (million $2018)		0	3,096	6,192	8,002	8,002	8,002
Spur (km)		0	350	822	1,958	2,566	2,471
Trunk (km)		0	487	973	1,214	1,214	1,214

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

Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (MMT)		0	7.39	36.4	71.3	98.5	104
Injection wells (wells)		0	8	34	60	100	124
Resource characterization, appraisal, permitting costs (million $2020)		32.8	810	1,299	1,299	1,299	1,299
Wells and facilities construction costs (million $2020)		0	257	1,000	1,782	2,980	3,700

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)							-637
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-5,685
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)							-58.1
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-6,380
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-637
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-2,929
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)							-29.1
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-3,594
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							257
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							4,057
Land impacted for carbon sink - Aggressive deployment - Cropland to woody energy crops (1000 hectares)							119
Land impacted for carbon sink - Aggressive deployment - Pasture to energy crops (1000 hectares)							265
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							106
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							4,803

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)							257
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							848
Land impacted for carbon sink - Moderate deployment - Cropland to woody energy crops (1000 hectares)							119
Land impacted for carbon sink - Moderate deployment - Pasture to energy crops (1000 hectares)							265
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							52.9
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							1,542

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)							-746
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-50,122
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,278
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-8,378
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-5,109
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-15,703
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-809
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-6,522
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-6,558
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-5,019
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-374
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-17,371
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-213
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,218
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-2,599
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-5,234
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-283
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-3,261
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-497
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,692

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)							-560
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-33,702
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-746
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-5,798
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-3,809
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-10,469
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-546
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,891
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-3,528
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-3,356
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							122
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							173
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,272
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							1,882
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)							76.8
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							431
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							186
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,664
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							8,807
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							61.1
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							162
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,637
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							941

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)							40.4
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							216
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							32.3
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,007
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							4,096
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							91.6
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							168
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,954
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,416
Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)							58.6
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							323
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							234
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,027
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							7,273

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		220	0.234	0.211	0.138	0.085	0.005
Monetary damages from air pollution - Natural Gas (million 2019$)		91.1	54.2	27.4	17.2	8.77	3.88
Monetary damages from air pollution - Transportation (million 2019$)		436	438	424	380	301	205
Premature deaths from air pollution - Coal (deaths)		24.9	0.026	0.024	0.016	0.01	0.001
Premature deaths from air pollution - Natural Gas (deaths)		10.3	6.12	3.09	1.95	0.99	0.438
Premature deaths from air pollution - Transportation (deaths)		49	49.2	47.7	42.8	33.9	23.1

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	7,974	8,300	0	0	0	0
Sales of cooking units - Electric Resistance (%)	43.5	45.6	45.9	45.7	46	45.9	45.7
Sales of cooking units - Gas (%)	56.5	54.4	54.1	54.3	54	54.1	54.3
Sales of space heating units - Electric Heat Pump (%)	9.46	31.9	71.2	79	79.3	79.4	79.4
Sales of space heating units - Electric Resistance (%)	4.72	6.4	12	15.8	18.7	19.2	19.2
Sales of space heating units - Fossil (%)	0	2.67	0.47	0.024	0	0	0
Sales of space heating units - Gas Furnace (%)	85.8	59	16.4	5.24	1.95	1.48	1.43
Sales of water heating units - Electric Heat Pump (%)	0.153	0.153	0.147	0.149	0.149	0.145	0.148
Sales of water heating units - Electric Resistance (%)	5.64	5.74	5.58	5.66	5.62	5.55	5.6
Sales of water heating units - Gas Furnace (%)	92.7	92.5	92.7	92.6	92.7	92.7	92.7
Sales of water heating units - Other (%)	1.56	1.58	1.58	1.58	1.58	1.57	1.56

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)		2.32	2.41	3.75	3.99	3.1	3.21

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	70.6	71.9	72.2	72.2	72.8	74.9	78.5
Final energy use - Industry (PJ)	201	210	218	222	228	232	238
Final energy use - Residential (PJ)	99.2	93.5	91	89.7	89.7	90.9	92.4
Final energy use - Transportation (PJ)	350	326	299	283	283	291	302

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	2.2	2.3	0	0	0	0
Sales of cooking units - Electric Resistance (%)	75.5	75.5	75.5	75.5	75.5	75.5	75.5
Sales of cooking units - Gas (%)	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Sales of space heating units - Electric Heat Pump (%)	26.6	55.5	56.3	57.6	58.8	60.4	62.7
Sales of space heating units - Electric Resistance (%)	29.8	23.9	23.5	22.8	21.8	20.4	18
Sales of space heating units - Fossil (%)	12.2	6.81	6.91	6.74	6.58	6.52	6.54
Sales of space heating units - Gas (%)	31.4	13.8	13.3	12.9	12.8	12.7	12.7
Sales of water heating units - Electric Heat Pump (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Resistance (%)	67.2	78.4	78.5	78.3	78.1	78.1	78
Sales of water heating units - Gas Furnace (%)	29.2	19.2	19	19.2	19.4	19.4	19.5
Sales of water heating units - Other (%)	3.59	2.49	2.47	2.49	2.52	2.51	2.52

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 (%)	1.55	1.96	2.18	2.03	1.83	1.7	1.62
Vehicle sales - Light-duty - EV (%)	3.58	5.62	6.4	7.87	9.58	11.1	12.3
Vehicle sales - Light-duty - gasoline (%)	90.2	86.6	84.5	82.6	80.6	78.6	77.1
Vehicle sales - Light-duty - hybrid (%)	4.45	5.3	6.48	7.05	7.62	8.2	8.64
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.377	0.346	0.307	0.304	0.304	0.315
Vehicle sales - Light-duty - other (%)	0.102	0.106	0.102	0.103	0.102	0.101	0.103
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)							-746
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-50,122
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,278
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-8,378
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-5,109
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-15,703
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-809
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-6,522
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-6,558
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-5,019
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-374
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-17,371
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-213
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,218
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-2,599
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-5,234
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-283
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-3,261

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)							-497
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,692
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-560
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-33,702
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-746
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-5,798
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-3,809
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-10,469
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-546
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,891
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-3,528
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-3,356
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							122
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							173
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,272
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							1,882
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)							76.8
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							431
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							186
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,664
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							8,807
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							61.1
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							162
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,637

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)							941
Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares)							40.4
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							216
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							32.3
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,007
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							4,096
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							91.6
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							168
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,954
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,416
Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)							58.6
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							323
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							234
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,027
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							7,273

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)	-32.9		-14.9				-12.1
Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y)	-4.27		-7.13				-7.5
Business-as-usual carbon sink - Total (Mt CO2e/y)	-37.1		-22				-19.6

Table 66: *REF scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		949	632	431	348	317	316
Monetary damages from air pollution - Natural Gas (million 2019$)		94.8	100	105	101	103	106
Monetary damages from air pollution - Transportation (million 2019$)		436	444	452	463	473	483
Premature deaths from air pollution - Coal (deaths)		107	71.4	48.7	39.3	35.9	35.6
Premature deaths from air pollution - Natural Gas (deaths)		10.7	11.3	11.9	11.4	11.6	12
Premature deaths from air pollution - Transportation (deaths)		49	49.9	50.9	52	53.2	54.3