Net-Zero America - illinois state report

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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)		40,927	44,680				
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 (%)	0.751	8.27	35.3	81	89	89.5	89.5
Sales of space heating units - Electric Resistance (%)	2.86	3.5	5.34	9.38	10.1	10.2	10.2
Sales of space heating units - Fossil (%)	0	2.07	0.402	0.017	0	0	0
Sales of space heating units - Gas Furnace (%)	96.4	86.2	59	9.63	0.906	0.363	0.363
Sales of water heating units - Electric Heat Pump (%)	0.271	2.48	19.4	46.1	50.7	51	51
Sales of water heating units - Electric Resistance (%)	2.65	4.62	18.3	44	48.5	48.8	48.8
Sales of water heating units - Gas Furnace (%)	96.9	92.7	62.2	9.74	0.572	0	0
Sales of water heating units - Other (%)	0.154	0.185	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)		6.63	6.83	11.6	12.4	12.3	13

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	441	434	415	383	346	319	305
Final energy use - Industry (PJ)	634	660	671	671	678	686	694
Final energy use - Residential (PJ)	591	551	512	443	367	307	269
Final energy use - Transportation (PJ)	1,043	977	873	748	634	562	530

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)		10.8	14.4				
Sales of cooking units - Electric Resistance (%)	50.8	61.3	93.4	99.7	100	100	100
Sales of cooking units - Gas (%)	49.2	38.7	6.63	0.334	0	0	0
Sales of space heating units - Electric Heat Pump (%)	3.5	10.7	39.6	85.8	93.9	94.4	94.2
Sales of space heating units - Electric Resistance (%)	12.7	18.4	13.8	6.17	4.76	4.69	4.9
Sales of space heating units - Fossil (%)	2.45	4.48	3.17	1.07	0.718	0.695	0.671
Sales of space heating units - Gas (%)	81.4	66.5	43.4	6.93	0.605	0.212	0.217
Sales of water heating units - Electric Heat Pump (%)	0	1.85	15.9	37.3	41	41.2	41.2
Sales of water heating units - Electric Resistance (%)	22.7	38.5	43.9	56.3	58.6	58.7	58.6
Sales of water heating units - Gas Furnace (%)	77.3	59.6	40	6.28	0.367	0	0
Sales of water heating units - Other (%)	0.046	0.112	0.113	0.113	0.111	0.111	0.112

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)		2,022	5,214	8,399	12,743	13,847	13,214
Public EV charging plugs - DC Fast (1000 units)	0.299		3.24		13.9		22.4
Public EV charging plugs - L2 (1000 units)	1.41		78		334		539
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 (%)	1.4	1.68	1.2	0.382	0.072	0.013	0
Vehicle sales - Light-duty - EV (%)	4.42	16.7	48.8	82.7	96.4	99.3	100
Vehicle sales - Light-duty - gasoline (%)	89.1	76.3	46.4	15.6	3.17	0.586	0
Vehicle sales - Light-duty - hybrid (%)	4.91	4.9	3.38	1.24	0.304	0.067	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.11	0.331	0.191	0.059	0.012	0.002	0
Vehicle sales - Light-duty - other (%)	0.095	0.091	0.058	0.02	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	0.024	0	0	0
Capital invested - Biomass w/ccu power plant (billion $2018)	0	0	0.199	0	0	0	0
Capital invested - Solar PV - Base (billion $2018)		2.64	1.73	5.31	8.41	4.98	2.34
Capital invested - Solar PV - Constrained (billion $2018)		1.16	2.5	7.75	8.56	5.43	1.47
Capital invested - Wind - Base (billion $2018)		10.1	29	25.6	30.1	28	30.8
Capital invested - Wind - Constrained (billion $2018)		3.55	6.59	4.41	2.68	0.201	66
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)	62.5	110	164	248	368	523	724
Installed renewables - Solar - Base land use assumptions (MW)	351	2,658	4,345	9,987	19,457	25,405	28,364
Installed renewables - Solar - Constrained land use assumptions (MW)	432	1,624	4,357	9,890	18,180	25,657	27,626
Installed renewables - Wind - Base land use assumptions (MW)	6,208	13,063	34,871	55,544	81,007	105,985	135,080
Installed renewables - Wind - Constrained land use assumptions (MW)	6,324	8,682	13,605	17,187	19,590	19,734	75,835

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	24.2	24.2	24.2	24.2
Biomass w/ccu power plant (GWh)	0	0	224	224	224	224	224
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)	650	4,313	6,920	15,776	30,541	39,500	43,941
Solar - Constrained land use assumptions (GWh)	770	2,660	6,920	15,546	28,427	39,685	42,633
Wind - Base land use assumptions (GWh)	22,788	44,881	115,313	180,643	260,635	338,249	426,461
Wind - Constrained land use assumptions (GWh)	23,175	30,574	46,053	56,813	63,779	64,186	242,358

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

Item	2020	2025	2030	2035	2040	2045	2050
Biomass purchases (million $2018/year)		0	11.3	2,030	3,353	3,754	3,754
Conversion capital investment - Cumulative 5-yr (million $2018)		0	183	29,262	19,141	5,818	0
Number of facilities - Allam power w ccu (quantity)	0	0	0	1	1	1	1
Number of facilities - Beccs hydrogen (quantity)	0	0	0	33	56	63	63
Number of facilities - Diesel (quantity)	0	0	0	0	0	0	0
Number of facilities - Diesel ccu (quantity)	0	0	0	1	1	1	1
Number of facilities - Power (quantity)	0	0	0	0	0	0	0
Number of facilities - Power ccu (quantity)	0	0	2	2	2	2	2
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	2	2	2	2	2

