Net-Zero America - wisconsin state report

2021-03-18

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

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Notes

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

Data by category and subcategory

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

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		19,303	21,086				
Sales of cooking units - Electric Resistance (%)	41	54.2	82.9	88.6	88.9	88.9	88.9
Sales of cooking units - Gas (%)	59	45.8	17.1	11.4	11.1	11.1	11.1
Sales of space heating units - Electric Heat Pump (%)	0.938	6.01	29.4	77.8	88.2	89	89.1
Sales of space heating units - Electric Resistance (%)	3.03	3.48	5.44	9.73	10.5	10.6	10.6
Sales of space heating units - Fossil (%)	5.62	2.66	0.503	0.021	0	0	0
Sales of space heating units - Gas Furnace (%)	90.4	87.9	64.6	12.4	1.3	0.384	0.356
Sales of water heating units - Electric Heat Pump (%)	0.306	1.32	13.9	42.1	48.3	48.8	48.8
Sales of water heating units - Electric Resistance (%)	2.97	4.18	16.6	44.4	50.5	51	51
Sales of water heating units - Gas Furnace (%)	96.6	94.3	69.4	13.2	1.05	0.035	0
Sales of water heating units - Other (%)	0.173	0.186	0.186	0.187	0.186	0.187	0.187

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)		3.38	3.48	6.55	7	5.91	6.17

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	194	191	184	171	157	146	140
Final energy use - Industry (PJ)	516	524	516	503	496	492	490
Final energy use - Residential (PJ)	247	230	215	188	157	132	115
Final energy use - Transportation (PJ)	508	474	413	338	271	230	212

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)		3.31	4.14				
Sales of cooking units - Electric Resistance (%)	51.1	61.5	93.4	99.7	100	100	100
Sales of cooking units - Gas (%)	48.9	38.5	6.59	0.332	0	0	0
Sales of space heating units - Electric Heat Pump (%)	3.66	8.85	32.5	79.5	89.5	90.4	90.3
Sales of space heating units - Electric Resistance (%)	13.4	18.8	15	6.74	4.9	4.78	4.99
Sales of space heating units - Fossil (%)	9.47	16	12.3	6.05	4.79	4.67	4.5
Sales of space heating units - Gas (%)	73.5	56.3	40.2	7.71	0.776	0.203	0.19
Sales of water heating units - Electric Heat Pump (%)	0	0.766	10.6	32.6	37.2	37.5	37.6
Sales of water heating units - Electric Resistance (%)	24.6	40.6	46.1	59	62.1	62.3	62.3
Sales of water heating units - Gas Furnace (%)	75.4	58.6	43.2	8.25	0.653	0.021	0
Sales of water heating units - Other (%)	0.053	0.114	0.115	0.114	0.112	0.112	0.113

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)		1,089	2,796	4,523	6,855	7,457	7,112
Public EV charging plugs - DC Fast (1000 units)	0.143		2.06		9		14.5
Public EV charging plugs - L2 (1000 units)	0.459		49.6		216		350
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 (%)	1.58	1.84	1.27	0.407	0.075	0.013	0
Vehicle sales - Light-duty - EV (%)	3.8	14.8	45.9	81.6	96.3	99.3	100
Vehicle sales - Light-duty - gasoline (%)	90.1	78.4	49.4	16.7	3.32	0.591	0
Vehicle sales - Light-duty - hybrid (%)	4.31	4.46	3.18	1.18	0.288	0.063	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.342	0.206	0.064	0.013	0.002	0
Vehicle sales - Light-duty - other (%)	0.103	0.099	0.065	0.023	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	0	0
Capital invested - Biomass w/ccu power plant (billion $2018)	0	0	0	0	0	0	0
Capital invested - Solar PV - Base (billion $2018)		0	0.104	1.36	0.29	0	0.356
Capital invested - Solar PV - Constrained (billion $2018)		0.719	0.334	1.27	1.13	0.49	0.187
Capital invested - Wind - Base (billion $2018)		1.17	2.17	2.36	4.1	6.87	14.1
Capital invested - Wind - Constrained (billion $2018)		1.44	3.18	14.1	13	9.68	4.97
Installed renewables - OffshoreWind - Base land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - OffshoreWind - Constrained land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - Rooftop PV (MW)	103	184	235	313	416	536	679
Installed renewables - Solar - Base land use assumptions (MW)	474	474	575	2,023	2,349	2,349	2,799
Installed renewables - Solar - Constrained land use assumptions (MW)	450	450	551	1,001	1,474	1,620	1,856
Installed renewables - Wind - Base land use assumptions (MW)	737	1,535	3,166	5,072	8,544	14,671	27,957
Installed renewables - Wind - Constrained land use assumptions (MW)	737	1,153	3,144	12,861	24,958	34,220	39,468

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

Item	2020	2025	2030	2035	2040	2045	2050
Biomass power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu allam power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu power plant (GWh)	0	0	0	0	0	0	0
OffshoreWind - Base land use assumptions (GWh)	0	0	0	0	0	0	0
OffshoreWind - Constrained land use assumptions (GWh)	0	0	0	0	0	0	0
Solar - Base land use assumptions (GWh)	830	830	982	3,137	3,610	3,610	4,278
Solar - Constrained land use assumptions (GWh)	788	788	940	1,604	2,290	2,508	2,859
Wind - Base land use assumptions (GWh)	3,031	5,854	11,388	17,739	29,093	49,189	92,875
Wind - Constrained land use assumptions (GWh)	3,031	4,416	10,931	42,907	82,017	110,217	125,604

