Net-Zero America - louisiana state report

2021-03-15

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)		16,472	19,203				
Sales of cooking units - Electric Resistance (%)	30.1	44.4	79.2	86.1	86.5	86.5	86.5
Sales of cooking units - Gas (%)	69.9	55.6	20.8	13.9	13.5	13.5	13.5
Sales of space heating units - Electric Heat Pump (%)	6.12	26.1	76.9	91.1	92.2	92.2	92.2
Sales of space heating units - Electric Resistance (%)	5.02	4.5	4.79	6.09	6.39	6.41	6.42
Sales of space heating units - Fossil (%)	0	0	0	0	0	0	0
Sales of space heating units - Gas Furnace (%)	88.9	69.4	18.3	2.84	1.39	1.35	1.34
Sales of water heating units - Electric Heat Pump (%)	0.147	10.7	56.3	66.5	66.9	66.9	66.9
Sales of water heating units - Electric Resistance (%)	4.15	8.12	26.9	31.1	31.3	31.3	31.3
Sales of water heating units - Gas Furnace (%)	93.7	79.3	15	0.631	0	0	0
Sales of water heating units - Other (%)	1.99	1.82	1.81	1.82	1.83	1.82	1.83

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)		5.94	6.22	10.4	11.1	8.07	8.36

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	127	128	123	117	112	111	112
Final energy use - Industry (PJ)	1,932	2,153	2,273	2,317	2,383	2,435	2,505
Final energy use - Residential (PJ)	142	136	128	117	108	103	102
Final energy use - Transportation (PJ)	598	567	515	454	397	363	350

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)		3.78	4.86				
Sales of cooking units - Electric Resistance (%)	66.6	73.7	95.5	99.8	100	100	100
Sales of cooking units - Gas (%)	33.4	26.3	4.49	0.226	0	0	0
Sales of space heating units - Electric Heat Pump (%)	15	30.5	75.4	85.4	85.9	85.7	85.7
Sales of space heating units - Electric Resistance (%)	44.7	43.2	18.2	12.6	12.3	12.5	12.5
Sales of space heating units - Fossil (%)	2.28	3.27	1.44	1.03	1.01	0.993	0.989
Sales of space heating units - Gas (%)	38	23	5.01	0.994	0.822	0.801	0.798
Sales of water heating units - Electric Heat Pump (%)	0	12	63.6	75.1	75.6	75.6	75.6
Sales of water heating units - Electric Resistance (%)	56.5	60.4	29.9	23	22.7	22.7	22.7
Sales of water heating units - Gas Furnace (%)	41.3	25.8	4.84	0.202	0	0	0
Sales of water heating units - Other (%)	2.21	1.75	1.73	1.71	1.71	1.72	1.72

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)		747	1,909	3,103	4,697	5,116	4,875
Public EV charging plugs - DC Fast (1000 units)	0.067		1.34		5.93		9.61
Public EV charging plugs - L2 (1000 units)	0.204		32.1		143		231
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 (%)	1.7	1.95	1.32	0.424	0.077	0.013	0
Vehicle sales - Light-duty - EV (%)	3.4	13.6	44	80.8	96.2	99.3	100
Vehicle sales - Light-duty - gasoline (%)	90.8	79.8	51.3	17.5	3.42	0.594	0
Vehicle sales - Light-duty - hybrid (%)	3.92	4.18	3.04	1.15	0.276	0.059	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.348	0.215	0.068	0.013	0.002	0
Vehicle sales - Light-duty - other (%)	0.109	0.105	0.07	0.025	0.005	0.001	0
Vehicle sales - Medium-duty - diesel (%)	64.7	59.7	42.3	14.4	2.59	0.384	0
Vehicle sales - Medium-duty - EV (%)	0.784	5.07	25.3	60.8	76.5	79.5	80
Vehicle sales - Medium-duty - gasoline (%)	33.7	33.3	25.5	9.32	1.77	0.277	0
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.402	0.341	0.14	0.03	0.005	0
Vehicle sales - Medium-duty - hydrogen FC (%)	0.196	1.27	6.33	15.2	19.1	19.9	20
Vehicle sales - Medium-duty - other (%)	0.253	0.255	0.205	0.083	0.019	0.004	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Capital invested - Biomass power plant (billion $2018)	0	0	0	0	0	0	0
Capital invested - Biomass w/ccu allam power plant (billion $2018)	0	0	0	0	0	0	0
Capital invested - Biomass w/ccu power plant (billion $2018)	0	0	4.01	0	1.27	0	0
Capital invested - Offshore Wind - Base (billion $2018)		0	0	0	0	0	0
Capital invested - Solar PV - Base (billion $2018)		0	0	0	0	0	0
Capital invested - Solar PV - Constrained (billion $2018)		12.5	1.23	0.476	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
Installed renewables - OffshoreWind - Base land use assumptions (MW)	0	90	90	180	270	270	439
Installed renewables - OffshoreWind - Constrained land use assumptions (MW)	0	90	90	180	270	270	439
Installed renewables - Rooftop PV (MW)	149	263	391	592	879	1,249	1,729
Installed renewables - Solar - Base land use assumptions (MW)	2,516	10,999	11,831	12,822	13,209	13,209	13,209
Installed renewables - Solar - Constrained land use assumptions (MW)	2,764	12,143	13,077	13,831	14,112	14,112	14,539
Installed renewables - Wind - Base land use assumptions (MW)	0	0	0	0	0	410	682
Installed renewables - Wind - Constrained land use assumptions (MW)	0	0	0	0	9,324	9,324	9,324