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0.24	41.5	66.8	74.1	74.8
Annual - BECCS (MMT)		0	0.22	37.8	62.4	69.9	69.9
Annual - Cement and lime (MMT)		0	0	3.35	3.32	3.42	3.53
Annual - NGCC (MMT)		0	0.02	0.38	1.08	0.81	1.38
Cumulative - All (MMT)		0	0.24	41.8	109	183	257
Cumulative - BECCS (MMT)		0	0.22	38	100	170	240
Cumulative - Cement and lime (MMT)		0	0	3.35	6.67	10.1	13.6
Cumulative - NGCC (MMT)		0	0.02	0.4	1.48	2.29	3.67

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

Item	2020	2025	2030	2035	2040	2045	2050
All (km)		0	1,464	3,167	4,446	5,778	6,621
Cumulative investment - All (million $2018)		0	6,204	9,975	10,943	12,504	13,165
Cumulative investment - Spur (million $2018)		0	304	1,825	2,792	4,354	5,015
Cumulative investment - Trunk (million $2018)		0	5,900	8,150	8,150	8,150	8,150
Spur (km)		0	507	1,842	3,122	4,454	5,297
Trunk (km)		0	958	1,324	1,324	1,324	1,324

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

Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (MMT)		0	1.1	3.52	7.23	11.2	14.9
Injection wells (wells)		0	2	9	15	26	32
Resource characterization, appraisal, permitting costs (million $2020)		100	281	361	361	361	361
Wells and facilities construction costs (million $2020)		0	66.8	260	464	776	963

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)							-3,836
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-17,544
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-428
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-21,808
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-3,836
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-9,245
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-214
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-13,295
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							1,734
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							7,209
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							779
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							9,721
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							1,734
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							3,799
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							389
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							5,922

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)							-95.6
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-21,662
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-2,692
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-2,426
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-108
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-1,364
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-3,477
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,430
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-4,831
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-1,239
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-47.9
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-6,654
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-449
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-932
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-55.1
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-455
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-1,217
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,715
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-366
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-418
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-71.7
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-14,157
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-1,570
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-1,679
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-80.8
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-909
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-2,347
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,073
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,599
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-828

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)							15.6
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							364
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							1,237
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							39.9
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)							330
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							359
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							137
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							411
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							2,894
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							7.82
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							342
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							474
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							20
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)							174
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							180
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							23.8
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							248
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,469
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							11.7

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)							353
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							855
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							30
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)							252
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							269
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							172
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							500
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							2,444

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

Item	2020	2025	2030	2035	2040	2045	2050
Natural gas consumption - Annual (tcf)		858	723	580	437	275	191
Natural gas consumption - Cumulative (tcf)							17,474
Natural gas production - Annual (tcf)		2.9	2.75	2.39	2.02	1.6	1.25
Oil consumption - Annual (million bbls)		204	179	143	108	81.3	59.6
Oil consumption - Cumulative (million bbls)							4,405
Oil production - Annual (million bbls)		10.9	10.9	10.9	8.66	7.04	4.69

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		961	0.815	0.792	0.688	0.483	0.033
Monetary damages from air pollution - Natural Gas (million 2019$)		406	285	214	182	104	45.1
Monetary damages from air pollution - Transportation (million 2019$)		4,899	4,586	3,504	2,047	963	413
Premature deaths from air pollution - Coal (deaths)		109	0.092	0.089	0.078	0.055	0.004
Premature deaths from air pollution - Natural Gas (deaths)		45.8	32.2	24.1	20.6	11.8	5.09
Premature deaths from air pollution - Transportation (deaths)		551	516	394	230	108	46.5

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		2,969	3,009	6,027	6,096	4,421	3,486
By economic sector - Construction (jobs)		17,402	25,542	34,708	42,720	45,856	51,094
By economic sector - Manufacturing (jobs)		19,745	23,393	31,660	31,381	26,513	32,791
By economic sector - Mining (jobs)		7,211	4,726	3,490	2,423	1,769	1,288