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

Item	2020	2025	2030	2035	2040	2045	2050
Biomass purchases (million $2018/year)		0	0	0	0	653	1,824
Conversion capital investment - Cumulative 5-yr (million $2018)		0	0	0	0	9,964	24,682
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	11	14
Number of facilities - Diesel (quantity)	0	0	0	0	0	0	0
Number of facilities - Diesel ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Power (quantity)	0	0	0	0	0	0	0
Number of facilities - Power ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Pyrolysis (quantity)	0	0	0	0	0	0	4
Number of facilities - Pyrolysis ccu (quantity)	0	0	0	0	0	0	11
Number of facilities - Sng (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng ccu (quantity)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0	0	0	12.8	25.1
Annual - BECCS (MMT)		0	0	0	0	12.8	25.1
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Annual - NGCC (MMT)		0	0	0	0	0	0
Cumulative - All (MMT)		0	0	0	0	12.8	37.9
Cumulative - BECCS (MMT)		0	0	0	0	12.8	37.9
Cumulative - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - NGCC (MMT)		0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
All (km)		0	0	0	0	176	1,528
Cumulative investment - All (million $2018)		0	0	0	0	253	1,249
Cumulative investment - Spur (million $2018)		0	0	0	0	253	1,249
Cumulative investment - Trunk (million $2018)		0	0	0	0	0	0
Spur (km)		0	0	0	0	176	1,528
Trunk (km)		0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (MMT)		0	0	0	0	0	0
Injection wells (wells)		0	0	0	0	0	0
Resource characterization, appraisal, permitting costs (million $2020)		0	0	0	0	0	0
Wells and facilities construction costs (million $2020)		0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-1,228
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-4,557
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-189
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-5,975
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-1,228
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-2,397
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-94.6
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-3,720
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							479
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							3,259
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							344
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							4,082
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							479
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							1,716
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							172
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							2,367

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)							-392
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-32,495
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-2,104
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-8,126
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-912
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-6,364
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-1,651
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-2,230
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-6,496
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-4,219
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-197
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-9,861
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-351
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,121
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-464
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-2,121
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-578
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-1,115
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-492
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,422
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-294
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-21,170
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-1,227
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-5,624
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-680
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-4,243
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-1,114
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-1,673
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-3,494
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,820

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)							64.2
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							285
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,144
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							336
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)							157
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							147
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							185
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,398
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,716
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							32.1
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							267
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,588
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							168
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)							82.5
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							73.7
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							32
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							846
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,089
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							48.1

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)							276
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,866
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							253
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)							120
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							111
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							231
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,704
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,608

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

Item	2020	2025	2030	2035	2040	2045	2050
Natural gas consumption - Annual (tcf)		420	354	284	214	135	93.3
Natural gas consumption - Cumulative (tcf)							8,559
Natural gas production - Annual (tcf)		0	0	0	0	0	0
Oil consumption - Annual (million bbls)		112	99.9	80.7	62.9	48.7	38
Oil consumption - Cumulative (million bbls)							2,487
Oil production - Annual (million bbls)		0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		455	0.374	0.363	0.319	0.222	0.013
Monetary damages from air pollution - Natural Gas (million 2019$)		134	93.8	52.9	42.8	27	12.1
Monetary damages from air pollution - Transportation (million 2019$)		1,048	981	749	435	201	81.6
Premature deaths from air pollution - Coal (deaths)		51.4	0.042	0.041	0.036	0.025	0.001
Premature deaths from air pollution - Natural Gas (deaths)		15.1	10.6	5.97	4.84	3.05	1.37
Premature deaths from air pollution - Transportation (deaths)		118	110	84.2	49	22.6	9.18

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		1,079	1,220	1,016	574	900	1,821
By economic sector - Construction (jobs)		4,987	5,073	6,937	7,464	9,195	14,789
By economic sector - Manufacturing (jobs)		6,804	7,976	10,231	9,740	8,396	11,665
By economic sector - Mining (jobs)		2,322	1,587	1,067	687	423	269

