Net-Zero America - nevada state report

2021-03-15

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

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Notes

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

Data by category and subcategory

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

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		7,465	8,314				
Sales of cooking units - Electric Resistance (%)	41.9	54.6	83	88.6	88.9	88.9	88.9
Sales of cooking units - Gas (%)	58.1	45.4	17	11.4	11.1	11.1	11.1
Sales of space heating units - Electric Heat Pump (%)	3.34	20.2	63.4	88.9	92.5	92.6	92.7
Sales of space heating units - Electric Resistance (%)	3.3	3.45	4.17	6.37	6.82	6.85	6.84
Sales of space heating units - Fossil (%)	0.985	0.209	0.04	0.002	0	0	0
Sales of space heating units - Gas Furnace (%)	92.4	76.1	32.4	4.78	0.723	0.51	0.507
Sales of water heating units - Electric Heat Pump (%)	0.03	8.12	45.4	61.3	63.2	63.3	63.3
Sales of water heating units - Electric Resistance (%)	1.46	5.07	23	34.6	36.2	36.3	36.3
Sales of water heating units - Gas Furnace (%)	98.1	86.4	31.1	3.68	0.19	0	0
Sales of water heating units - Other (%)	0.365	0.384	0.383	0.384	0.383	0.384	0.383

Table 2: *E+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand*

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested - Cumulative 5-yr (billion $2018)		2.23	2.35	3.09	3.28	3.08	3.22

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	89.2	89	85.7	80.3	75.1	72.2	71.6
Final energy use - Industry (PJ)	73.7	73.6	72.2	72.9	75.5	77.3	79.1
Final energy use - Residential (PJ)	94.5	92.3	87.6	79.2	71.6	67.4	65.8
Final energy use - Transportation (PJ)	291	274	249	218	190	171	162

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)		3.41	4.55				
Sales of cooking units - Electric Resistance (%)	66.4	73.5	95.5	99.8	100	100	100
Sales of cooking units - Gas (%)	33.6	26.5	4.53	0.228	0	0	0
Sales of space heating units - Electric Heat Pump (%)	9.66	27.4	68.8	88.9	91.4	91.5	91.4
Sales of space heating units - Electric Resistance (%)	13.5	20.2	10.8	6.22	5.65	5.68	5.75
Sales of space heating units - Fossil (%)	2.25	3.38	1.94	1.18	1.02	0.999	1.02
Sales of space heating units - Gas (%)	74.6	49	18.5	3.73	1.9	1.81	1.81
Sales of water heating units - Electric Heat Pump (%)	0	8.43	46.6	60.9	62.4	62.5	62.5
Sales of water heating units - Electric Resistance (%)	23.2	37.5	32.8	35.1	35.7	35.8	35.8
Sales of water heating units - Gas Furnace (%)	75.1	52.3	18.8	2.22	0.114	0	0
Sales of water heating units - Other (%)	1.72	1.82	1.81	1.8	1.78	1.78	1.78

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)		477	1,240	1,983	3,014	3,269	3,123
Public EV charging plugs - DC Fast (1000 units)	0.256		0.746		3.11		4.99
Public EV charging plugs - L2 (1000 units)	0.619		17.9		74.7		120
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 (%)	1.44	1.72	1.21	0.387	0.073	0.013	0
Vehicle sales - Light-duty - EV (%)	4.28	16.3	48.1	82.5	96.4	99.3	100
Vehicle sales - Light-duty - gasoline (%)	89.3	76.8	47.1	15.8	3.2	0.587	0
Vehicle sales - Light-duty - hybrid (%)	4.77	4.8	3.33	1.22	0.301	0.066	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.11	0.333	0.194	0.06	0.012	0.002	0
Vehicle sales - Light-duty - other (%)	0.097	0.093	0.059	0.021	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	9.55	6.1	4.81	4.06
Capital invested - Solar PV - Constrained (billion $2018)		3.93	0	4.62	3.7	2.12	1.58
Capital invested - Wind - Base (billion $2018)		0.755	3.61	4.44	2.11	0.898	2.84
Capital invested - Wind - Constrained (billion $2018)		0.262	1.01	0.429	0.94	0.089	0.787
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)	675	1,040	1,389	1,810	2,310	2,893	3,583
Installed renewables - Solar - Base land use assumptions (MW)	5,422	5,422	5,422	15,563	22,435	28,170	33,300
Installed renewables - Solar - Constrained land use assumptions (MW)	5,272	5,272	5,272	7,109	9,380	10,984	15,428
Installed renewables - Wind - Base land use assumptions (MW)	822	1,335	4,050	7,632	9,418	10,219	12,897
Installed renewables - Wind - Constrained land use assumptions (MW)	222	437	1,128	1,610	2,374	2,417	3,217