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Other (jobs)		1,357	1,979	3,434	5,038	5,493	6,239
By economic sector - Pipeline (jobs)		1,058	1,601	1,066	632	556	657
By economic sector - Professional (jobs)		10,710	15,142	24,613	32,319	36,422	40,856
By economic sector - Trade (jobs)		8,059	9,493	12,933	16,399	18,501	21,341
By economic sector - Utilities (jobs)		21,944	26,956	32,994	38,326	40,915	46,284
By education level - All sectors - Associates degree or some college (jobs)		27,319	34,622	46,468	54,488	56,651	64,674
By education level - All sectors - Bachelors degree (jobs)		18,781	23,004	30,907	36,166	37,734	42,706
By education level - All sectors - Doctoral degree (jobs)		621	798	1,160	1,442	1,570	1,749
By education level - All sectors - High school diploma or less (jobs)		39,240	47,835	64,703	74,038	74,717	83,892
By education level - All sectors - Masters or professional degree (jobs)		4,493	5,582	7,687	9,200	9,776	11,014
By resource sector - Biomass (jobs)		7,011	6,882	15,395	17,314	16,261	15,366
By resource sector - CO2 (jobs)		53.1	5,823	3,018	974	1,978	3,799
By resource sector - Coal (jobs)		4,620	1,584	1,162	1,004	900	796
By resource sector - Grid (jobs)		24,329	31,296	49,021	61,863	71,240	83,397
By resource sector - Natural Gas (jobs)		10,687	8,662	7,320	7,749	4,221	3,147
By resource sector - Nuclear (jobs)		6,266	5,516	3,870	2,680	1,368	0
By resource sector - Oil (jobs)		11,530	9,557	7,423	5,282	3,774	2,521
By resource sector - Solar (jobs)		9,777	10,623	18,308	23,642	20,303	23,475
By resource sector - Wind (jobs)		16,180	31,897	45,408	54,826	60,402	71,532
Median wages - Annual - All ($2019 per job)		64,977	66,411	67,018	68,533	70,362	71,320
On-Site or In-Plant Training - Total jobs - 1 to 4 years (jobs)		14,200	17,888	23,892	27,925	28,977	32,936
On-Site or In-Plant Training - Total jobs - 4 to 10 years (jobs)		5,518	7,215	9,578	11,448	12,172	13,775
On-Site or In-Plant Training - Total jobs - None (jobs)		14,546	18,152	24,767	28,922	29,763	33,601
On-Site or In-Plant Training - Total jobs - Over 10 years (jobs)		732	953	1,277	1,501	1,573	1,799
On-Site or In-Plant Training - Total jobs - Up to 1 year (jobs)		55,458	67,632	91,410	105,538	107,963	121,924
On-the-Job Training - All sectors - 1 to 4 years (jobs)		18,106	22,978	30,637	35,933	37,435	42,598
On-the-Job Training - All sectors - 4 to 10 years (jobs)		5,281	6,999	9,347	11,254	12,014	13,607
On-the-Job Training - All sectors - None (jobs)		4,926	6,033	8,107	9,440	9,734	10,961
On-the-Job Training - All sectors - Over 10 years (jobs)		879	1,109	1,459	1,659	1,669	1,899
On-the-Job Training - All sectors - Up to 1 year (jobs)		61,261	74,721	101,374	117,048	119,594	134,970
Related work experience - All sectors - 1 to 4 years (jobs)		32,202	39,725	53,657	62,656	64,815	73,283
Related work experience - All sectors - 4 to 10 years (jobs)		20,469	25,716	34,424	40,324	42,009	47,740
Related work experience - All sectors - None (jobs)		13,011	16,120	21,780	25,262	25,904	29,229
Related work experience - All sectors - Over 10 years (jobs)		5,658	7,001	9,294	10,723	11,039	12,597
Related work experience - All sectors - Up to 1 year (jobs)		19,114	23,279	31,769	36,369	36,680	41,185
Wage income - All (million $2019)		5,878	7,428	10,115	12,017	12,698	14,553

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)		40,922	44,666				
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 (%)	0.751	6.2	9.31	19.3	41.6	67.6	82.4
Sales of space heating units - Electric Resistance (%)	2.86	3.43	3.64	4.33	6.04	8.25	9.53
Sales of space heating units - Fossil (%)	0	2.4	2.27	1.73	0.88	0.287	0.075
Sales of space heating units - Gas Furnace (%)	96.4	88	84.8	74.6	51.5	23.8	7.97
Sales of water heating units - Electric Heat Pump (%)	0.271	1.04	2.99	9.2	22.7	38.2	46.9
Sales of water heating units - Electric Resistance (%)	2.65	3.78	5.32	10.5	22.3	36.6	44.8
Sales of water heating units - Gas Furnace (%)	96.9	95	91.5	80.1	54.8	25	8.1
Sales of water heating units - Other (%)	0.154	0.185	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)		5.41	5.46	7.27	7.54	10.4	11

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	441	434	424	414	399	379	356
Final energy use - Industry (PJ)	634	660	674	680	693	701	708
Final energy use - Residential (PJ)	591	552	524	495	458	408	352
Final energy use - Transportation (PJ)	1,044	984	908	847	798	740	672

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)		10.7	14.3				
Sales of cooking units - Electric Resistance (%)	50.6	51.9	56.4	68.3	84.9	95.1	98.7
Sales of cooking units - Gas (%)	49.4	48.1	43.6	31.7	15.1	4.87	1.31
Sales of space heating units - Electric Heat Pump (%)	3.5	8.23	11.6	22.2	45.5	72.3	87.2
Sales of space heating units - Electric Resistance (%)	12.7	18.7	18.1	16.4	12.5	8.16	5.9
Sales of space heating units - Fossil (%)	2.45	4.6	4.47	3.97	2.93	1.72	1.01
Sales of space heating units - Gas (%)	81.4	68.5	65.9	57.4	39	17.8	5.87
Sales of water heating units - Electric Heat Pump (%)	0	0.582	2.2	7.34	18.4	30.9	37.9
Sales of water heating units - Electric Resistance (%)	22.7	38.3	38.8	40.9	46.2	52.8	56.7
Sales of water heating units - Gas Furnace (%)	77.3	61	58.9	51.7	35.3	16.1	5.22
Sales of water heating units - Other (%)	0.046	0.112	0.113	0.113	0.113	0.113	0.112