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Other (jobs)		312	344	666	704	906	1,560
By economic sector - Pipeline (jobs)		528	452	362	275	213	360
By economic sector - Professional (jobs)		2,918	2,957	3,558	4,075	6,429	11,532
By economic sector - Trade (jobs)		2,602	2,258	2,526	2,568	3,366	5,661
By economic sector - Utilities (jobs)		6,264	5,853	7,176	8,101	10,069	15,287
By education level - All sectors - Associates degree or some college (jobs)		8,381	8,391	10,424	10,849	12,626	19,752
By education level - All sectors - Bachelors degree (jobs)		5,788	5,658	6,651	6,822	8,148	12,964
By education level - All sectors - Doctoral degree (jobs)		177	172	197	209	293	503
By education level - All sectors - High school diploma or less (jobs)		12,126	12,188	14,736	14,710	16,816	26,439
By education level - All sectors - Masters or professional degree (jobs)		1,345	1,309	1,531	1,597	2,015	3,285
By resource sector - Biomass (jobs)		2,792	2,909	2,325	1,396	3,327	7,932
By resource sector - CO2 (jobs)		0	0	0	0	206	1,869
By resource sector - Coal (jobs)		1,355	369	0	0	0	0
By resource sector - Grid (jobs)		6,660	6,987	11,146	13,349	16,356	26,106
By resource sector - Natural Gas (jobs)		5,020	4,379	3,611	3,308	3,575	2,390
By resource sector - Nuclear (jobs)		649	508	185	0	0	0
By resource sector - Oil (jobs)		4,997	4,076	3,041	2,199	1,592	1,166
By resource sector - Solar (jobs)		2,968	3,291	6,000	5,459	4,772	7,090
By resource sector - Wind (jobs)		3,376	5,199	7,231	8,477	10,071	16,390
Median wages - Annual - All ($2019 per job)		60,691	60,843	61,317	62,867	64,760	65,800
On-Site or In-Plant Training - Total jobs - 1 to 4 years (jobs)		4,344	4,328	5,338	5,538	6,451	10,081
On-Site or In-Plant Training - Total jobs - 4 to 10 years (jobs)		1,677	1,637	2,023	2,147	2,617	4,140
On-Site or In-Plant Training - Total jobs - None (jobs)		4,470	4,481	5,413	5,519	6,500	10,311
On-Site or In-Plant Training - Total jobs - Over 10 years (jobs)		228	229	286	299	351	551
On-Site or In-Plant Training - Total jobs - Up to 1 year (jobs)		17,098	17,044	20,479	20,684	23,980	37,861
On-the-Job Training - All sectors - 1 to 4 years (jobs)		5,522	5,497	6,802	7,102	8,311	12,985
On-the-Job Training - All sectors - 4 to 10 years (jobs)		1,592	1,558	1,955	2,095	2,571	4,072
On-the-Job Training - All sectors - None (jobs)		1,509	1,487	1,775	1,786	2,097	3,347
On-the-Job Training - All sectors - Over 10 years (jobs)		270	276	341	343	377	582
On-the-Job Training - All sectors - Up to 1 year (jobs)		18,925	18,900	22,666	22,862	26,542	41,957
Related work experience - All sectors - 1 to 4 years (jobs)		9,892	9,793	11,821	12,139	14,288	22,516
Related work experience - All sectors - 4 to 10 years (jobs)		6,290	6,233	7,587	7,865	9,254	14,555
Related work experience - All sectors - None (jobs)		4,057	4,045	4,880	4,945	5,772	9,107
Related work experience - All sectors - Over 10 years (jobs)		1,734	1,737	2,117	2,173	2,482	3,869
Related work experience - All sectors - Up to 1 year (jobs)		5,845	5,910	7,134	7,065	8,102	12,896
Wage income - All (million $2019)		1,688	1,687	2,057	2,149	2,584	4,142

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)		19,301	21,085				
Sales of cooking units - Electric Resistance (%)	41	45.8	49.8	60.5	75.4	84.5	87.7
Sales of cooking units - Gas (%)	59	54.2	50.2	39.5	24.6	15.5	12.3
Sales of space heating units - Electric Heat Pump (%)	0.938	4.33	5.66	9.99	20.2	33.1	40.9
Sales of space heating units - Electric Resistance (%)	3.03	3.36	3.47	3.84	4.75	5.92	6.59
Sales of space heating units - Fossil (%)	5.62	3.12	3.01	2.66	2.19	1.88	1.77
Sales of space heating units - Gas Furnace (%)	90.4	89.2	87.9	83.5	72.8	59.1	50.7
Sales of water heating units - Electric Heat Pump (%)	0.306	0.605	1.35	3.8	9.77	17.5	22.2
Sales of water heating units - Electric Resistance (%)	2.97	3.47	4.17	6.6	12.5	20.1	24.7
Sales of water heating units - Gas Furnace (%)	96.6	95.7	94.3	89.4	77.6	62.3	52.9
Sales of water heating units - Other (%)	0.173	0.186	0.186	0.187	0.186	0.187	0.187

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)		2.66	2.66	3.62	3.74	5.53	5.85

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	194	191	186	183	179	175	171
Final energy use - Industry (PJ)	516	524	517	508	504	500	498
Final energy use - Residential (PJ)	247	230	218	208	197	184	171
Final energy use - Transportation (PJ)	509	478	433	396	369	336	297

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)		3.29	4.06				
Sales of cooking units - Electric Resistance (%)	50.9	52.2	56.7	68.5	85	95.2	98.7
Sales of cooking units - Gas (%)	49.1	47.8	43.3	31.5	15	4.84	1.3
Sales of space heating units - Electric Heat Pump (%)	3.66	7.03	8.43	13	23.5	36.7	44.5
Sales of space heating units - Electric Resistance (%)	13.4	19	18.7	17.9	16	13.7	12.5
Sales of space heating units - Fossil (%)	9.47	16.4	16.3	15.5	14	12.3	11.1
Sales of space heating units - Gas (%)	73.5	57.5	56.6	53.6	46.4	37.4	31.9
Sales of water heating units - Electric Heat Pump (%)	0	0.205	0.783	2.7	7.35	13.3	17
Sales of water heating units - Electric Resistance (%)	24.6	40.2	40.4	41.4	44.2	47.7	49.9
Sales of water heating units - Gas Furnace (%)	75.4	59.4	58.7	55.8	48.3	38.9	33
Sales of water heating units - Other (%)	0.053	0.114	0.115	0.115	0.115	0.115	0.115

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	177	370	1,251	3,933	5,731
Public EV charging plugs - DC Fast (1000 units)	0.143		0.646		3.34		9.32
Public EV charging plugs - L2 (1000 units)	0.459		15.5		80.4		224
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 (%)	1.6	2	2.06	1.64	1.05	0.542	0.232
Vehicle sales - Light-duty - EV (%)	1.85	4.59	11.7	25.6	48.1	71.8	87.5
Vehicle sales - Light-duty - gasoline (%)	91.9	87.6	79.9	67	46.6	25.1	11
Vehicle sales - Light-duty - hybrid (%)	4.47	5.28	5.94	5.42	4.08	2.42	1.18
Vehicle sales - Light-duty - hydrogen FC (%)	0.113	0.381	0.328	0.251	0.179	0.099	0.046
Vehicle sales - Light-duty - other (%)	0.104	0.108	0.098	0.086	0.062	0.034	0.016
Vehicle sales - Medium-duty - diesel (%)	64.8	62.2	57.7	49.4	35.6	19.6	8.37
Vehicle sales - Medium-duty - EV (%)	0.664	1.94	5.49	14.3	31.4	52.6	68
Vehicle sales - Medium-duty - gasoline (%)	33.8	34.7	34.7	31.9	24.4	14.2	6.33
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.418	0.464	0.478	0.414	0.275	0.141
Vehicle sales - Medium-duty - hydrogen FC (%)	0.166	0.485	1.37	3.58	7.86	13.2	17
Vehicle sales - Medium-duty - other (%)	0.253	0.266	0.279	0.286	0.258	0.184	0.102