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

Item	2020	2025	2030	2035	2040	2045	2050
Biomass power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu allam power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu power plant (GWh)	0	0	4,506	4,506	5,927	5,927	5,927
OffshoreWind - Base land use assumptions (GWh)	0	316	316	632	947	947	1,534
OffshoreWind - Constrained land use assumptions (GWh)	0	316	316	632	947	947	1,534
Solar - Base land use assumptions (GWh)	4,154	17,977	19,332	20,951	21,584	21,584	21,584
Solar - Constrained land use assumptions (GWh)	4,549	19,843	21,368	22,600	23,061	23,061	23,757
Wind - Base land use assumptions (GWh)	0	0	0	0	0	1,119	1,843
Wind - Constrained land use assumptions (GWh)	0	0	0	0	23,852	23,852	23,852

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

Item	2020	2025	2030	2035	2040	2045	2050
Biomass purchases (million $2018/year)		0	178	338	1,053	1,053	1,053
Conversion capital investment - Cumulative 5-yr (million $2018)		0	3,683	2,872	12,973	0	0
Number of facilities - Allam power w ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Beccs hydrogen (quantity)	0	0	0	3	16	16	16
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	4	4	5	5	5
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	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	4.5	8.25	24.6	24.7	25.1
Annual - BECCS (MMT)		0	4.46	8.14	24.5	24.6	24.6
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Annual - NGCC (MMT)		0	0.03	0.11	0.12	0.13	0.58
Cumulative - All (MMT)		0	4.5	12.8	37.4	62.1	87.2
Cumulative - BECCS (MMT)		0	4.46	12.6	37.1	61.7	86.2
Cumulative - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - NGCC (MMT)		0	0.03	0.14	0.26	0.39	0.97

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

Item	2020	2025	2030	2035	2040	2045	2050
All (km)		0	1,158	2,112	2,735	2,824	3,406
Cumulative investment - All (million $2018)		0	5,319	8,747	9,320	9,421	9,749
Cumulative investment - Spur (million $2018)		0	211	512	1,085	1,187	1,515
Cumulative investment - Trunk (million $2018)		0	5,108	8,234	8,234	8,234	8,234
Spur (km)		0	337	760	1,383	1,472	2,054
Trunk (km)		0	821	1,352	1,352	1,352	1,352

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

Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (MMT)		0	12.1	41.4	75	121	163
Injection wells (wells)		0	10	41	72	122	150
Resource characterization, appraisal, permitting costs (million $2020)		47.3	1,162	1,837	1,837	1,837	1,837
Wells and facilities construction costs (million $2020)		0	312	1,215	2,166	3,621	4,496

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)							-181
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-5,416
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-67.8
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-5,665
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-181
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-2,814
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-33.9
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-3,029
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							73.3
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							1,563
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							123
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							1,760
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							73.3
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							813
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							61.7
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							948

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)							-388
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-37,585
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,388
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-7,036
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-3,857
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-13,381
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-846
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-1,337
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-5,571
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-3,779
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-195
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-12,212
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-231
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-2,703
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-1,962
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-4,460
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-296
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-669
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-422
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,274
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-292
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-24,865
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-810
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-4,869
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-2,876
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-8,921
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-571
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-1,003
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,997
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,527

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)							63.5
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							188
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							3,588
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							1,421
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)							80.4
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							88.4
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							158
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,253
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,840
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							31.8
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							176
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,375
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							711
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)							42.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							44.2
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							27.4
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							758
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,165
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							47.7

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)							182
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,481
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,069
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)							61.4
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							66.3
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							198
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,527
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,633

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

Item	2020	2025	2030	2035	2040	2045	2050
Natural gas consumption - Annual (tcf)		1,342	1,131	907	683	430	298
Natural gas consumption - Cumulative (tcf)							27,326
Natural gas production - Annual (tcf)		3,393	3,208	2,794	2,362	1,873	1,455
Oil consumption - Annual (million bbls)		176	158	129	102	80	58.8
Oil consumption - Cumulative (million bbls)							3,942
Oil production - Annual (million bbls)		87.4	87.7	87.6	69.4	56.4	37.5

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		251	0.265	0.229	0.146	0.088	0.003
Monetary damages from air pollution - Natural Gas (million 2019$)		147	87.1	48.6	42.1	22.2	11.7
Monetary damages from air pollution - Transportation (million 2019$)		716	671	513	298	138	57.1
Premature deaths from air pollution - Coal (deaths)		28.3	0.03	0.026	0.017	0.01	0
Premature deaths from air pollution - Natural Gas (deaths)		16.6	9.84	5.48	4.76	2.51	1.32
Premature deaths from air pollution - Transportation (deaths)		80.6	75.5	57.7	33.5	15.5	6.42

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		173	482	787	1,871	1,526	1,257
By economic sector - Construction (jobs)		18,631	15,168	15,055	13,369	11,175	10,662
By economic sector - Manufacturing (jobs)		26,861	30,395	37,234	35,031	27,836	32,792
By economic sector - Mining (jobs)		25,601	19,924	14,818	9,645	6,203	3,458