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)	13,021	13,021	13,021	34,562	49,077	61,165	71,940
Solar - Constrained land use assumptions (GWh)	12,657	12,657	12,657	16,469	20,892	24,040	32,842
Wind - Base land use assumptions (GWh)	2,421	3,919	11,540	21,442	26,325	28,482	35,708
Wind - Constrained land use assumptions (GWh)	657	1,195	2,853	3,945	5,397	5,474	7,205

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	0	0
Conversion capital investment - Cumulative 5-yr (million $2018)		0	0	0	0	0	0
Number of facilities - Allam power w ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Beccs hydrogen (quantity)	0	0	0	0	0	0	0
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	0
Number of facilities - Pyrolysis ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng ccu (quantity)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0.01	0.03	0.05	0.04	0.03
Annual - BECCS (MMT)		0	0	0	0	0	0
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Annual - NGCC (MMT)		0	0.01	0.03	0.05	0.04	0.03
Cumulative - All (MMT)		0	0.01	0.04	0.09	0.13	0.16
Cumulative - BECCS (MMT)		0	0	0	0	0	0
Cumulative - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - NGCC (MMT)		0	0.01	0.04	0.09	0.13	0.16

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

Item	2020	2025	2030	2035	2040	2045	2050
All (km)		0	51.1	102	102	102	102
Cumulative investment - All (million $2018)		0	26.6	53.3	53.4	53.4	53.3
Cumulative investment - Spur (million $2018)		0	26.6	53.3	53.4	53.4	53.3
Cumulative investment - Trunk (million $2018)		0	0	0	0	0	0
Spur (km)		0	51.1	102	102	102	102
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)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-227
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-1.61
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-229
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-114
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-0.807
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-115
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							319
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							2.48
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							322
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							160
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							1.24
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							162

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)							-1,579
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-10,254
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-691
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-4,703
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-2.49
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4.57
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-186
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-593
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,495
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-791
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-3,666
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-115
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-1,806
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-1.27
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1.52
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-65.1
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-44.9
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-841
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-1,185
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-6,960
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-403
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-3,254
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-1.86
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-3.05
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-126
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-319
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-1,668

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)							258
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							93.6
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							2,398
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							0.918
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)							17.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							16.8
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							827
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							3,612
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							129
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							87.9
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							919
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							0.459
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)							9.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							2.92
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							500
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,649
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							194

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)							90.7
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							1,658
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							0.69
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)							13.5
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							21.1
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,008
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							2,986

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

Item	2020	2025	2030	2035	2040	2045	2050
Natural gas consumption - Annual (tcf)		232	196	157	118	74.3	51.5
Natural gas consumption - Cumulative (tcf)							4,725
Natural gas production - Annual (tcf)		0.004	0.003	0.003	0.003	0.002	0.002
Oil consumption - Annual (million bbls)		44.9	38.5	29.3	20.6	13.8	8.32
Oil consumption - Cumulative (million bbls)							906
Oil production - Annual (million bbls)		0.33	0.332	0.331	0.262	0.213	0.142

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		49.7	0.067	0.067	0.044	0.027	0
Monetary damages from air pollution - Natural Gas (million 2019$)		40.7	21.6	18.5	17.4	11.7	4.81
Monetary damages from air pollution - Transportation (million 2019$)		473	466	372	224	105	40.3
Premature deaths from air pollution - Coal (deaths)		5.62	0.008	0.008	0.005	0.003	0
Premature deaths from air pollution - Natural Gas (deaths)		4.59	2.44	2.09	1.96	1.32	0.543
Premature deaths from air pollution - Transportation (deaths)		53.2	52.4	41.8	25.2	11.8	4.54

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		4.73	9.61	3.67	2.85	2.09	1.56
By economic sector - Construction (jobs)		6,041	7,276	15,232	15,004	14,345	16,626
By economic sector - Manufacturing (jobs)		3,127	5,003	6,673	6,273	5,545	6,319
By economic sector - Mining (jobs)		1,000	705	460	278	154	81.4