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-1,228
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-4,557
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-189
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-5,975
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-1,228
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-2,397
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-94.6
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-3,720
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							479
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							3,259
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							344

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)							4,082
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							479
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							1,716
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							172
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							2,367

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)							-392
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-32,495
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-2,104
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-8,126
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-912
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-6,364
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-1,651
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-2,230
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-6,496
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-4,219
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-197
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-9,861
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-351
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,121
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-464
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-2,121
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-578
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-1,115
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-492
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,422
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-294

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-21,170
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-1,227
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-5,624
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-680
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-4,243
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-1,114
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-1,673
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-3,494
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,820
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							64.2
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							285
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,144
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							336
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)							157
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							147
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							185
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,398
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,716
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							32.1
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							267
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,588
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							168
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)							82.5
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							73.7
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							32
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							846
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,089
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							48.1
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							276
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,866
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							253
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)							120
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							111
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							231
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,704
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,608

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		455	0.374	0.363	0.319	0.222	0.013
Monetary damages from air pollution - Natural Gas (million 2019$)		126	66.5	27.2	12.7	5.01	3.96
Monetary damages from air pollution - Transportation (million 2019$)		1,066	1,081	1,057	957	766	529
Premature deaths from air pollution - Coal (deaths)		51.4	0.042	0.041	0.036	0.025	0.001
Premature deaths from air pollution - Natural Gas (deaths)		14.3	7.5	3.08	1.43	0.566	0.448
Premature deaths from air pollution - Transportation (deaths)		120	122	119	108	86.2	59.5

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)		19,303	21,086				
Sales of cooking units - Electric Resistance (%)	41	54.2	82.9	88.6	88.9	88.9	88.9
Sales of cooking units - Gas (%)	59	45.8	17.1	11.4	11.1	11.1	11.1
Sales of space heating units - Electric Heat Pump (%)	0.938	6.01	29.4	77.8	88.2	89	89.1
Sales of space heating units - Electric Resistance (%)	3.03	3.48	5.44	9.73	10.5	10.6	10.6
Sales of space heating units - Fossil (%)	5.62	2.66	0.503	0.021	0	0	0
Sales of space heating units - Gas Furnace (%)	90.4	87.9	64.6	12.4	1.3	0.384	0.356
Sales of water heating units - Electric Heat Pump (%)	0.306	1.32	13.9	42.1	48.3	48.8	48.8
Sales of water heating units - Electric Resistance (%)	2.97	4.18	16.6	44.4	50.5	51	51
Sales of water heating units - Gas Furnace (%)	96.6	94.3	69.4	13.2	1.05	0.035	0
Sales of water heating units - Other (%)	0.173	0.186	0.186	0.187	0.186	0.187	0.187

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)		3.38	3.48	6.55	7	5.91	6.17

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	194	191	184	171	157	146	140
Final energy use - Industry (PJ)	516	524	516	503	496	492	490
Final energy use - Residential (PJ)	247	230	215	188	157	132	115
Final energy use - Transportation (PJ)	508	474	413	338	271	230	212

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)		3.31	4.14				
Sales of cooking units - Electric Resistance (%)	51.1	61.5	93.4	99.7	100	100	100
Sales of cooking units - Gas (%)	48.9	38.5	6.59	0.332	0	0	0
Sales of space heating units - Electric Heat Pump (%)	3.66	8.85	32.5	79.5	89.5	90.4	90.3
Sales of space heating units - Electric Resistance (%)	13.4	18.8	15	6.74	4.9	4.78	4.99
Sales of space heating units - Fossil (%)	9.47	16	12.3	6.05	4.79	4.67	4.5
Sales of space heating units - Gas (%)	73.5	56.3	40.2	7.71	0.776	0.203	0.19
Sales of water heating units - Electric Heat Pump (%)	0	0.766	10.6	32.6	37.2	37.5	37.6
Sales of water heating units - Electric Resistance (%)	24.6	40.6	46.1	59	62.1	62.3	62.3
Sales of water heating units - Gas Furnace (%)	75.4	58.6	43.2	8.25	0.653	0.021	0
Sales of water heating units - Other (%)	0.053	0.114	0.115	0.114	0.112	0.112	0.113

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)		1,089	2,796	4,523	6,855	7,457	7,112
Public EV charging plugs - DC Fast (1000 units)	0.143		2.06		9		14.5
Public EV charging plugs - L2 (1000 units)	0.459		49.6		216		350
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 (%)	1.58	1.84	1.27	0.407	0.075	0.013	0
Vehicle sales - Light-duty - EV (%)	3.8	14.8	45.9	81.6	96.3	99.3	100
Vehicle sales - Light-duty - gasoline (%)	90.1	78.4	49.4	16.7	3.32	0.591	0
Vehicle sales - Light-duty - hybrid (%)	4.31	4.46	3.18	1.18	0.288	0.063	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.342	0.206	0.064	0.013	0.002	0
Vehicle sales - Light-duty - other (%)	0.103	0.099	0.065	0.023	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	0.207	0.28	0.969	0.509	7.33
Capital invested - Wind - Base (billion $2018)		1.23	2.48	3.09	9.85	22.7	26.9
Installed renewables - OffshoreWind - Base land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - OffshoreWind - Constrained land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - Solar - Base land use assumptions (MW)	474	474	676	974	2,065	2,673	11,931
Installed renewables - Solar - Constrained land use assumptions (MW)	947	947	1,870	3,872	4,615	4,615	28,397
Installed renewables - Wind - Base land use assumptions (MW)	737	1,576	3,438	5,930	14,266	34,531	59,967
Installed renewables - Wind - Constrained land use assumptions (MW)	1,475	2,500	8,138	34,914	67,408	78,980	96,983