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Other (jobs)		1,833	950	1,134	1,222	1,186	1,381
By economic sector - Pipeline (jobs)		2,177	2,517	1,992	1,289	926	708
By economic sector - Professional (jobs)		11,016	8,780	8,765	9,077	7,722	6,909
By economic sector - Trade (jobs)		9,894	7,912	7,265	6,336	5,172	4,355
By economic sector - Utilities (jobs)		14,952	15,134	15,450	14,244	11,051	10,132
By education level - All sectors - Associates degree or some college (jobs)		33,558	30,800	31,406	28,149	22,292	22,233
By education level - All sectors - Bachelors degree (jobs)		25,587	22,892	22,506	19,790	15,480	14,799
By education level - All sectors - Doctoral degree (jobs)		839	694	649	585	465	411
By education level - All sectors - High school diploma or less (jobs)		45,133	41,625	42,885	39,098	31,064	30,972
By education level - All sectors - Masters or professional degree (jobs)		6,021	5,248	5,054	4,463	3,497	3,240
By resource sector - Biomass (jobs)		744	1,328	2,242	5,633	5,567	5,367
By resource sector - CO2 (jobs)		47.4	5,826	4,378	1,433	1,842	2,235
By resource sector - Coal (jobs)		641	105	8.25	7.08	6.3	5.52
By resource sector - Grid (jobs)		11,976	11,411	16,175	17,208	14,746	15,191
By resource sector - Natural Gas (jobs)		41,897	32,991	25,333	20,464	13,078	7,450
By resource sector - Nuclear (jobs)		1,128	1,110	1,093	634	0	0
By resource sector - Oil (jobs)		27,520	24,381	21,256	15,488	11,575	7,349
By resource sector - Solar (jobs)		19,783	13,691	18,105	18,417	16,667	22,253
By resource sector - Wind (jobs)		7,403	10,415	13,910	12,801	9,318	11,805
Median wages - Annual - All ($2019 per job)		59,061	59,662	59,502	59,590	59,990	59,446
On-Site or In-Plant Training - Total jobs - 1 to 4 years (jobs)		17,739	16,190	16,333	14,527	11,464	11,259
On-Site or In-Plant Training - Total jobs - 4 to 10 years (jobs)		6,827	6,059	5,873	5,149	4,077	3,790
On-Site or In-Plant Training - Total jobs - None (jobs)		18,076	16,377	16,611	14,993	11,849	11,759
On-Site or In-Plant Training - Total jobs - Over 10 years (jobs)		850	788	804	726	580	572
On-Site or In-Plant Training - Total jobs - Up to 1 year (jobs)		67,646	61,847	62,880	56,689	44,828	44,274
On-the-Job Training - All sectors - 1 to 4 years (jobs)		22,732	20,707	20,807	18,453	14,546	14,251
On-the-Job Training - All sectors - 4 to 10 years (jobs)		6,317	5,586	5,433	4,790	3,808	3,557
On-the-Job Training - All sectors - None (jobs)		6,137	5,435	5,419	4,832	3,824	3,753
On-the-Job Training - All sectors - Over 10 years (jobs)		1,143	1,052	1,086	962	758	782
On-the-Job Training - All sectors - Up to 1 year (jobs)		74,809	68,481	69,757	63,046	49,863	49,311
Related work experience - All sectors - 1 to 4 years (jobs)		40,840	37,108	37,279	33,304	26,247	25,533
Related work experience - All sectors - 4 to 10 years (jobs)		26,179	23,770	23,804	21,123	16,642	16,237
Related work experience - All sectors - None (jobs)		15,504	14,191	14,397	13,034	10,339	10,161
Related work experience - All sectors - Over 10 years (jobs)		7,464	6,847	6,927	6,124	4,803	4,773
Related work experience - All sectors - Up to 1 year (jobs)		21,151	19,344	20,094	18,498	14,767	14,949
Wage income - All (million $2019)		6,564	6,042	6,099	5,487	4,367	4,260

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)		16,461	19,126				
Sales of cooking units - Electric Resistance (%)	30.1	34.2	39	52	70.1	81.2	85
Sales of cooking units - Gas (%)	69.9	65.8	61	48	29.9	18.8	15
Sales of space heating units - Electric Heat Pump (%)	6.12	16.4	22.3	39	65.1	83.1	89.8
Sales of space heating units - Electric Resistance (%)	5.02	4.5	4.54	4.7	5.12	5.78	6.22
Sales of space heating units - Fossil (%)	0	0	0	0	0	0	0
Sales of space heating units - Gas Furnace (%)	88.9	79.1	73.2	56.3	29.8	11.1	4.02
Sales of water heating units - Electric Heat Pump (%)	0.147	1.96	7.14	22.1	44.9	59.9	65.1
Sales of water heating units - Electric Resistance (%)	4.15	4.5	6.61	12.8	22.2	28.4	30.5
Sales of water heating units - Gas Furnace (%)	93.7	91.7	84.4	63.3	31	9.9	2.58
Sales of water heating units - Other (%)	1.99	1.82	1.81	1.82	1.83	1.82	1.83

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)		4.71	4.85	6.22	6.5	9.04	9.59

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	127	128	127	126	123	121	119
Final energy use - Industry (PJ)	1,932	2,153	2,275	2,325	2,395	2,445	2,512
Final energy use - Residential (PJ)	142	137	134	131	124	116	110
Final energy use - Transportation (PJ)	599	570	531	500	477	451	421

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)		3.73	4.58				
Sales of cooking units - Electric Resistance (%)	66.5	67.4	70.4	78.5	89.8	96.7	99.1
Sales of cooking units - Gas (%)	33.5	32.6	29.6	21.5	10.2	3.31	0.889
Sales of space heating units - Electric Heat Pump (%)	15	21.9	27	41.8	64.3	78.9	84
Sales of space heating units - Electric Resistance (%)	44.7	48	45.1	36.7	24.2	16.2	13.4
Sales of space heating units - Fossil (%)	2.28	3.62	3.47	2.83	1.88	1.28	1.07
Sales of space heating units - Gas (%)	38	26.5	24.5	18.7	9.62	3.59	1.53
Sales of water heating units - Electric Heat Pump (%)	0	2.06	7.93	24.8	50.7	67.6	73.5
Sales of water heating units - Electric Resistance (%)	56.5	66.3	63	52.9	37.5	27.4	23.9
Sales of water heating units - Gas Furnace (%)	41.3	29.9	27.3	20.5	10.1	3.2	0.831
Sales of water heating units - Other (%)	2.21	1.75	1.73	1.73	1.74	1.73	1.72