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	333	687	2,331	7,297	10,644
Public EV charging plugs - DC Fast (1000 units)	0.299		1.05		5.19		14.3
Public EV charging plugs - L2 (1000 units)	1.41		25.2		125		345
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 (%)	1.41	1.85	2.03	1.61	1.02	0.519	0.223
Vehicle sales - Light-duty - EV (%)	2.06	5.07	12.6	27.1	49.7	72.9	87.9
Vehicle sales - Light-duty - gasoline (%)	91.2	86.7	78.4	65.1	44.7	23.9	10.6
Vehicle sales - Light-duty - hybrid (%)	5.1	5.88	6.55	5.89	4.34	2.52	1.21
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.376	0.317	0.239	0.168	0.092	0.043
Vehicle sales - Light-duty - other (%)	0.096	0.1	0.09	0.078	0.056	0.03	0.014
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)							-3,836
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-17,544
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-428
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-21,808
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-3,836
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-9,245
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-214
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-13,295
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							1,734
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							7,209
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							779

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)							9,721
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							1,734
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							3,799
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							389
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							5,922

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)							-95.6
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-21,662
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-2,692
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-2,426
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-108
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-1,364
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-3,477
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,430
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-4,831
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-1,239
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-47.9
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-6,654
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-449
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-932
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-55.1
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-455
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-1,217
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,715
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-366
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-418
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-71.7

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)							-14,157
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-1,570
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-1,679
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-80.8
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-909
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-2,347
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,073
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,599
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-828
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							15.6
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							364
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							1,237
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							39.9
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)							330
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							359
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							137
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							411
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							2,894
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							7.82
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							342
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							474
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							20
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)							174
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							180
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							23.8
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							248
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,469
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							11.7
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							353
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							855
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							30
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)							252
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							269
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							172
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							500
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							2,444

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		961	0.815	0.792	0.688	0.483	0.033
Monetary damages from air pollution - Natural Gas (million 2019$)		440	300	127	55.5	18.5	13.4
Monetary damages from air pollution - Transportation (million 2019$)		4,985	5,062	4,958	4,497	3,605	2,497
Premature deaths from air pollution - Coal (deaths)		109	0.092	0.089	0.078	0.055	0.004
Premature deaths from air pollution - Natural Gas (deaths)		49.7	33.9	14.4	6.27	2.09	1.52
Premature deaths from air pollution - Transportation (deaths)		561	569	558	506	405	281

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)		40,927	44,680				
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 (%)	0.751	8.27	35.3	81	89	89.5	89.5
Sales of space heating units - Electric Resistance (%)	2.86	3.5	5.34	9.38	10.1	10.2	10.2
Sales of space heating units - Fossil (%)	0	2.07	0.402	0.017	0	0	0
Sales of space heating units - Gas Furnace (%)	96.4	86.2	59	9.63	0.906	0.363	0.363
Sales of water heating units - Electric Heat Pump (%)	0.271	2.48	19.4	46.1	50.7	51	51
Sales of water heating units - Electric Resistance (%)	2.65	4.62	18.3	44	48.5	48.8	48.8
Sales of water heating units - Gas Furnace (%)	96.9	92.7	62.2	9.74	0.572	0	0
Sales of water heating units - Other (%)	0.154	0.185	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)		6.63	6.83	11.6	12.4	12.3	13

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	441	434	415	383	346	319	305
Final energy use - Industry (PJ)	634	660	671	671	678	686	694
Final energy use - Residential (PJ)	591	551	512	443	367	307	269
Final energy use - Transportation (PJ)	1,043	977	873	748	634	562	530

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)		10.8	14.4				
Sales of cooking units - Electric Resistance (%)	50.8	61.3	93.4	99.7	100	100	100
Sales of cooking units - Gas (%)	49.2	38.7	6.63	0.334	0	0	0
Sales of space heating units - Electric Heat Pump (%)	3.5	10.7	39.6	85.8	93.9	94.4	94.2
Sales of space heating units - Electric Resistance (%)	12.7	18.4	13.8	6.17	4.76	4.69	4.9
Sales of space heating units - Fossil (%)	2.45	4.48	3.17	1.07	0.718	0.695	0.671
Sales of space heating units - Gas (%)	81.4	66.5	43.4	6.93	0.605	0.212	0.217
Sales of water heating units - Electric Heat Pump (%)	0	1.85	15.9	37.3	41	41.2	41.2
Sales of water heating units - Electric Resistance (%)	22.7	38.5	43.9	56.3	58.6	58.7	58.6
Sales of water heating units - Gas Furnace (%)	77.3	59.6	40	6.28	0.367	0	0
Sales of water heating units - Other (%)	0.046	0.112	0.113	0.113	0.111	0.111	0.112