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

Item	2020	2025	2030	2035	2040	2045	2050
OffshoreWind - Base land use assumptions (GWh)	0	0	0	0	0	0	0
OffshoreWind - Constrained land use assumptions (GWh)	0	0	0	0	0	0	0
Solar - Base land use assumptions (GWh)	830	830	1,132	1,576	3,192	4,095	17,860
Solar - Constrained land use assumptions (GWh)	1,659	1,659	3,024	5,982	7,085	7,085	42,496
Wind - Base land use assumptions (GWh)	3,031	5,991	12,295	20,551	47,859	114,530	195,827
Wind - Constrained land use assumptions (GWh)	6,062	9,467	27,943	116,150	217,377	250,814	309,441

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)							-1,228
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-4,557
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-189
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-5,975
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-1,228
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-2,397
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-94.6
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-3,720
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							479
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							3,259
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							344
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							4,082
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							479
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							1,716
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							172
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							2,367

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)							-392
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-32,495
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-2,104
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-8,126
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-912
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-6,364

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-1,651
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-2,230
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-6,496
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-4,219
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-197
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-9,861
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-351
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,121
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-464
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-2,121
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-578
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-1,115
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-492
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,422
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-294
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-21,170
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-1,227
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-5,624
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-680
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-4,243
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-1,114
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-1,673
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-3,494
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,820
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							64.2
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							285
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,144
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							336

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares)							157
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							147
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							185
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,398
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,716
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							32.1
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							267
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,588
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							168
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)							82.5
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							73.7
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							32
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							846
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,089
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							48.1
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							276
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,866
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							253
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)							120

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							111
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							231
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,704
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,608

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		455	0.374	0.363	0.319	0.222	0.013
Monetary damages from air pollution - Natural Gas (million 2019$)		120	71.9	35	23.8	9.59	3.96
Monetary damages from air pollution - Transportation (million 2019$)		1,048	981	749	435	201	81.6
Premature deaths from air pollution - Coal (deaths)		51.4	0.042	0.041	0.036	0.025	0.001
Premature deaths from air pollution - Natural Gas (deaths)		13.5	8.12	3.95	2.69	1.08	0.447
Premature deaths from air pollution - Transportation (deaths)		118	110	84.2	49	22.6	9.18

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)		19,303	21,086				
Sales of cooking units - Electric Resistance (%)	41	54.2	82.9	88.6	88.9	88.9	88.9
Sales of cooking units - Gas (%)	59	45.8	17.1	11.4	11.1	11.1	11.1
Sales of space heating units - Electric Heat Pump (%)	0.938	6.01	29.4	77.8	88.2	89	89.1
Sales of space heating units - Electric Resistance (%)	3.03	3.48	5.44	9.73	10.5	10.6	10.6
Sales of space heating units - Fossil (%)	5.62	2.66	0.503	0.021	0	0	0
Sales of space heating units - Gas Furnace (%)	90.4	87.9	64.6	12.4	1.3	0.384	0.356
Sales of water heating units - Electric Heat Pump (%)	0.306	1.32	13.9	42.1	48.3	48.8	48.8
Sales of water heating units - Electric Resistance (%)	2.97	4.18	16.6	44.4	50.5	51	51
Sales of water heating units - Gas Furnace (%)	96.6	94.3	69.4	13.2	1.05	0.035	0
Sales of water heating units - Other (%)	0.173	0.186	0.186	0.187	0.186	0.187	0.187

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)		3.38	3.48	6.55	7	5.91	6.17

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	194	191	184	171	157	146	140

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Industry (PJ)	516	524	516	503	496	492	490
Final energy use - Residential (PJ)	247	230	215	188	157	132	115
Final energy use - Transportation (PJ)	508	474	413	338	271	230	212

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)		3.31	4.14				
Sales of cooking units - Electric Resistance (%)	51.1	61.5	93.4	99.7	100	100	100
Sales of cooking units - Gas (%)	48.9	38.5	6.59	0.332	0	0	0
Sales of space heating units - Electric Heat Pump (%)	3.66	8.85	32.5	79.5	89.5	90.4	90.3
Sales of space heating units - Electric Resistance (%)	13.4	18.8	15	6.74	4.9	4.78	4.99
Sales of space heating units - Fossil (%)	9.47	16	12.3	6.05	4.79	4.67	4.5
Sales of space heating units - Gas (%)	73.5	56.3	40.2	7.71	0.776	0.203	0.19
Sales of water heating units - Electric Heat Pump (%)	0	0.766	10.6	32.6	37.2	37.5	37.6
Sales of water heating units - Electric Resistance (%)	24.6	40.6	46.1	59	62.1	62.3	62.3
Sales of water heating units - Gas Furnace (%)	75.4	58.6	43.2	8.25	0.653	0.021	0
Sales of water heating units - Other (%)	0.053	0.114	0.115	0.114	0.112	0.112	0.113