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Other (jobs)		731	874	2,560	2,642	2,750	3,658
By economic sector - Pipeline (jobs)		264	236	203	156	109	61.4
By economic sector - Professional (jobs)		2,457	3,297	6,883	7,165	7,159	8,679
By economic sector - Trade (jobs)		1,734	2,077	4,320	4,514	4,619	5,832
By economic sector - Utilities (jobs)		5,031	6,499	10,552	11,485	11,333	12,433
By education level - All sectors - Associates degree or some college (jobs)		6,552	8,394	15,220	15,480	15,019	17,509
By education level - All sectors - Bachelors degree (jobs)		4,039	5,140	9,091	9,253	8,989	10,525
By education level - All sectors - Doctoral degree (jobs)		133	169	330	337	332	398
By education level - All sectors - High school diploma or less (jobs)		8,698	11,043	19,997	20,143	19,413	22,591
By education level - All sectors - Masters or professional degree (jobs)		968	1,232	2,246	2,308	2,263	2,668
By resource sector - Biomass (jobs)		20.3	26.5	10.5	8.58	7.64	6.65
By resource sector - CO2 (jobs)		0	116	233	232	231	61.2
By resource sector - Coal (jobs)		173	32.1	0	0	0	0
By resource sector - Grid (jobs)		7,640	10,855	19,010	20,735	20,480	23,582
By resource sector - Natural Gas (jobs)		2,984	2,544	2,232	2,373	2,272	1,564
By resource sector - Nuclear (jobs)		0	0.004	0.007	0	0	0
By resource sector - Oil (jobs)		2,072	1,639	1,165	767	485	276
By resource sector - Solar (jobs)		5,502	5,726	17,180	16,390	16,260	21,032
By resource sector - Wind (jobs)		1,998	5,038	7,054	7,015	6,281	7,168
Median wages - Annual - All ($2019 per job)		60,296	60,802	61,169	62,341	63,413	64,215
On-Site or In-Plant Training - Total jobs - 1 to 4 years (jobs)		3,400	4,322	7,823	7,938	7,685	8,928
On-Site or In-Plant Training - Total jobs - 4 to 10 years (jobs)		1,442	1,792	3,345	3,406	3,309	3,829
On-Site or In-Plant Training - Total jobs - None (jobs)		3,281	4,192	7,631	7,716	7,472	8,753
On-Site or In-Plant Training - Total jobs - Over 10 years (jobs)		181	232	422	432	419	485
On-Site or In-Plant Training - Total jobs - Up to 1 year (jobs)		12,085	15,439	27,663	28,029	27,131	31,695
On-the-Job Training - All sectors - 1 to 4 years (jobs)		4,393	5,582	10,115	10,274	9,951	11,548
On-the-Job Training - All sectors - 4 to 10 years (jobs)		1,427	1,775	3,353	3,417	3,324	3,851
On-the-Job Training - All sectors - None (jobs)		1,091	1,375	2,542	2,566	2,490	2,936
On-the-Job Training - All sectors - Over 10 years (jobs)		202	259	468	464	442	513
On-the-Job Training - All sectors - Up to 1 year (jobs)		13,275	16,988	30,407	30,800	29,809	34,842
Related work experience - All sectors - 1 to 4 years (jobs)		7,314	9,297	16,720	16,981	16,466	19,218
Related work experience - All sectors - 4 to 10 years (jobs)		4,774	6,077	10,924	11,095	10,750	12,504
Related work experience - All sectors - None (jobs)		2,963	3,759	6,814	6,922	6,717	7,840
Related work experience - All sectors - Over 10 years (jobs)		1,260	1,624	2,855	2,890	2,787	3,239
Related work experience - All sectors - Up to 1 year (jobs)		4,079	5,220	9,572	9,632	9,296	10,890
Wage income - All (million $2019)		1,230	1,580	2,868	2,963	2,919	3,448

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)		7,460	8,285				
Sales of cooking units - Electric Resistance (%)	41.9	46.2	50.2	60.8	75.4	84.6	87.8
Sales of cooking units - Gas (%)	58.1	53.8	49.8	39.2	24.6	15.4	12.2
Sales of space heating units - Electric Heat Pump (%)	3.34	13	18	32.6	57.8	78.9	88.5
Sales of space heating units - Electric Resistance (%)	3.3	3.43	3.51	3.82	4.64	5.8	6.5
Sales of space heating units - Fossil (%)	0.985	0.242	0.226	0.167	0.082	0.026	0.007
Sales of space heating units - Gas Furnace (%)	92.4	83.3	78.3	63.4	37.5	15.3	4.96
Sales of water heating units - Electric Heat Pump (%)	0.03	1.53	5.79	18.2	38.6	54.2	60.6
Sales of water heating units - Electric Resistance (%)	1.46	2.2	4.25	10.4	21	30.2	34.5
Sales of water heating units - Gas Furnace (%)	98.1	95.9	89.6	71	39.9	15.3	4.5
Sales of water heating units - Other (%)	0.365	0.384	0.383	0.384	0.383	0.384	0.383

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	2.09	2.43	2.55	2.99	3.14

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	89.2	89.2	88.5	87.3	84.9	81.8	79
Final energy use - Industry (PJ)	73.7	73.6	72.4	73.5	76.5	78.3	80
Final energy use - Residential (PJ)	94.5	92.7	91.9	90.1	85.9	79.9	74.4
Final energy use - Transportation (PJ)	291	276	258	242	229	214	195