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	120	254	856	2,700	3,931
Public EV charging plugs - DC Fast (1000 units)	0.067		0.404		2.19		6.15
Public EV charging plugs - L2 (1000 units)	0.204		9.71		52.7		148
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 (%)	1.71	2.1	2.09	1.67	1.08	0.557	0.238
Vehicle sales - Light-duty - EV (%)	1.71	4.29	11	24.5	46.9	71.1	87.2
Vehicle sales - Light-duty - gasoline (%)	92.3	88.2	80.9	68.3	47.8	25.9	11.4
Vehicle sales - Light-duty - hybrid (%)	4.05	4.89	5.54	5.12	3.91	2.35	1.15
Vehicle sales - Light-duty - hydrogen FC (%)	0.113	0.385	0.335	0.259	0.186	0.104	0.048
Vehicle sales - Light-duty - other (%)	0.11	0.113	0.104	0.091	0.066	0.037	0.017
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)							-181
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-5,416
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-67.8
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-5,665
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-181
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-2,814
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-33.9
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-3,029
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							73.3
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							1,563
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							123

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)							1,760
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							73.3
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							813
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							61.7
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							948

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)							-388
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-37,585
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,388
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-7,036
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-3,857
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-13,381
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-846
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-1,337
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-5,571
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-3,779
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-195
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-12,212
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-231
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-2,703
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-1,962
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-4,460
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-296
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-669
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-422
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,274
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-292

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)							-24,865
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-810
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-4,869
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-2,876
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-8,921
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-571
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-1,003
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,997
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,527
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							63.5
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							188
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							3,588
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							1,421
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)							80.4
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							88.4
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							158
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,253
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,840
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							31.8
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							176
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,375
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							711
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)							42.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							44.2
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							27.4
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							758
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,165
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							47.7
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							182
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,481
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,069
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)							61.4
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							66.3
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							198
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,527
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,633

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		251	0.265	0.229	0.146	0.088	0.003
Monetary damages from air pollution - Natural Gas (million 2019$)		142	73.6	33.7	14.6	7.17	6.75
Monetary damages from air pollution - Transportation (million 2019$)		727	735	719	651	521	360
Premature deaths from air pollution - Coal (deaths)		28.3	0.03	0.026	0.017	0.01	0
Premature deaths from air pollution - Natural Gas (deaths)		16	8.3	3.8	1.65	0.809	0.762
Premature deaths from air pollution - Transportation (deaths)		81.8	82.7	80.9	73.2	58.6	40.5

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)		16,472	19,203				
Sales of cooking units - Electric Resistance (%)	30.1	44.4	79.2	86.1	86.5	86.5	86.5
Sales of cooking units - Gas (%)	69.9	55.6	20.8	13.9	13.5	13.5	13.5
Sales of space heating units - Electric Heat Pump (%)	6.12	26.1	76.9	91.1	92.2	92.2	92.2
Sales of space heating units - Electric Resistance (%)	5.02	4.5	4.79	6.09	6.39	6.41	6.42
Sales of space heating units - Fossil (%)	0	0	0	0	0	0	0
Sales of space heating units - Gas Furnace (%)	88.9	69.4	18.3	2.84	1.39	1.35	1.34
Sales of water heating units - Electric Heat Pump (%)	0.147	10.7	56.3	66.5	66.9	66.9	66.9
Sales of water heating units - Electric Resistance (%)	4.15	8.12	26.9	31.1	31.3	31.3	31.3
Sales of water heating units - Gas Furnace (%)	93.7	79.3	15	0.631	0	0	0
Sales of water heating units - Other (%)	1.99	1.82	1.81	1.82	1.83	1.82	1.83

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)		5.94	6.22	10.4	11.1	8.07	8.36

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	127	128	123	117	112	111	112
Final energy use - Industry (PJ)	1,932	2,153	2,273	2,317	2,383	2,435	2,505
Final energy use - Residential (PJ)	142	136	128	117	108	103	102
Final energy use - Transportation (PJ)	598	567	515	454	397	363	350

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)		3.78	4.86				
Sales of cooking units - Electric Resistance (%)	66.6	73.7	95.5	99.8	100	100	100
Sales of cooking units - Gas (%)	33.4	26.3	4.49	0.226	0	0	0
Sales of space heating units - Electric Heat Pump (%)	15	30.5	75.4	85.4	85.9	85.7	85.7
Sales of space heating units - Electric Resistance (%)	44.7	43.2	18.2	12.6	12.3	12.5	12.5
Sales of space heating units - Fossil (%)	2.28	3.27	1.44	1.03	1.01	0.993	0.989
Sales of space heating units - Gas (%)	38	23	5.01	0.994	0.822	0.801	0.798
Sales of water heating units - Electric Heat Pump (%)	0	12	63.6	75.1	75.6	75.6	75.6
Sales of water heating units - Electric Resistance (%)	56.5	60.4	29.9	23	22.7	22.7	22.7
Sales of water heating units - Gas Furnace (%)	41.3	25.8	4.84	0.202	0	0	0
Sales of water heating units - Other (%)	2.21	1.75	1.73	1.71	1.71	1.72	1.72

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)		747	1,909	3,103	4,697	5,116	4,875
Public EV charging plugs - DC Fast (1000 units)	0.067		1.34		5.93		9.61
Public EV charging plugs - L2 (1000 units)	0.204		32.1		143		231
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 (%)	1.7	1.95	1.32	0.424	0.077	0.013	0
Vehicle sales - Light-duty - EV (%)	3.4	13.6	44	80.8	96.2	99.3	100
Vehicle sales - Light-duty - gasoline (%)	90.8	79.8	51.3	17.5	3.42	0.594	0
Vehicle sales - Light-duty - hybrid (%)	3.92	4.18	3.04	1.15	0.276	0.059	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.348	0.215	0.068	0.013	0.002	0
Vehicle sales - Light-duty - other (%)	0.109	0.105	0.07	0.025	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)		0.255	0.217	0	0.31	0	3.13
Capital invested - Solar PV - Base (billion $2018)		5	0.207	0.17	0.14	0.476	0
Capital invested - Wind - Base (billion $2018)		0	0	0	0.397	0.388	26.1
Installed renewables - OffshoreWind - Base land use assumptions (MW)	0	90	180	180	359	359	2,859
Installed renewables - OffshoreWind - Constrained land use assumptions (MW)	0	0	0	0	0	0	877
Installed renewables - Solar - Base land use assumptions (MW)	3,945	8,318	8,520	8,700	8,858	9,426	9,426
Installed renewables - Solar - Constrained land use assumptions (MW)	5,010	13,980	16,071	16,386	16,386	16,386	18,996
Installed renewables - Wind - Base land use assumptions (MW)	0	0	0	0	336	682	25,361
Installed renewables - Wind - Constrained land use assumptions (MW)	0	0	0	2,396	18,648	18,648	22,449