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)		2,022	5,214	8,399	12,743	13,847	13,214
Public EV charging plugs - DC Fast (1000 units)	0.299		3.24		13.9		22.4
Public EV charging plugs - L2 (1000 units)	1.41		78		334		539
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 (%)	1.4	1.68	1.2	0.382	0.072	0.013	0
Vehicle sales - Light-duty - EV (%)	4.42	16.7	48.8	82.7	96.4	99.3	100
Vehicle sales - Light-duty - gasoline (%)	89.1	76.3	46.4	15.6	3.17	0.586	0
Vehicle sales - Light-duty - hybrid (%)	4.91	4.9	3.38	1.24	0.304	0.067	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.11	0.331	0.191	0.059	0.012	0.002	0
Vehicle sales - Light-duty - other (%)	0.095	0.091	0.058	0.02	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)		1.93	6.22	10.7	7.78	9.39	13.6
Capital invested - Wind - Base (billion $2018)		10.5	29.9	38.8	42.7	38.7	18.6
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)	351	2,039	8,122	19,441	28,204	39,411	56,645
Installed renewables - Solar - Constrained land use assumptions (MW)	703	5,675	16,203	38,526	55,356	78,259	116,840
Installed renewables - Wind - Base land use assumptions (MW)	6,208	13,339	35,822	67,091	103,262	137,735	155,340
Installed renewables - Wind - Constrained land use assumptions (MW)	12,649	17,364	27,274	39,079	39,468	39,539	281,714

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)	650	3,335	12,940	30,355	44,122	61,587	88,304
Solar - Constrained land use assumptions (GWh)	1,300	9,037	25,367	59,858	85,959	121,832	181,695
Wind - Base land use assumptions (GWh)	22,788	45,757	118,224	217,032	329,845	434,349	485,306
Wind - Constrained land use assumptions (GWh)	46,350	61,148	92,321	127,299	128,372	128,572	889,474

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)							-3,836
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-17,544
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-428
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-21,808
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-3,836
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-9,245
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-214
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-13,295
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							1,734
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							7,209
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							779
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							9,721
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							1,734
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							3,799
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							389
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							5,922

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)							-95.6
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-21,662
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-2,692
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-2,426
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-108
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-1,364

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)							-3,477
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,430
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-4,831
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-1,239
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-47.9
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-6,654
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-449
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-932
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-55.1
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-455
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-1,217
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,715
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-366
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-418
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-71.7
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-14,157
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-1,570
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-1,679
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-80.8
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-909
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-2,347
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,073
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,599
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-828
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							15.6
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							364
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							1,237
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							39.9

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)							330
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							359
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							137
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							411
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							2,894
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							7.82
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							342
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							474
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							20
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)							174
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							180
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							23.8
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							248
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,469
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							11.7
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							353
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							855
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							30
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)							252

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)							269
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							172
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							500
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							2,444

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		961	0.815	0.792	0.688	0.483	0.033
Monetary damages from air pollution - Natural Gas (million 2019$)		432	286	165	110	39.2	10.8
Monetary damages from air pollution - Transportation (million 2019$)		4,899	4,586	3,504	2,047	963	413
Premature deaths from air pollution - Coal (deaths)		109	0.092	0.089	0.078	0.055	0.004
Premature deaths from air pollution - Natural Gas (deaths)		48.7	32.3	18.6	12.5	4.43	1.22
Premature deaths from air pollution - Transportation (deaths)		551	516	394	230	108	46.5

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)		40,927	44,680				
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 (%)	0.751	8.27	35.3	81	89	89.5	89.5
Sales of space heating units - Electric Resistance (%)	2.86	3.5	5.34	9.38	10.1	10.2	10.2
Sales of space heating units - Fossil (%)	0	2.07	0.402	0.017	0	0	0
Sales of space heating units - Gas Furnace (%)	96.4	86.2	59	9.63	0.906	0.363	0.363
Sales of water heating units - Electric Heat Pump (%)	0.271	2.48	19.4	46.1	50.7	51	51
Sales of water heating units - Electric Resistance (%)	2.65	4.62	18.3	44	48.5	48.8	48.8
Sales of water heating units - Gas Furnace (%)	96.9	92.7	62.2	9.74	0.572	0	0
Sales of water heating units - Other (%)	0.154	0.185	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)		6.63	6.83	11.6	12.4	12.3	13

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	441	434	415	383	346	319	305

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Industry (PJ)	634	660	671	671	678	686	694
Final energy use - Residential (PJ)	591	551	512	443	367	307	269
Final energy use - Transportation (PJ)	1,043	977	873	748	634	562	530

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)		10.8	14.4				
Sales of cooking units - Electric Resistance (%)	50.8	61.3	93.4	99.7	100	100	100
Sales of cooking units - Gas (%)	49.2	38.7	6.63	0.334	0	0	0
Sales of space heating units - Electric Heat Pump (%)	3.5	10.7	39.6	85.8	93.9	94.4	94.2
Sales of space heating units - Electric Resistance (%)	12.7	18.4	13.8	6.17	4.76	4.69	4.9
Sales of space heating units - Fossil (%)	2.45	4.48	3.17	1.07	0.718	0.695	0.671
Sales of space heating units - Gas (%)	81.4	66.5	43.4	6.93	0.605	0.212	0.217
Sales of water heating units - Electric Heat Pump (%)	0	1.85	15.9	37.3	41	41.2	41.2
Sales of water heating units - Electric Resistance (%)	22.7	38.5	43.9	56.3	58.6	58.7	58.6
Sales of water heating units - Gas Furnace (%)	77.3	59.6	40	6.28	0.367	0	0
Sales of water heating units - Other (%)	0.046	0.112	0.113	0.113	0.111	0.111	0.112