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)		3.39	4.49				
Sales of cooking units - Electric Resistance (%)	66.2	67.1	70.2	78.4	89.7	96.7	99.1
Sales of cooking units - Gas (%)	33.8	32.9	29.8	21.6	10.3	3.33	0.896
Sales of space heating units - Electric Heat Pump (%)	9.66	20.3	25	38.9	62.1	80.4	88.2
Sales of space heating units - Electric Resistance (%)	13.5	21.8	20.6	17.6	12.4	8.21	6.44
Sales of space heating units - Fossil (%)	2.25	3.63	3.53	2.94	1.99	1.35	1.13
Sales of space heating units - Gas (%)	74.6	54.3	50.8	40.6	23.5	10.1	4.22
Sales of water heating units - Electric Heat Pump (%)	0	1.53	5.88	18.5	39	54	60.1
Sales of water heating units - Electric Resistance (%)	23.2	38.6	38.2	36.7	35.1	35	35.4
Sales of water heating units - Gas Furnace (%)	75.1	58	54.2	42.9	24.1	9.21	2.71
Sales of water heating units - Other (%)	1.72	1.82	1.82	1.82	1.8	1.79	1.78

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	80.1	162	553	1,721	2,514
Public EV charging plugs - DC Fast (1000 units)	0.256		0.253		1.17		3.2
Public EV charging plugs - L2 (1000 units)	0.619		6.09		28.1		76.9
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 (%)	1.45	1.88	2.04	1.61	1.02	0.524	0.225
Vehicle sales - Light-duty - EV (%)	2.01	4.96	12.4	26.8	49.4	72.7	87.8
Vehicle sales - Light-duty - gasoline (%)	91.4	86.9	78.7	65.5	45.1	24.2	10.7
Vehicle sales - Light-duty - hybrid (%)	4.96	5.74	6.41	5.78	4.28	2.5	1.2
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.377	0.32	0.242	0.17	0.094	0.044
Vehicle sales - Light-duty - other (%)	0.098	0.102	0.092	0.08	0.057	0.031	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)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-227
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-1.61
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-229
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-114
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-0.807
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-115
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							319
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							2.48

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)							322
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							160
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							1.24
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							162

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)							-1,579
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-10,254
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-691
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-4,703
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-2.49
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4.57
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-186
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-593
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,495
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-791
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-3,666
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-115
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-1,806
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-1.27
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1.52
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-65.1
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-44.9
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-841
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-1,185

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)							-6,960
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-403
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-3,254
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-1.86
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-3.05
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-126
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-319
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-1,668
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							258
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							93.6
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							2,398
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							0.918
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)							17.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							16.8
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							827
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							3,612
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							129
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							87.9
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							919
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							0.459
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)							9.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							2.92
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							500
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,649
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							194
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							90.7
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							1,658
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							0.69
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)							13.5
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							21.1
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,008
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							2,986

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		49.7	0.067	0.067	0.044	0.027	0
Monetary damages from air pollution - Natural Gas (million 2019$)		41.5	16.3	10.7	5.53	2.61	1.34
Monetary damages from air pollution - Transportation (million 2019$)		482	515	527	497	413	295
Premature deaths from air pollution - Coal (deaths)		5.62	0.008	0.008	0.005	0.003	0
Premature deaths from air pollution - Natural Gas (deaths)		4.68	1.85	1.21	0.624	0.295	0.151
Premature deaths from air pollution - Transportation (deaths)		54.2	57.9	59.3	55.9	46.5	33.1

Table 25: *E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Commercial*

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		7,465	8,314				
Sales of cooking units - Electric Resistance (%)	41.9	54.6	83	88.6	88.9	88.9	88.9
Sales of cooking units - Gas (%)	58.1	45.4	17	11.4	11.1	11.1	11.1
Sales of space heating units - Electric Heat Pump (%)	3.34	20.2	63.4	88.9	92.5	92.6	92.7
Sales of space heating units - Electric Resistance (%)	3.3	3.45	4.17	6.37	6.82	6.85	6.84
Sales of space heating units - Fossil (%)	0.985	0.209	0.04	0.002	0	0	0
Sales of space heating units - Gas Furnace (%)	92.4	76.1	32.4	4.78	0.723	0.51	0.507
Sales of water heating units - Electric Heat Pump (%)	0.03	8.12	45.4	61.3	63.2	63.3	63.3
Sales of water heating units - Electric Resistance (%)	1.46	5.07	23	34.6	36.2	36.3	36.3
Sales of water heating units - Gas Furnace (%)	98.1	86.4	31.1	3.68	0.19	0	0
Sales of water heating units - Other (%)	0.365	0.384	0.383	0.384	0.383	0.384	0.383

Table 26: *E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand*

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested - Cumulative 5-yr (billion $2018)		2.23	2.35	3.09	3.28	3.08	3.22

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	89.2	89	85.7	80.3	75.1	72.2	71.6
Final energy use - Industry (PJ)	73.7	73.6	72.2	72.9	75.5	77.3	79.1
Final energy use - Residential (PJ)	94.5	92.3	87.6	79.2	71.6	67.4	65.8
Final energy use - Transportation (PJ)	291	274	249	218	190	171	162