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)		1,089	2,796	4,523	6,855	7,457	7,112
Public EV charging plugs - DC Fast (1000 units)	0.143		2.06		9		14.5
Public EV charging plugs - L2 (1000 units)	0.459		49.6		216		350
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 (%)	1.58	1.84	1.27	0.407	0.075	0.013	0
Vehicle sales - Light-duty - EV (%)	3.8	14.8	45.9	81.6	96.3	99.3	100
Vehicle sales - Light-duty - gasoline (%)	90.1	78.4	49.4	16.7	3.32	0.591	0
Vehicle sales - Light-duty - hybrid (%)	4.31	4.46	3.18	1.18	0.288	0.063	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.342	0.206	0.064	0.013	0.002	0
Vehicle sales - Light-duty - other (%)	0.103	0.099	0.065	0.023	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	0	0	0	0.075	0
Capital invested - Solar PV - Constrained (billion $2018)		0	0	0.095	0.11	0.273	0
Capital invested - Wind - Base (billion $2018)		1.09	0.945	0.889	1.06	1.88	0.039
Capital invested - Wind - Constrained (billion $2018)		0.324	0.812	2.3	3.78	11.6	0.156
Installed renewables - OffshoreWind - Base land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - OffshoreWind - Constrained land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - Solar - Base land use assumptions (MW)	474	474	474	474	474	564	564
Installed renewables - Solar - Constrained land use assumptions (MW)	474	474	474	575	698	1,025	1,025
Installed renewables - Wind - Base land use assumptions (MW)	737	1,479	2,188	2,904	3,804	5,477	5,514
Installed renewables - Wind - Constrained land use assumptions (MW)	737	957	1,568	3,421	6,617	16,940	17,087

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

Item	2020	2025	2030	2035	2040	2045	2050
OffshoreWind - Base land use assumptions (GWh)	0	0	0	0	0	0	0
OffshoreWind - Constrained land use assumptions (GWh)	0	0	0	0	0	0	0
Solar - Base land use assumptions (GWh)	830	830	830	830	830	962	962
Solar - Constrained land use assumptions (GWh)	830	830	830	982	1,166	1,645	1,645
Wind - Base land use assumptions (GWh)	3,031	5,681	8,106	10,556	13,566	19,104	19,223
Wind - Constrained land use assumptions (GWh)	3,031	3,784	5,782	11,836	22,371	56,384	56,867

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)							-1,228
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-4,557
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-189
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-5,975
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-1,228
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-2,397
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-94.6
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-3,720

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							479
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							3,259
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							344
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							4,082
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							479
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							1,716
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							172
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							2,367

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)							-392
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-32,495
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-2,104
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-8,126
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-912
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-6,364
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-1,651
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-2,230
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-6,496
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-4,219
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-197
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-9,861
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-351
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,121
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-464
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-2,121
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-578

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-1,115
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-492
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,422
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-294
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-21,170
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-1,227
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-5,624
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-680
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-4,243
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-1,114
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-1,673
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-3,494
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,820
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							64.2
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							285
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,144
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							336
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)							157
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							147
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							185
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,398
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,716
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							32.1
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							267

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,588
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							168
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)							82.5
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							73.7
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							32
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							846
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,089
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							48.1
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							276
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,866
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							253
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)							120
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							111
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							231
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,704
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,608

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		455	0.374	0.363	0.319	0.222	0.013
Monetary damages from air pollution - Natural Gas (million 2019$)		139	97.1	147	108	38.6	14.8
Monetary damages from air pollution - Transportation (million 2019$)		1,048	981	749	435	201	81.6
Premature deaths from air pollution - Coal (deaths)		51.4	0.042	0.041	0.036	0.025	0.001

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

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Natural Gas (deaths)		15.7	11	16.6	12.2	4.36	1.67
Premature deaths from air pollution - Transportation (deaths)		118	110	84.2	49	22.6	9.18

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)		19,301	21,085				
Sales of cooking units - Electric Resistance (%)	41	45.8	49.8	60.5	75.4	84.5	87.7
Sales of cooking units - Gas (%)	59	54.2	50.2	39.5	24.6	15.5	12.3
Sales of space heating units - Electric Heat Pump (%)	0.938	4.33	5.66	9.99	20.2	33.1	40.9
Sales of space heating units - Electric Resistance (%)	3.03	3.36	3.47	3.84	4.75	5.92	6.59
Sales of space heating units - Fossil (%)	5.62	3.12	3.01	2.66	2.19	1.88	1.77
Sales of space heating units - Gas Furnace (%)	90.4	89.2	87.9	83.5	72.8	59.1	50.7
Sales of water heating units - Electric Heat Pump (%)	0.306	0.605	1.35	3.8	9.77	17.5	22.2
Sales of water heating units - Electric Resistance (%)	2.97	3.47	4.17	6.6	12.5	20.1	24.7
Sales of water heating units - Gas Furnace (%)	96.6	95.7	94.3	89.4	77.6	62.3	52.9
Sales of water heating units - Other (%)	0.173	0.186	0.186	0.187	0.186	0.187	0.187

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)		2.66	2.66	3.62	3.74	5.53	5.85

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	194	191	186	183	179	175	171
Final energy use - Industry (PJ)	516	524	517	508	504	500	498
Final energy use - Residential (PJ)	247	230	218	208	197	184	171
Final energy use - Transportation (PJ)	509	478	433	396	369	336	297