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)		2,022	5,214	8,399	12,743	13,847	13,214
Public EV charging plugs - DC Fast (1000 units)	0.299		3.24		13.9		22.4
Public EV charging plugs - L2 (1000 units)	1.41		78		334		539
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 (%)	1.4	1.68	1.2	0.382	0.072	0.013	0
Vehicle sales - Light-duty - EV (%)	4.42	16.7	48.8	82.7	96.4	99.3	100
Vehicle sales - Light-duty - gasoline (%)	89.1	76.3	46.4	15.6	3.17	0.586	0
Vehicle sales - Light-duty - hybrid (%)	4.91	4.9	3.38	1.24	0.304	0.067	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.11	0.331	0.191	0.059	0.012	0.002	0
Vehicle sales - Light-duty - other (%)	0.095	0.091	0.058	0.02	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)		2.75	6.89	3.69	4.13	1.86	0
Capital invested - Solar PV - Constrained (billion $2018)		2.5	5.3	4.21	4.26	1.14	0
Capital invested - Wind - Base (billion $2018)		7.65	9.8	0	7.4	12.2	24
Capital invested - Wind - Constrained (billion $2018)		3.22	3.5	0.04	1.89	2.27	4.57
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)	351	2,759	9,498	13,413	18,070	20,294	20,294
Installed renewables - Solar - Constrained land use assumptions (MW)	351	2,534	7,720	12,186	16,990	18,354	18,354
Installed renewables - Wind - Base land use assumptions (MW)	6,208	11,406	18,764	18,764	25,026	35,897	58,554
Installed renewables - Wind - Constrained land use assumptions (MW)	6,208	8,399	11,028	11,060	12,661	14,688	19,009

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)	650	4,484	15,207	21,416	28,778	32,247	32,247
Solar - Constrained land use assumptions (GWh)	650	4,120	12,364	19,414	27,032	29,170	29,170
Wind - Base land use assumptions (GWh)	22,788	39,611	63,820	63,820	83,778	118,245	190,130
Wind - Constrained land use assumptions (GWh)	22,788	29,699	38,214	38,321	43,298	49,489	62,135

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)							-3,836
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-17,544
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-428
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-21,808
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-3,836
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-9,245
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-214
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-13,295

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)							1,734
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							7,209
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							779
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							9,721
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							1,734
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							3,799
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							389
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							5,922

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)							-95.6
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-21,662
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-2,692
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-2,426
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-108
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-1,364
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-3,477
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,430
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-4,831
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-1,239
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-47.9
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-6,654
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-449
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-932
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-55.1
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-455
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-1,217

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)							-2,715
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-366
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-418
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-71.7
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-14,157
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-1,570
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-1,679
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-80.8
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-909
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-2,347
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,073
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,599
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-828
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							15.6
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							364
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							1,237
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							39.9
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)							330
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							359
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							137
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							411
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							2,894
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							7.82
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							342

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)							474
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							20
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)							174
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							180
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							23.8
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							248
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,469
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							11.7
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							353
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							855
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							30
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)							252
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							269
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							172
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							500
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							2,444

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		961	0.815	0.792	0.688	0.483	0.033
Monetary damages from air pollution - Natural Gas (million 2019$)		369	199	317	227	91	29.4
Monetary damages from air pollution - Transportation (million 2019$)		4,899	4,586	3,504	2,047	963	413
Premature deaths from air pollution - Coal (deaths)		109	0.092	0.089	0.078	0.055	0.004

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

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Natural Gas (deaths)		41.6	22.4	35.8	25.6	10.3	3.32
Premature deaths from air pollution - Transportation (deaths)		551	516	394	230	108	46.5

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)		40,922	44,666				
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 (%)	0.751	6.2	9.31	19.3	41.6	67.6	82.4
Sales of space heating units - Electric Resistance (%)	2.86	3.43	3.64	4.33	6.04	8.25	9.53
Sales of space heating units - Fossil (%)	0	2.4	2.27	1.73	0.88	0.287	0.075
Sales of space heating units - Gas Furnace (%)	96.4	88	84.8	74.6	51.5	23.8	7.97
Sales of water heating units - Electric Heat Pump (%)	0.271	1.04	2.99	9.2	22.7	38.2	46.9
Sales of water heating units - Electric Resistance (%)	2.65	3.78	5.32	10.5	22.3	36.6	44.8
Sales of water heating units - Gas Furnace (%)	96.9	95	91.5	80.1	54.8	25	8.1
Sales of water heating units - Other (%)	0.154	0.185	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)		5.41	5.46	7.27	7.54	10.4	11

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	441	434	424	414	399	379	356
Final energy use - Industry (PJ)	634	660	674	680	693	701	708
Final energy use - Residential (PJ)	591	552	524	495	458	408	352
Final energy use - Transportation (PJ)	1,044	984	908	847	798	740	672

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)		10.7	14.3				
Sales of cooking units - Electric Resistance (%)	50.6	51.9	56.4	68.3	84.9	95.1	98.7
Sales of cooking units - Gas (%)	49.4	48.1	43.6	31.7	15.1	4.87	1.31
Sales of space heating units - Electric Heat Pump (%)	3.5	8.23	11.6	22.2	45.5	72.3	87.2
Sales of space heating units - Electric Resistance (%)	12.7	18.7	18.1	16.4	12.5	8.16	5.9
Sales of space heating units - Fossil (%)	2.45	4.6	4.47	3.97	2.93	1.72	1.01
Sales of space heating units - Gas (%)	81.4	68.5	65.9	57.4	39	17.8	5.87
Sales of water heating units - Electric Heat Pump (%)	0	0.582	2.2	7.34	18.4	30.9	37.9
Sales of water heating units - Electric Resistance (%)	22.7	38.3	38.8	40.9	46.2	52.8	56.7