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	316	632	632	1,253	1,253	10,012
OffshoreWind - Constrained land use assumptions (GWh)	0	0	0	0	0	0	3,069
Solar - Base land use assumptions (GWh)	6,488	13,634	13,965	14,260	14,519	15,447	15,447
Solar - Constrained land use assumptions (GWh)	8,259	22,928	26,350	26,867	26,867	26,867	31,079
Wind - Base land use assumptions (GWh)	0	0	0	0	917	1,843	64,431

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

Item	2020	2025	2030	2035	2040	2045	2050
Wind - Constrained land use assumptions (GWh)	0	0	0	5,683	47,705	47,705	57,891

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)							-181
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-5,416
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-67.8
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-5,665
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-181
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-2,814
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-33.9
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-3,029
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							73.3
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							1,563
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							123
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							1,760
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							73.3
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							813
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							61.7
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							948

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)							-388
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-37,585
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,388

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-7,036
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-3,857
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-13,381
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-846
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-1,337
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-5,571
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-3,779
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-195
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-12,212
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-231
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-2,703
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-1,962
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-4,460
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-296
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-669
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-422
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,274
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-292
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-24,865
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-810
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-4,869
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-2,876
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-8,921
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-571
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-1,003
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,997
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,527
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							63.5
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							188

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 - Extend rotation length (1000 hectares)							3,588
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							1,421
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)							80.4
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							88.4
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							158
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,253
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,840
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							31.8
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							176
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,375
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							711
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)							42.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							44.2
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							27.4
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							758
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,165
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							47.7
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							182
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,481
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,069

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 - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)							61.4
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							66.3
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							198
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,527
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,633

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		251	0.265	0.229	0.146	0.088	0.003
Monetary damages from air pollution - Natural Gas (million 2019$)		141	83.8	38.3	26.8	8.47	4.42
Monetary damages from air pollution - Transportation (million 2019$)		716	671	513	298	138	57.1
Premature deaths from air pollution - Coal (deaths)		28.3	0.03	0.026	0.017	0.01	0
Premature deaths from air pollution - Natural Gas (deaths)		15.9	9.46	4.32	3.03	0.956	0.499
Premature deaths from air pollution - Transportation (deaths)		80.6	75.5	57.7	33.5	15.5	6.42

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)		16,472	19,203				
Sales of cooking units - Electric Resistance (%)	30.1	44.4	79.2	86.1	86.5	86.5	86.5
Sales of cooking units - Gas (%)	69.9	55.6	20.8	13.9	13.5	13.5	13.5
Sales of space heating units - Electric Heat Pump (%)	6.12	26.1	76.9	91.1	92.2	92.2	92.2
Sales of space heating units - Electric Resistance (%)	5.02	4.5	4.79	6.09	6.39	6.41	6.42
Sales of space heating units - Fossil (%)	0	0	0	0	0	0	0
Sales of space heating units - Gas Furnace (%)	88.9	69.4	18.3	2.84	1.39	1.35	1.34
Sales of water heating units - Electric Heat Pump (%)	0.147	10.7	56.3	66.5	66.9	66.9	66.9
Sales of water heating units - Electric Resistance (%)	4.15	8.12	26.9	31.1	31.3	31.3	31.3
Sales of water heating units - Gas Furnace (%)	93.7	79.3	15	0.631	0	0	0
Sales of water heating units - Other (%)	1.99	1.82	1.81	1.82	1.83	1.82	1.83

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)		5.94	6.22	10.4	11.1	8.07	8.36

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	127	128	123	117	112	111	112
Final energy use - Industry (PJ)	1,932	2,153	2,273	2,317	2,383	2,435	2,505
Final energy use - Residential (PJ)	142	136	128	117	108	103	102
Final energy use - Transportation (PJ)	598	567	515	454	397	363	350

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)		3.78	4.86				
Sales of cooking units - Electric Resistance (%)	66.6	73.7	95.5	99.8	100	100	100
Sales of cooking units - Gas (%)	33.4	26.3	4.49	0.226	0	0	0
Sales of space heating units - Electric Heat Pump (%)	15	30.5	75.4	85.4	85.9	85.7	85.7
Sales of space heating units - Electric Resistance (%)	44.7	43.2	18.2	12.6	12.3	12.5	12.5
Sales of space heating units - Fossil (%)	2.28	3.27	1.44	1.03	1.01	0.993	0.989
Sales of space heating units - Gas (%)	38	23	5.01	0.994	0.822	0.801	0.798
Sales of water heating units - Electric Heat Pump (%)	0	12	63.6	75.1	75.6	75.6	75.6
Sales of water heating units - Electric Resistance (%)	56.5	60.4	29.9	23	22.7	22.7	22.7
Sales of water heating units - Gas Furnace (%)	41.3	25.8	4.84	0.202	0	0	0
Sales of water heating units - Other (%)	2.21	1.75	1.73	1.71	1.71	1.72	1.72