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)		3.29	4.06				
Sales of cooking units - Electric Resistance (%)	50.9	52.2	56.7	68.5	85	95.2	98.7
Sales of cooking units - Gas (%)	49.1	47.8	43.3	31.5	15	4.84	1.3
Sales of space heating units - Electric Heat Pump (%)	3.66	7.03	8.43	13	23.5	36.7	44.5
Sales of space heating units - Electric Resistance (%)	13.4	19	18.7	17.9	16	13.7	12.5
Sales of space heating units - Fossil (%)	9.47	16.4	16.3	15.5	14	12.3	11.1
Sales of space heating units - Gas (%)	73.5	57.5	56.6	53.6	46.4	37.4	31.9
Sales of water heating units - Electric Heat Pump (%)	0	0.205	0.783	2.7	7.35	13.3	17
Sales of water heating units - Electric Resistance (%)	24.6	40.2	40.4	41.4	44.2	47.7	49.9

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of water heating units - Gas Furnace (%)	75.4	59.4	58.7	55.8	48.3	38.9	33
Sales of water heating units - Other (%)	0.053	0.114	0.115	0.115	0.115	0.115	0.115

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	177	370	1,251	3,933	5,731
Public EV charging plugs - DC Fast (1000 units)	0.143		0.646		3.34		9.32
Public EV charging plugs - L2 (1000 units)	0.459		15.5		80.4		224
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 (%)	1.6	2	2.06	1.64	1.05	0.542	0.232
Vehicle sales - Light-duty - EV (%)	1.85	4.59	11.7	25.6	48.1	71.8	87.5
Vehicle sales - Light-duty - gasoline (%)	91.9	87.6	79.9	67	46.6	25.1	11
Vehicle sales - Light-duty - hybrid (%)	4.47	5.28	5.94	5.42	4.08	2.42	1.18
Vehicle sales - Light-duty - hydrogen FC (%)	0.113	0.381	0.328	0.251	0.179	0.099	0.046
Vehicle sales - Light-duty - other (%)	0.104	0.108	0.098	0.086	0.062	0.034	0.016
Vehicle sales - Medium-duty - diesel (%)	64.8	62.2	57.7	49.4	35.6	19.6	8.37
Vehicle sales - Medium-duty - EV (%)	0.664	1.94	5.49	14.3	31.4	52.6	68
Vehicle sales - Medium-duty - gasoline (%)	33.8	34.7	34.7	31.9	24.4	14.2	6.33
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.418	0.464	0.478	0.414	0.275	0.141
Vehicle sales - Medium-duty - hydrogen FC (%)	0.166	0.485	1.37	3.58	7.86	13.2	17
Vehicle sales - Medium-duty - other (%)	0.253	0.266	0.279	0.286	0.258	0.184	0.102

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

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

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

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

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

Item	2020	2025	2030	2035	2040	2045	2050
Biomass purchases (million $2018/year)		0	0	0	0	2,034	3,688
Conversion capital investment - Cumulative 5-yr (million $2018)		0	0	0	0	21,604	18,471
Number of facilities - Allam power w ccu (quantity)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Number of facilities - Beccs hydrogen (quantity)	0	0	0	0	0	25	28
Number of facilities - Diesel (quantity)	0	0	0	0	0	0	0
Number of facilities - Diesel ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Power (quantity)	0	0	0	0	0	0	0
Number of facilities - Power ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Pyrolysis (quantity)	0	0	0	0	0	0	16
Number of facilities - Pyrolysis ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng ccu (quantity)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0	0	0	27.8	31.1
Annual - BECCS (MMT)		0	0	0	0	27.8	31.1
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Annual - NGCC (MMT)		0	0	0	0	0	0
Cumulative - All (MMT)		0	0	0	0	27.8	58.9
Cumulative - BECCS (MMT)		0	0	0	0	27.8	58.9
Cumulative - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - NGCC (MMT)		0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
All (km)		0	0	0	0	583	380
Cumulative investment - All (million $2018)		0	0	0	0	928	788
Cumulative investment - Spur (million $2018)		0	0	0	0	928	788
Cumulative investment - Trunk (million $2018)		0	0	0	0	0	0
Spur (km)		0	0	0	0	583	380
Trunk (km)		0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (MMT)		0	0	0	0	0	0
Injection wells (wells)		0	0	0	0	0	0
Resource characterization, appraisal, permitting costs (million $2020)		0	0	0	0	0	0
Wells and facilities construction costs (million $2020)		0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-1,571
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-4,130
Carbon sink potential - Aggressive deployment - Cropland to woody energy crops (1000 tCO2e/y)							0

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive deployment - Pasture to energy crops (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-170
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-5,872
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-1,571
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-2,172
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)							-85.2
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-3,828
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							798
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							7,286
Land impacted for carbon sink - Aggressive deployment - Cropland to woody energy crops (1000 hectares)							33.6
Land impacted for carbon sink - Aggressive deployment - Pasture to energy crops (1000 hectares)							137
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							310
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							8,565
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							798
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							1,553
Land impacted for carbon sink - Moderate deployment - Cropland to woody energy crops (1000 hectares)							33.6
Land impacted for carbon sink - Moderate deployment - Pasture to energy crops (1000 hectares)							137
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							155
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							2,677

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)							-392
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-32,495
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-2,104
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-8,126
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-912
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-6,364
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-1,651
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-2,230
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-6,496
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-4,219
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-197
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-9,861
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-351
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,121
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-464
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-2,121
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-578
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-1,115
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-492
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,422
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-294
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-21,170
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-1,227
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-5,624
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-680
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-4,243
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-1,114
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-1,673
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-3,494
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,820

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							64.2
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							285
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,144
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							336
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)							157
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							147
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							185
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,398
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,716
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							32.1
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							267
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,588
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							168
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)							82.5
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							73.7
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							32
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							846
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,089
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							48.1

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							276
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,866
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							253
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)							120
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							111
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							231
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,704
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,608