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)		3.41	4.55				
Sales of cooking units - Electric Resistance (%)	66.4	73.5	95.5	99.8	100	100	100
Sales of cooking units - Gas (%)	33.6	26.5	4.53	0.228	0	0	0
Sales of space heating units - Electric Heat Pump (%)	9.66	27.4	68.8	88.9	91.4	91.5	91.4
Sales of space heating units - Electric Resistance (%)	13.5	20.2	10.8	6.22	5.65	5.68	5.75
Sales of space heating units - Fossil (%)	2.25	3.38	1.94	1.18	1.02	0.999	1.02
Sales of space heating units - Gas (%)	74.6	49	18.5	3.73	1.9	1.81	1.81
Sales of water heating units - Electric Heat Pump (%)	0	8.43	46.6	60.9	62.4	62.5	62.5
Sales of water heating units - Electric Resistance (%)	23.2	37.5	32.8	35.1	35.7	35.8	35.8
Sales of water heating units - Gas Furnace (%)	75.1	52.3	18.8	2.22	0.114	0	0
Sales of water heating units - Other (%)	1.72	1.82	1.81	1.8	1.78	1.78	1.78

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)		477	1,240	1,983	3,014	3,269	3,123
Public EV charging plugs - DC Fast (1000 units)	0.256		0.746		3.11		4.99
Public EV charging plugs - L2 (1000 units)	0.619		17.9		74.7		120
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 (%)	1.44	1.72	1.21	0.387	0.073	0.013	0
Vehicle sales - Light-duty - EV (%)	4.28	16.3	48.1	82.5	96.4	99.3	100
Vehicle sales - Light-duty - gasoline (%)	89.3	76.8	47.1	15.8	3.2	0.587	0
Vehicle sales - Light-duty - hybrid (%)	4.77	4.8	3.33	1.22	0.301	0.066	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.11	0.333	0.194	0.06	0.012	0.002	0
Vehicle sales - Light-duty - other (%)	0.097	0.093	0.059	0.021	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	1.54	12.5	7.67	7.2	6.58
Capital invested - Wind - Base (billion $2018)		1.35	3.98	5.69	4.12	3.06	6.92
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)	5,422	5,422	6,930	20,186	28,824	37,420	45,733
Installed renewables - Solar - Constrained land use assumptions (MW)	10,845	10,845	13,478	18,315	25,740	36,048	49,143
Installed renewables - Wind - Base land use assumptions (MW)	822	1,738	4,729	9,316	12,802	15,530	22,067
Installed renewables - Wind - Constrained land use assumptions (MW)	444	1,582	2,500	4,836	5,608	5,812	6,809

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)	13,021	13,021	16,228	44,271	62,484	80,384	97,813
Solar - Constrained land use assumptions (GWh)	26,042	26,042	31,596	41,365	56,454	77,211	103,659
Wind - Base land use assumptions (GWh)	2,421	5,086	13,422	26,074	35,514	42,609	58,960
Wind - Constrained land use assumptions (GWh)	1,314	4,057	6,274	11,021	12,636	13,105	15,221

Table 32: *E+RE+ scenario - PILLAR 6: Land sinks - Agriculture*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-227
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-1.61
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-229
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-114
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-0.807
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-115
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							319
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							2.48
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							322
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							160
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							1.24
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							162

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)							-1,579
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-10,254
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-691
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-4,703
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-2.49
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4.57

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)							-186
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-593
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,495
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-791
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-3,666
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-115
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-1,806
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-1.27
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1.52
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-65.1
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-44.9
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-841
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-1,185
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-6,960
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-403
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-3,254
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-1.86
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-3.05
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-126
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-319
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-1,668
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							258
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							93.6
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							2,398
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							0.918

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)							17.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							16.8
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							827
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							3,612
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							129
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							87.9
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							919
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							0.459
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)							9.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							2.92
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							500
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,649
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							194
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							90.7
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							1,658
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							0.69
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)							13.5

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)							0
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							21.1
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,008
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							2,986

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		49.7	0.067	0.067	0.044	0.027	0
Monetary damages from air pollution - Natural Gas (million 2019$)		37.3	19.5	10.2	6.87	3.43	1.19
Monetary damages from air pollution - Transportation (million 2019$)		473	466	372	224	105	40.3
Premature deaths from air pollution - Coal (deaths)		5.62	0.008	0.008	0.005	0.003	0
Premature deaths from air pollution - Natural Gas (deaths)		4.21	2.21	1.15	0.775	0.387	0.134
Premature deaths from air pollution - Transportation (deaths)		53.2	52.4	41.8	25.2	11.8	4.54