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)		747	1,909	3,103	4,697	5,116	4,875
Public EV charging plugs - DC Fast (1000 units)	0.067		1.34		5.93		9.61
Public EV charging plugs - L2 (1000 units)	0.204		32.1		143		231
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 (%)	1.7	1.95	1.32	0.424	0.077	0.013	0
Vehicle sales - Light-duty - EV (%)	3.4	13.6	44	80.8	96.2	99.3	100
Vehicle sales - Light-duty - gasoline (%)	90.8	79.8	51.3	17.5	3.42	0.594	0
Vehicle sales - Light-duty - hybrid (%)	3.92	4.18	3.04	1.15	0.276	0.059	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.348	0.215	0.068	0.013	0.002	0
Vehicle sales - Light-duty - other (%)	0.109	0.105	0.07	0.025	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

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

Item	2020	2025	2030	2035	2040	2045	2050
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 - Offshore Wind - Base (billion $2018)		0.255	0	0	0.156	0	0
Capital invested - Solar PV - Base (billion $2018)		6.52	0.356	0.17	0	0	0
Capital invested - Solar PV - Constrained (billion $2018)		5.33	0.495	0.403	0	0.151	0
Capital invested - Wind - Constrained (billion $2018)		0	0	0	0	0	1.07
Installed renewables - OffshoreWind - Base land use assumptions (MW)	0	90	90	90	180	180	180
Installed renewables - OffshoreWind - Constrained land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - Solar - Base land use assumptions (MW)	6,758	12,456	12,804	12,984	12,984	12,984	12,984
Installed renewables - Solar - Constrained land use assumptions (MW)	2,606	7,272	7,755	8,183	8,183	8,362	8,362
Installed renewables - Wind - Base land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - Wind - Constrained land use assumptions (MW)	0	0	0	0	0	0	1,008

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

Item	2020	2025	2030	2035	2040	2045	2050
OffshoreWind - Base land use assumptions (GWh)	0	316	316	316	632	632	632
OffshoreWind - Constrained land use assumptions (GWh)	0	0	0	0	0	0	0
Solar - Base land use assumptions (GWh)	11,065	20,363	20,930	21,225	21,225	21,225	21,225
Solar - Constrained land use assumptions (GWh)	4,300	11,917	12,712	13,413	13,413	13,706	13,706
Wind - Base land use assumptions (GWh)	0	0	0	0	0	0	0
Wind - Constrained land use assumptions (GWh)	0	0	0	0	0	0	2,390

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)							-181
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-5,416
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-67.8
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-5,665
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-181

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-2,814
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-33.9
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-3,029
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							73.3
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							1,563
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							123
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							1,760
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							73.3
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							813
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							61.7
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							948

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)							-388
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-37,585
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,388
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-7,036
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-3,857
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-13,381
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-846
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-1,337
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-5,571
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-3,779
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-195
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-12,212
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-231

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-2,703
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-1,962
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-4,460
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-296
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-669
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-422
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,274
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-292
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-24,865
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-810
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-4,869
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-2,876
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-8,921
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-571
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-1,003
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,997
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,527
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							63.5
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							188
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							3,588
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							1,421
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)							80.4
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							88.4
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							158
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,253

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 - Total impacted (over 30 years) (1000 hectares)							6,840
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							31.8
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							176
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,375
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							711
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)							42.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							44.2
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							27.4
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							758
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,165
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							47.7
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							182
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,481
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,069
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)							61.4
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							66.3
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							198
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,527
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,633

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		251	0.265	0.229	0.146	0.088	0.003
Monetary damages from air pollution - Natural Gas (million 2019$)		157	95.2	107	88.8	37.3	9.73
Monetary damages from air pollution - Transportation (million 2019$)		716	671	513	298	138	57.1
Premature deaths from air pollution - Coal (deaths)		28.3	0.03	0.026	0.017	0.01	0
Premature deaths from air pollution - Natural Gas (deaths)		17.7	10.7	12.1	10	4.21	1.1
Premature deaths from air pollution - Transportation (deaths)		80.6	75.5	57.7	33.5	15.5	6.42

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)		16,461	19,126				
Sales of cooking units - Electric Resistance (%)	30.1	34.2	39	52	70.1	81.2	85
Sales of cooking units - Gas (%)	69.9	65.8	61	48	29.9	18.8	15
Sales of space heating units - Electric Heat Pump (%)	6.12	16.4	22.3	39	65.1	83.1	89.8
Sales of space heating units - Electric Resistance (%)	5.02	4.5	4.54	4.7	5.12	5.78	6.22
Sales of space heating units - Fossil (%)	0	0	0	0	0	0	0
Sales of space heating units - Gas Furnace (%)	88.9	79.1	73.2	56.3	29.8	11.1	4.02
Sales of water heating units - Electric Heat Pump (%)	0.147	1.96	7.14	22.1	44.9	59.9	65.1
Sales of water heating units - Electric Resistance (%)	4.15	4.5	6.61	12.8	22.2	28.4	30.5
Sales of water heating units - Gas Furnace (%)	93.7	91.7	84.4	63.3	31	9.9	2.58
Sales of water heating units - Other (%)	1.99	1.82	1.81	1.82	1.83	1.82	1.83

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)		4.71	4.85	6.22	6.5	9.04	9.59

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	127	128	127	126	123	121	119
Final energy use - Industry (PJ)	1,932	2,153	2,275	2,325	2,395	2,445	2,512
Final energy use - Residential (PJ)	142	137	134	131	124	116	110
Final energy use - Transportation (PJ)	599	570	531	500	477	451	421

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)		3.73	4.58				
Sales of cooking units - Electric Resistance (%)	66.5	67.4	70.4	78.5	89.8	96.7	99.1
Sales of cooking units - Gas (%)	33.5	32.6	29.6	21.5	10.2	3.31	0.889
Sales of space heating units - Electric Heat Pump (%)	15	21.9	27	41.8	64.3	78.9	84