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 (%)	77.3	61	58.9	51.7	35.3	16.1	5.22
Sales of water heating units - Other (%)	0.046	0.112	0.113	0.113	0.113	0.113	0.112

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	333	687	2,331	7,297	10,644
Public EV charging plugs - DC Fast (1000 units)	0.299		1.05		5.19		14.3
Public EV charging plugs - L2 (1000 units)	1.41		25.2		125		345
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 (%)	1.41	1.85	2.03	1.61	1.02	0.519	0.223
Vehicle sales - Light-duty - EV (%)	2.06	5.07	12.6	27.1	49.7	72.9	87.9
Vehicle sales - Light-duty - gasoline (%)	91.2	86.7	78.4	65.1	44.7	23.9	10.6
Vehicle sales - Light-duty - hybrid (%)	5.1	5.88	6.55	5.89	4.34	2.52	1.21
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.376	0.317	0.239	0.168	0.092	0.043
Vehicle sales - Light-duty - other (%)	0.096	0.1	0.09	0.078	0.056	0.03	0.014
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	0.075	0	0	0
Capital invested - Biomass w/ccu power plant (billion $2018)	0	0	1.9	1.4	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	74.6	74.6	74.6	74.6
Biomass w/ccu power plant (GWh)	0	0	2,136	3,710	3,710	3,710	3,710

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

Item	2020	2025	2030	2035	2040	2045	2050
Biomass purchases (million $2018/year)		0	151	6,164	10,720	10,720	10,720
Conversion capital investment - Cumulative 5-yr (million $2018)		0	1,746	60,802	45,876	0	0
Number of facilities - Allam power w ccu (quantity)	0	0	0	2	2	2	2

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	70	124	124	124
Number of facilities - Diesel (quantity)	0	0	0	0	0	0	0
Number of facilities - Diesel ccu (quantity)	0	0	0	2	2	2	2
Number of facilities - Power (quantity)	0	0	0	0	0	0	0
Number of facilities - Power ccu (quantity)	0	0	2	4	4	4	4
Number of facilities - Pyrolysis (quantity)	0	0	0	0	0	0	0
Number of facilities - Pyrolysis ccu (quantity)	0	0	0	2	2	2	2
Number of facilities - Sng (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng ccu (quantity)	0	0	2	2	2	2	2

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	2.13	83.5	142	142	143
Annual - BECCS (MMT)		0	2.12	80	139	139	139
Annual - Cement and lime (MMT)		0	0	3.35	3.32	3.42	3.53
Annual - NGCC (MMT)		0	0.01	0.09	0.11	0.08	0.03
Cumulative - All (MMT)		0	2.13	85.6	228	371	513
Cumulative - BECCS (MMT)		0	2.12	82.2	221	360	499
Cumulative - Cement and lime (MMT)		0	0	3.35	6.67	10.1	13.6
Cumulative - NGCC (MMT)		0	0.01	0.1	0.21	0.29	0.32

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

Item	2020	2025	2030	2035	2040	2045	2050
All (km)		0	1,311	5,604	8,760	8,881	8,894
Cumulative investment - All (million $2018)		0	6,509	13,041	20,368	21,553	21,678
Cumulative investment - Spur (million $2018)		0	240	4,152	6,968	8,152	8,277
Cumulative investment - Trunk (million $2018)		0	6,269	8,888	13,401	13,401	13,401
Spur (km)		0	354	4,280	6,716	6,837	6,849
Trunk (km)		0	958	1,324	2,045	2,045	2,045

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

Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (MMT)		0	2.77	13.9	27.3	38.4	40.1
Injection wells (wells)		0	7	26	46	78	96
Resource characterization, appraisal, permitting costs (million $2020)		100	441	682	682	682	682
Wells and facilities construction costs (million $2020)		0	200	781	1,392	2,327	2,890

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)							-4,993
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-15,905
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)							-387
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-21,285
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-4,993
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-8,380
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)							-193
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-13,567
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							2,460
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							16,127
Land impacted for carbon sink - Aggressive deployment - Cropland to woody energy crops (1000 hectares)							822
Land impacted for carbon sink - Aggressive deployment - Pasture to energy crops (1000 hectares)							113
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							703
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							20,227
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							2,460
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							3,442
Land impacted for carbon sink - Moderate deployment - Cropland to woody energy crops (1000 hectares)							822
Land impacted for carbon sink - Moderate deployment - Pasture to energy crops (1000 hectares)							113
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							352
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							7,189

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)							-95.6
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-21,662
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-2,692
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-2,426
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-108
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-1,364
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-3,477
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,430
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-4,831
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-1,239
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-47.9
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-6,654
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-449
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-932
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-55.1
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-455
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-1,217
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,715
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-366
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-418
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-71.7
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-14,157
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-1,570
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-1,679
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-80.8
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-909
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-2,347
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,073
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,599
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-828