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)		7,465	8,314				
Sales of cooking units - Electric Resistance (%)	41.9	54.6	83	88.6	88.9	88.9	88.9
Sales of cooking units - Gas (%)	58.1	45.4	17	11.4	11.1	11.1	11.1
Sales of space heating units - Electric Heat Pump (%)	3.34	20.2	63.4	88.9	92.5	92.6	92.7
Sales of space heating units - Electric Resistance (%)	3.3	3.45	4.17	6.37	6.82	6.85	6.84
Sales of space heating units - Fossil (%)	0.985	0.209	0.04	0.002	0	0	0
Sales of space heating units - Gas Furnace (%)	92.4	76.1	32.4	4.78	0.723	0.51	0.507
Sales of water heating units - Electric Heat Pump (%)	0.03	8.12	45.4	61.3	63.2	63.3	63.3
Sales of water heating units - Electric Resistance (%)	1.46	5.07	23	34.6	36.2	36.3	36.3
Sales of water heating units - Gas Furnace (%)	98.1	86.4	31.1	3.68	0.19	0	0
Sales of water heating units - Other (%)	0.365	0.384	0.383	0.384	0.383	0.384	0.383

Table 36: *E+RE- scenario - PILLAR 1: Efficiency/Electrification - Electricity demand*

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested - Cumulative 5-yr (billion $2018)		2.23	2.35	3.09	3.28	3.08	3.22

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	89.2	89	85.7	80.3	75.1	72.2	71.6

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Industry (PJ)	73.7	73.6	72.2	72.9	75.5	77.3	79.1
Final energy use - Residential (PJ)	94.5	92.3	87.6	79.2	71.6	67.4	65.8
Final energy use - Transportation (PJ)	291	274	249	218	190	171	162

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)		3.41	4.55				
Sales of cooking units - Electric Resistance (%)	66.4	73.5	95.5	99.8	100	100	100
Sales of cooking units - Gas (%)	33.6	26.5	4.53	0.228	0	0	0
Sales of space heating units - Electric Heat Pump (%)	9.66	27.4	68.8	88.9	91.4	91.5	91.4
Sales of space heating units - Electric Resistance (%)	13.5	20.2	10.8	6.22	5.65	5.68	5.75
Sales of space heating units - Fossil (%)	2.25	3.38	1.94	1.18	1.02	0.999	1.02
Sales of space heating units - Gas (%)	74.6	49	18.5	3.73	1.9	1.81	1.81
Sales of water heating units - Electric Heat Pump (%)	0	8.43	46.6	60.9	62.4	62.5	62.5
Sales of water heating units - Electric Resistance (%)	23.2	37.5	32.8	35.1	35.7	35.8	35.8
Sales of water heating units - Gas Furnace (%)	75.1	52.3	18.8	2.22	0.114	0	0
Sales of water heating units - Other (%)	1.72	1.82	1.81	1.8	1.78	1.78	1.78

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)		477	1,240	1,983	3,014	3,269	3,123
Public EV charging plugs - DC Fast (1000 units)	0.256		0.746		3.11		4.99
Public EV charging plugs - L2 (1000 units)	0.619		17.9		74.7		120
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 (%)	1.44	1.72	1.21	0.387	0.073	0.013	0
Vehicle sales - Light-duty - EV (%)	4.28	16.3	48.1	82.5	96.4	99.3	100
Vehicle sales - Light-duty - gasoline (%)	89.3	76.8	47.1	15.8	3.2	0.587	0
Vehicle sales - Light-duty - hybrid (%)	4.77	4.8	3.33	1.22	0.301	0.066	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.11	0.333	0.194	0.06	0.012	0.002	0
Vehicle sales - Light-duty - other (%)	0.097	0.093	0.059	0.021	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)		1.02	1.25	4.31	3.28	1.17	0
Capital invested - Solar PV - Constrained (billion $2018)		1.21	1.27	1.83	1.36	0.252	0
Capital invested - Wind - Base (billion $2018)		0.732	0.847	2.48	2.62	1.24	1.86
Capital invested - Wind - Constrained (billion $2018)		0.158	0.176	0.868	0.274	0.093	0.954
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)	5,422	6,314	7,541	12,120	15,811	17,206	17,206
Installed renewables - Solar - Constrained land use assumptions (MW)	5,422	6,480	7,718	9,664	11,200	11,500	11,500
Installed renewables - Wind - Base land use assumptions (MW)	672	1,169	1,806	3,801	6,015	7,122	8,877
Installed renewables - Wind - Constrained land use assumptions (MW)	152	259	391	1,091	1,323	1,406	2,307

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)	13,021	14,913	17,524	27,219	34,994	37,937	37,937
Solar - Constrained land use assumptions (GWh)	13,021	15,248	17,820	21,754	24,732	25,315	25,315
Wind - Base land use assumptions (GWh)	1,971	3,423	5,281	10,860	16,962	20,030	24,862
Wind - Constrained land use assumptions (GWh)	448	757	1,085	2,768	3,322	3,520	5,281

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-227
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-1.61
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-229
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-114
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-0.807
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-115

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)							0
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							319
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							2.48
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							322
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							160
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							1.24
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							162

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)							-1,579
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-10,254
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-691
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-4,703
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-2.49
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4.57
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-186
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-593
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,495
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-791
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-3,666
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-115
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-1,806
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-1.27
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1.52
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-65.1