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Electric Resistance (%)	44.7	48	45.1	36.7	24.2	16.2	13.4
Sales of space heating units - Fossil (%)	2.28	3.62	3.47	2.83	1.88	1.28	1.07
Sales of space heating units - Gas (%)	38	26.5	24.5	18.7	9.62	3.59	1.53
Sales of water heating units - Electric Heat Pump (%)	0	2.06	7.93	24.8	50.7	67.6	73.5
Sales of water heating units - Electric Resistance (%)	56.5	66.3	63	52.9	37.5	27.4	23.9
Sales of water heating units - Gas Furnace (%)	41.3	29.9	27.3	20.5	10.1	3.2	0.831
Sales of water heating units - Other (%)	2.21	1.75	1.73	1.73	1.74	1.73	1.72

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	120	254	856	2,700	3,931
Public EV charging plugs - DC Fast (1000 units)	0.067		0.404		2.19		6.15
Public EV charging plugs - L2 (1000 units)	0.204		9.71		52.7		148
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 (%)	1.71	2.1	2.09	1.67	1.08	0.557	0.238
Vehicle sales - Light-duty - EV (%)	1.71	4.29	11	24.5	46.9	71.1	87.2
Vehicle sales - Light-duty - gasoline (%)	92.3	88.2	80.9	68.3	47.8	25.9	11.4
Vehicle sales - Light-duty - hybrid (%)	4.05	4.89	5.54	5.12	3.91	2.35	1.15
Vehicle sales - Light-duty - hydrogen FC (%)	0.113	0.385	0.335	0.259	0.186	0.104	0.048
Vehicle sales - Light-duty - other (%)	0.11	0.113	0.104	0.091	0.066	0.037	0.017
Vehicle sales - Medium-duty - diesel (%)	64.8	62.2	57.7	49.4	35.6	19.6	8.37
Vehicle sales - Medium-duty - EV (%)	0.664	1.94	5.49	14.3	31.4	52.6	68
Vehicle sales - Medium-duty - gasoline (%)	33.8	34.7	34.7	31.9	24.4	14.2	6.33
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.418	0.464	0.478	0.414	0.275	0.141
Vehicle sales - Medium-duty - hydrogen FC (%)	0.166	0.485	1.37	3.58	7.86	13.2	17
Vehicle sales - Medium-duty - other (%)	0.253	0.266	0.279	0.286	0.258	0.184	0.102

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

Item	2020	2025	2030	2035	2040	2045	2050
Capital invested - Biomass power plant (billion $2018)	0	0	0	0	0	0	0
Capital invested - Biomass w/ccu allam power plant (billion $2018)	0	0	0	0	0	0	0
Capital invested - Biomass w/ccu power plant (billion $2018)	0	0	0	10.5	12.5	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Biomass power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu allam power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu power plant (GWh)	0	0	0	11,774	25,838	25,838	25,838

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	799	2,743	2,743	2,743
Conversion capital investment - Cumulative 5-yr (million $2018)		0	0	10,894	24,876	0	0
Number of facilities - Allam power w ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Beccs hydrogen (quantity)	0	0	0	1	16	16	16
Number of facilities - Diesel (quantity)	0	0	0	0	0	0	0
Number of facilities - Diesel ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Power (quantity)	0	0	0	0	0	0	0
Number of facilities - Power ccu (quantity)	0	0	0	9	20	20	20
Number of facilities - Pyrolysis (quantity)	0	0	0	0	0	0	0
Number of facilities - Pyrolysis ccu (quantity)	0	0	0	1	1	1	1
Number of facilities - Sng (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng ccu (quantity)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0	13.4	44.5	44.5	44.5
Annual - BECCS (MMT)		0	0	13.3	44.4	44.4	44.3
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Annual - NGCC (MMT)		0	0	0.14	0.11	0.09	0.17
Cumulative - All (MMT)		0	0	13.4	57.9	102	147
Cumulative - BECCS (MMT)		0	0	13.3	57.6	102	146
Cumulative - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - NGCC (MMT)		0	0	0.14	0.25	0.34	0.51

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

Item	2020	2025	2030	2035	2040	2045	2050
All (km)		0	845	2,391	3,748	3,748	4,168
Cumulative investment - All (million $2018)		0	5,578	10,341	14,944	14,944	15,240
Cumulative investment - Spur (million $2018)		0	12.7	714	1,786	1,786	2,082
Cumulative investment - Trunk (million $2018)		0	5,565	9,626	13,158	13,158	13,158
Spur (km)		0	23.9	934	1,822	1,822	2,242
Trunk (km)		0	821	1,456	1,926	1,926	1,926

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

Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (MMT)		0	19.4	87.8	173	240	252
Injection wells (wells)		0	16	65	116	194	240
Resource characterization, appraisal, permitting costs (million $2020)		47.3	1,958	3,115	3,115	3,115	3,115
Wells and facilities construction costs (million $2020)		0	499	1,946	3,468	5,799	7,199

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)							-527

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-4,958
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)							-59.9
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-5,545
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-527
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-2,572
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)							-29.9
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-3,129
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							217
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							3,538
Land impacted for carbon sink - Aggressive deployment - Cropland to woody energy crops (1000 hectares)							56.5
Land impacted for carbon sink - Aggressive deployment - Pasture to energy crops (1000 hectares)							240
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							109
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							4,161
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							217
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							744
Land impacted for carbon sink - Moderate deployment - Cropland to woody energy crops (1000 hectares)							56.5
Land impacted for carbon sink - Moderate deployment - Pasture to energy crops (1000 hectares)							240

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 - Permanent conservation cover (1000 hectares)							54.5
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							1,312

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)							-388
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-37,585
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,388
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-7,036
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-3,857
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-13,381
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-846
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-1,337
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-5,571
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-3,779
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-195
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-12,212
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-231
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-2,703
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-1,962
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-4,460
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-296
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-669
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-422
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,274
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-292
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-24,865
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-810
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-4,869
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-2,876
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-8,921