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		455	0.374	0.363	0.319	0.222	0.013
Monetary damages from air pollution - Natural Gas (million 2019$)		127	59.8	34	22.1	10.4	4.7
Monetary damages from air pollution - Transportation (million 2019$)		1,066	1,081	1,057	957	766	529
Premature deaths from air pollution - Coal (deaths)		51.4	0.042	0.041	0.036	0.025	0.001
Premature deaths from air pollution - Natural Gas (deaths)		14.3	6.76	3.84	2.49	1.18	0.53
Premature deaths from air pollution - Transportation (deaths)		120	122	119	108	86.2	59.5

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)		19,095	19,795				
Sales of cooking units - Electric Resistance (%)	41	44.2	44.3	44.3	44.3	44.4	44.5
Sales of cooking units - Gas (%)	59	55.8	55.7	55.7	55.7	55.6	55.5
Sales of space heating units - Electric Heat Pump (%)	0.938	11.3	43.3	70.2	74.9	75.5	75.5
Sales of space heating units - Electric Resistance (%)	3.03	4.33	9.16	17.5	23.2	24.1	24.1
Sales of space heating units - Fossil (%)	5.62	2.84	1.46	0.267	0.031	0.001	0
Sales of space heating units - Gas Furnace (%)	90.4	81.6	46.1	12	1.88	0.453	0.355
Sales of water heating units - Electric Heat Pump (%)	0.306	0.343	0.347	0.346	0.34	0.342	0.342
Sales of water heating units - Electric Resistance (%)	2.97	3.21	3.18	3.19	3.17	3.16	3.16

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of water heating units - Gas Furnace (%)	96.6	96.3	96.3	96.3	96.3	96.3	96.3
Sales of water heating units - Other (%)	0.173	0.186	0.186	0.187	0.186	0.187	0.187

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)		3.26	3.34	4.1	4.26	3.93	4.03

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	193	194	192	189	185	185	190
Final energy use - Industry (PJ)	516	542	554	566	585	606	631
Final energy use - Residential (PJ)	247	231	221	214	209	206	203
Final energy use - Transportation (PJ)	508	478	436	411	410	422	438

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)		3.19	3.37				
Sales of cooking units - Electric Resistance (%)	50.5	50.5	50.5	50.5	50.5	50.5	50.5
Sales of cooking units - Gas (%)	49.5	49.5	49.5	49.5	49.5	49.5	49.5
Sales of space heating units - Electric Heat Pump (%)	2.81	10.6	10.9	11.5	12	12.6	13.4
Sales of space heating units - Electric Resistance (%)	13.5	18.3	18.1	17.9	17.4	16.8	16.1
Sales of space heating units - Fossil (%)	9.72	15.4	14.9	14.5	14.5	14.6	14.5
Sales of space heating units - Gas (%)	74	55.7	56	56.1	56	56.1	56
Sales of water heating units - Electric Heat Pump (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Resistance (%)	24.6	40.1	39.9	39.8	39.9	39.7	39.7
Sales of water heating units - Gas Furnace (%)	75.4	59.8	60	60	60	60.1	60.2
Sales of water heating units - Other (%)	0.053	0.114	0.115	0.116	0.115	0.116	0.116

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 (%)	1.59	2	2.19	2.04	1.84	1.71	1.63
Vehicle sales - Light-duty - EV (%)	3.45	5.45	6.22	7.64	9.32	10.8	12
Vehicle sales - Light-duty - gasoline (%)	90.4	86.9	84.8	83	80.9	79	77.4
Vehicle sales - Light-duty - hybrid (%)	4.33	5.18	6.35	6.92	7.49	8.09	8.56
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.378	0.348	0.309	0.307	0.308	0.318
Vehicle sales - Light-duty - other (%)	0.104	0.107	0.104	0.104	0.104	0.103	0.105
Vehicle sales - Medium-duty - diesel (%)	65.2	63.5	61.6	59.6	58	56.5	55.2
Vehicle sales - Medium-duty - EV (%)	0.027	0.105	0.329	0.671	0.895	0.973	0.993
Vehicle sales - Medium-duty - gasoline (%)	34	35.5	37	38.5	39.7	40.8	41.7

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

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

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-392
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-32,495
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-2,104
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-8,126
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-912
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-6,364
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-1,651
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-2,230
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-6,496
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-4,219
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-197
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-9,861
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-351
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,121
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-464
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-2,121
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-578
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-1,115
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-492
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-1,422
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-294
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-21,170
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-1,227
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-5,624
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-680
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-4,243

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-1,114
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-1,673
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-3,494
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-2,820
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							64.2
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							285
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,144
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							336
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)							157
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							147
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							185
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							1,398
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							6,716
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							32.1
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							267
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,588
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							168
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)							82.5
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							73.7
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							32
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							846

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,089
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							48.1
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							276
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							2,866
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							253
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)							120
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							111
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							231
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,704
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							5,608

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)	-24.8		-14.9				-13.3
Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y)	-1.73		-3.12				-3.24
Business-as-usual carbon sink - Total (Mt CO2e/y)	-26.6		-18				-16.5

Table 66: *REF scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		1,513	876	595	488	439	427
Monetary damages from air pollution - Natural Gas (million 2019$)		145	141	187	144	123	110
Monetary damages from air pollution - Transportation (million 2019$)		1,065	1,095	1,126	1,163	1,201	1,239
Premature deaths from air pollution - Coal (deaths)		171	99	67.2	55.1	49.6	48.2
Premature deaths from air pollution - Natural Gas (deaths)		16.4	15.9	21.1	16.2	13.9	12.5
Premature deaths from air pollution - Transportation (deaths)		120	123	127	131	135	139