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)							0
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-44.9
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-841
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-1,185
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-6,960
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-403
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-3,254
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-1.86
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-3.05
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-126
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-319
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-1,668
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							258
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							93.6
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							2,398
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							0.918
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)							17.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							16.8
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							827
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							3,612
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							129
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							87.9

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)							919
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							0.459
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)							9.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							2.92
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							500
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,649
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							194
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							90.7
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							1,658
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							0.69
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)							13.5
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							21.1
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,008
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							2,986

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		49.7	0.067	0.067	0.044	0.027	0
Monetary damages from air pollution - Natural Gas (million 2019$)		46.7	28.6	29.1	34.3	22.5	5.07
Monetary damages from air pollution - Transportation (million 2019$)		473	466	372	224	105	40.3
Premature deaths from air pollution - Coal (deaths)		5.62	0.008	0.008	0.005	0.003	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Natural Gas (deaths)		5.27	3.23	3.28	3.87	2.54	0.573
Premature deaths from air pollution - Transportation (deaths)		53.2	52.4	41.8	25.2	11.8	4.54

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)		7,460	8,285				
Sales of cooking units - Electric Resistance (%)	41.9	46.2	50.2	60.8	75.4	84.6	87.8
Sales of cooking units - Gas (%)	58.1	53.8	49.8	39.2	24.6	15.4	12.2
Sales of space heating units - Electric Heat Pump (%)	3.34	13	18	32.6	57.8	78.9	88.5
Sales of space heating units - Electric Resistance (%)	3.3	3.43	3.51	3.82	4.64	5.8	6.5
Sales of space heating units - Fossil (%)	0.985	0.242	0.226	0.167	0.082	0.026	0.007
Sales of space heating units - Gas Furnace (%)	92.4	83.3	78.3	63.4	37.5	15.3	4.96
Sales of water heating units - Electric Heat Pump (%)	0.03	1.53	5.79	18.2	38.6	54.2	60.6
Sales of water heating units - Electric Resistance (%)	1.46	2.2	4.25	10.4	21	30.2	34.5
Sales of water heating units - Gas Furnace (%)	98.1	95.9	89.6	71	39.9	15.3	4.5
Sales of water heating units - Other (%)	0.365	0.384	0.383	0.384	0.383	0.384	0.383

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	2.09	2.43	2.55	2.99	3.14

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	89.2	89.2	88.5	87.3	84.9	81.8	79
Final energy use - Industry (PJ)	73.7	73.6	72.4	73.5	76.5	78.3	80
Final energy use - Residential (PJ)	94.5	92.7	91.9	90.1	85.9	79.9	74.4
Final energy use - Transportation (PJ)	291	276	258	242	229	214	195

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)		3.39	4.49				
Sales of cooking units - Electric Resistance (%)	66.2	67.1	70.2	78.4	89.7	96.7	99.1
Sales of cooking units - Gas (%)	33.8	32.9	29.8	21.6	10.3	3.33	0.896
Sales of space heating units - Electric Heat Pump (%)	9.66	20.3	25	38.9	62.1	80.4	88.2
Sales of space heating units - Electric Resistance (%)	13.5	21.8	20.6	17.6	12.4	8.21	6.44
Sales of space heating units - Fossil (%)	2.25	3.63	3.53	2.94	1.99	1.35	1.13
Sales of space heating units - Gas (%)	74.6	54.3	50.8	40.6	23.5	10.1	4.22
Sales of water heating units - Electric Heat Pump (%)	0	1.53	5.88	18.5	39	54	60.1
Sales of water heating units - Electric Resistance (%)	23.2	38.6	38.2	36.7	35.1	35	35.4

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 (%)	75.1	58	54.2	42.9	24.1	9.21	2.71
Sales of water heating units - Other (%)	1.72	1.82	1.82	1.82	1.8	1.79	1.78

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	80.1	162	553	1,721	2,514
Public EV charging plugs - DC Fast (1000 units)	0.256		0.253		1.17		3.2
Public EV charging plugs - L2 (1000 units)	0.619		6.09		28.1		76.9
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 (%)	1.45	1.88	2.04	1.61	1.02	0.524	0.225
Vehicle sales - Light-duty - EV (%)	2.01	4.96	12.4	26.8	49.4	72.7	87.8
Vehicle sales - Light-duty - gasoline (%)	91.4	86.9	78.7	65.5	45.1	24.2	10.7
Vehicle sales - Light-duty - hybrid (%)	4.96	5.74	6.41	5.78	4.28	2.5	1.2
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.377	0.32	0.242	0.17	0.094	0.044
Vehicle sales - Light-duty - other (%)	0.098	0.102	0.092	0.08	0.057	0.031	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	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	0	0
Conversion capital investment - Cumulative 5-yr (million $2018)		0	0	0	0	0	0
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	0	0
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	0
Number of facilities - Pyrolysis ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng ccu (quantity)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0.01	0.04	0.06	0.04	0.05
Annual - BECCS (MMT)		0	0	0	0	0	0
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Annual - NGCC (MMT)		0	0.01	0.04	0.06	0.04	0.05
Cumulative - All (MMT)		0	0.01	0.05	0.11	0.15	0.2
Cumulative - BECCS (MMT)		0	0	0	0	0	0
Cumulative - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - NGCC (MMT)		0	0.01	0.05	0.11	0.15	0.2