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-571
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-1,003
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,997
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,527
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							63.5
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							188
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							3,588
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							1,421
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)							80.4
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							88.4
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							158
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,253
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,840
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							31.8
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							176
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,375
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							711
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)							42.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							44.2
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							27.4
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							758

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 - Total impacted (over 30 years) (1000 hectares)							3,165
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							47.7
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							182
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,481
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,069
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)							61.4
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							66.3
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							198
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,527
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,633

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		251	0.265	0.229	0.146	0.088	0.003
Monetary damages from air pollution - Natural Gas (million 2019$)		146	74.1	41.8	28.8	17.1	10.8
Monetary damages from air pollution - Transportation (million 2019$)		727	735	719	651	521	360
Premature deaths from air pollution - Coal (deaths)		28.3	0.03	0.026	0.017	0.01	0
Premature deaths from air pollution - Natural Gas (deaths)		16.5	8.37	4.72	3.25	1.93	1.22
Premature deaths from air pollution - Transportation (deaths)		81.8	82.7	80.9	73.2	58.6	40.5

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)		16,112	16,910				
Sales of cooking units - Electric Resistance (%)	30.1	32.3	32.3	32.3	32.3	32.3	32.3
Sales of cooking units - Gas (%)	69.9	67.7	67.7	67.7	67.7	67.7	67.7
Sales of space heating units - Electric Heat Pump (%)	6.12	28.9	70.9	79.1	79.5	79.5	79.5
Sales of space heating units - Electric Resistance (%)	5.02	6.38	12.2	15.9	18.7	19.1	19.1
Sales of space heating units - Fossil (%)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Gas Furnace (%)	88.9	64.7	17	5	1.82	1.39	1.34
Sales of water heating units - Electric Heat Pump (%)	0.147	0.132	0.129	0.132	0.131	0.129	0.129
Sales of water heating units - Electric Resistance (%)	4.15	3.75	3.71	3.72	3.75	3.73	3.74
Sales of water heating units - Gas Furnace (%)	93.7	94.3	94.3	94.3	94.3	94.3	94.3
Sales of water heating units - Other (%)	1.99	1.82	1.81	1.82	1.83	1.82	1.83

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)		6.34	6.66	9.85	10.5	8.17	8.47

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	127	130	131	133	135	141	150
Final energy use - Industry (PJ)	1,933	2,162	2,297	2,357	2,441	2,510	2,595
Final energy use - Residential (PJ)	142	137	138	141	145	151	156
Final energy use - Transportation (PJ)	599	570	535	514	514	526	543

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)		3.65	3.76				
Sales of cooking units - Electric Resistance (%)	66.2	66.2	66.2	66.2	66.2	66.2	66.2
Sales of cooking units - Gas (%)	33.8	33.8	33.8	33.8	33.8	33.8	33.8
Sales of space heating units - Electric Heat Pump (%)	12.3	40.8	42	44	45.9	48.4	52.1
Sales of space heating units - Electric Resistance (%)	46.3	37.2	36.6	35.6	34.3	32	28.2
Sales of space heating units - Fossil (%)	2.33	2.13	2.16	2.14	2.1	2.11	2.11
Sales of space heating units - Gas (%)	39.1	19.9	19.2	18.2	17.7	17.5	17.6
Sales of water heating units - Electric Heat Pump (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Resistance (%)	56.5	67.6	67.7	67.7	67.5	67.5	67.5
Sales of water heating units - Gas Furnace (%)	41.3	30.7	30.5	30.6	30.8	30.7	30.8
Sales of water heating units - Other (%)	2.21	1.75	1.73	1.74	1.75	1.75	1.76

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 (%)	1.71	2.1	2.21	2.06	1.86	1.73	1.65
Vehicle sales - Light-duty - EV (%)	3.05	4.94	5.66	6.92	8.47	9.91	11.1
Vehicle sales - Light-duty - gasoline (%)	91.1	87.7	85.8	84.1	82.2	80.2	78.6
Vehicle sales - Light-duty - hybrid (%)	3.94	4.81	5.91	6.48	7.09	7.74	8.29

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.382	0.355	0.318	0.316	0.318	0.329
Vehicle sales - Light-duty - other (%)	0.109	0.113	0.11	0.11	0.11	0.109	0.112
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)							-388
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-37,585
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,388
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-7,036
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-3,857
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-13,381
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-846
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-1,337
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-5,571
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-3,779
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-195
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-12,212
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-231
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-2,703
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-1,962
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-4,460
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-296
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-669
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-422
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,274
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-292
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-24,865
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-810

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-4,869
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-2,876
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-8,921
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-571
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-1,003
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,997
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,527
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							63.5
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							188
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							3,588
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							1,421
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)							80.4
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							88.4
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							158
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,253
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,840
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							31.8
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							176
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,375
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							711
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)							42.3

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 - Reforest cropland (1000 hectares)							44.2
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							27.4
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							758
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,165
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							47.7
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							182
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,481
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,069
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)							61.4
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							66.3
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							198
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,527
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,633

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)	-31.8		-11.5				-9.34
Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y)	-3.64		-6.07				-6.39
Business-as-usual carbon sink - Total (Mt CO2e/y)	-35.4		-17.6				-15.7

Table 66: *REF scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		1,342	802	417	333	300	298
Monetary damages from air pollution - Natural Gas (million 2019$)		161	168	189	148	144	125
Monetary damages from air pollution - Transportation (million 2019$)		727	747	767	791	816	841
Premature deaths from air pollution - Coal (deaths)		152	90.6	47	37.6	33.9	33.7
Premature deaths from air pollution - Natural Gas (deaths)		18.2	19	21.4	16.7	16.3	14.1

Table 66: *REF scenario - IMPACTS - Health (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Transportation (deaths)		81.8	84	86.3	89	91.8	94.6