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)							15.6
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							364
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							1,237
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							39.9
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)							330
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							359
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							137
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							411
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							2,894
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							7.82
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							342
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							474
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							20
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)							174
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							180
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							23.8
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							248
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,469
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							11.7

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)							353
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							855
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							30
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)							252
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							269
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							172
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							500
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							2,444

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		961	0.815	0.792	0.688	0.483	0.033
Monetary damages from air pollution - Natural Gas (million 2019$)		461	269	163	105	52.6	17.4
Monetary damages from air pollution - Transportation (million 2019$)		4,985	5,062	4,958	4,497	3,605	2,497
Premature deaths from air pollution - Coal (deaths)		109	0.092	0.089	0.078	0.055	0.004
Premature deaths from air pollution - Natural Gas (deaths)		52	30.4	18.4	11.8	5.93	1.97
Premature deaths from air pollution - Transportation (deaths)		561	569	558	506	405	281

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)		40,483	41,990				
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 (%)	0.751	12.5	44.7	71.1	75.5	75.9	75.9
Sales of space heating units - Electric Resistance (%)	2.86	4.31	8.93	17.1	22.7	23.6	23.7
Sales of space heating units - Fossil (%)	0	2.21	1.15	0.205	0.023	0	0
Sales of space heating units - Gas Furnace (%)	96.4	81	45.2	11.6	1.78	0.443	0.362
Sales of water heating units - Electric Heat Pump (%)	0.271	0.342	0.346	0.345	0.34	0.342	0.342
Sales of water heating units - Electric Resistance (%)	2.65	3.2	3.17	3.18	3.17	3.15	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 (%)	96.9	96.3	96.3	96.3	96.3	96.3	96.3
Sales of water heating units - Other (%)	0.154	0.185	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)		5.74	5.83	7.97	8.31	10.3	10.9

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	441	441	437	426	415	414	426
Final energy use - Industry (PJ)	634	673	695	715	742	766	795
Final energy use - Residential (PJ)	591	553	532	516	507	501	496
Final energy use - Transportation (PJ)	1,044	993	935	904	914	947	988

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)		10.3	11.1				
Sales of cooking units - Electric Resistance (%)	50.2	50.2	50.2	50.2	50.2	50.2	50.2
Sales of cooking units - Gas (%)	49.8	49.8	49.8	49.8	49.8	49.8	49.8
Sales of space heating units - Electric Heat Pump (%)	2.39	12.9	13.5	14.3	15	15.6	16.5
Sales of space heating units - Electric Resistance (%)	12.9	17.8	17.6	17.4	16.8	16	15.2
Sales of space heating units - Fossil (%)	2.6	4.13	4.15	4.15	4.16	4.19	4.17
Sales of space heating units - Gas (%)	82.1	65.2	64.8	64.2	64.1	64.2	64
Sales of water heating units - Electric Heat Pump (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Resistance (%)	22.7	38.1	37.9	37.8	37.8	37.7	37.7
Sales of water heating units - Gas Furnace (%)	77.3	61.8	62	62.1	62.1	62.2	62.2
Sales of water heating units - Other (%)	0.046	0.112	0.113	0.113	0.113	0.114	0.114

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 (%)	1.4	1.84	2.16	2.01	1.81	1.68	1.6
Vehicle sales - Light-duty - EV (%)	4.06	6.24	7.06	8.71	10.6	12.1	13.3
Vehicle sales - Light-duty - gasoline (%)	89.4	85.7	83.3	81.3	79.2	77.2	75.7
Vehicle sales - Light-duty - hybrid (%)	4.93	5.75	7	7.56	8.09	8.59	8.95
Vehicle sales - Light-duty - hydrogen FC (%)	0.11	0.371	0.337	0.297	0.293	0.293	0.303
Vehicle sales - Light-duty - other (%)	0.095	0.099	0.095	0.096	0.095	0.094	0.096
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)							-95.6
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-21,662
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-2,692
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-2,426
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-108
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-1,364
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-3,477
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,430
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-4,831
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-1,239
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-47.9
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-6,654
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-449
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-932
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-55.1
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-455
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-1,217
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,715
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-366
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-418
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-71.7
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-14,157
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-1,570
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-1,679
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-80.8
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-909

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)							-2,347
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,073
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,599
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-828
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							15.6
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							364
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							1,237
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							39.9
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)							330
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							359
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							137
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							411
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							2,894
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							7.82
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							342
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							474
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							20
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)							174
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							180
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							23.8
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							248

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,469
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							11.7
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							353
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							855
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							30
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)							252
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							269
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							172
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							500
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							2,444

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)	-11.1		-4.33				-3.87
Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y)	-0.371		-0.667				-0.694
Business-as-usual carbon sink - Total (Mt CO2e/y)	-11.5		-5				-4.57

Table 66: *REF scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		3,823	2,373	1,653	1,334	1,212	1,193
Monetary damages from air pollution - Natural Gas (million 2019$)		410	476	592	594	630	563
Monetary damages from air pollution - Transportation (million 2019$)		4,980	5,129	5,287	5,472	5,655	5,836
Premature deaths from air pollution - Coal (deaths)		432	268	187	151	137	135
Premature deaths from air pollution - Natural Gas (deaths)		46.3	53.8	66.9	67	71.1	63.5
Premature deaths from air pollution - Transportation (deaths)		560	577	595	615	636	656