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

Item	2020	2025	2030	2035	2040	2045	2050
All (km)		0	51.1	102	102	102	102
Cumulative investment - All (million $2018)		0	26.6	53.4	53.5	53.4	53.4
Cumulative investment - Spur (million $2018)		0	26.6	53.4	53.5	53.4	53.4
Cumulative investment - Trunk (million $2018)		0	0	0	0	0	0
Spur (km)		0	51.1	102	102	102	102
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)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-227
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)							-1.61
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-229
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-114
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)							-0.807
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-115
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							789
Land impacted for carbon sink - Aggressive deployment - Cropland to woody energy crops (1000 hectares)							0
Land impacted for carbon sink - Aggressive deployment - Pasture to energy crops (1000 hectares)							0
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							2.48
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							791
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							160
Land impacted for carbon sink - Moderate deployment - Cropland to woody energy crops (1000 hectares)							0
Land impacted for carbon sink - Moderate deployment - Pasture to energy crops (1000 hectares)							0
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							1.24
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							162

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)							-1,579
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-10,254
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-691
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-4,703
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-2.49
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4.57
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-186
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-593
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,495
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-791
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-3,666
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-115
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-1,806
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-1.27
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1.52
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-65.1
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-44.9
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-841
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-1,185
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-6,960
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-403
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-3,254
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-1.86
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-3.05
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-126
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-319
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-1,668

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)							258
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							93.6
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							2,398
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							0.918
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)							17.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							16.8
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							827
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							3,612
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							129
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							87.9
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							919
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							0.459
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)							9.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							2.92
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							500
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							1,649
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							194

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)							90.7
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							1,658
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							0.69
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)							13.5
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							21.1
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,008
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							2,986

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		49.7	0.067	0.067	0.044	0.027	0
Monetary damages from air pollution - Natural Gas (million 2019$)		39.2	16.1	11.5	9.69	6.41	3.23
Monetary damages from air pollution - Transportation (million 2019$)		482	515	527	497	413	295
Premature deaths from air pollution - Coal (deaths)		5.62	0.008	0.008	0.005	0.003	0
Premature deaths from air pollution - Natural Gas (deaths)		4.43	1.82	1.3	1.09	0.723	0.365
Premature deaths from air pollution - Transportation (deaths)		54.2	57.9	59.3	55.9	46.5	33.1

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

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		7,365	7,706				
Sales of cooking units - Electric Resistance (%)	41.9	44.7	44.7	44.6	44.4	44.5	44.6
Sales of cooking units - Gas (%)	58.1	55.3	55.3	55.4	55.6	55.5	55.4
Sales of space heating units - Electric Heat Pump (%)	3.34	23.9	63.4	77.1	78.7	78.8	78.8
Sales of space heating units - Electric Resistance (%)	3.3	5.04	10.6	16	20	20.6	20.7
Sales of space heating units - Fossil (%)	0.985	0.211	0.092	0.03	0.004	0	0
Sales of space heating units - Gas Furnace (%)	92.4	70.9	25.9	6.85	1.34	0.57	0.508
Sales of water heating units - Electric Heat Pump (%)	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Sales of water heating units - Electric Resistance (%)	1.46	1.47	1.47	1.48	1.47	1.48	1.47

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 (%)	98.1	98.1	98.1	98.1	98.1	98.1	98.1
Sales of water heating units - Other (%)	0.365	0.384	0.383	0.384	0.383	0.384	0.383

Table 60: *REF scenario - PILLAR 1: Efficiency/Electrification - Electricity demand*

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested - Cumulative 5-yr (billion $2018)		2.15	2.25	2.49	2.61	2.9	3.04

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	89.2	90.9	92	92.1	92.8	95.6	100
Final energy use - Industry (PJ)	73.8	76.5	78.3	81.6	85.7	92	98.7
Final energy use - Residential (PJ)	94.5	93.4	95	97.3	101	105	108
Final energy use - Transportation (PJ)	291	280	269	263	267	277	288

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)		3.21	3.39				
Sales of cooking units - Electric Resistance (%)	65.9	65.9	65.9	65.9	65.9	65.9	65.9
Sales of cooking units - Gas (%)	34.1	34.1	34.1	34.1	34.1	34.1	34.1
Sales of space heating units - Electric Heat Pump (%)	8.46	27.8	28.5	29.6	30.6	31.8	33.4
Sales of space heating units - Electric Resistance (%)	13.8	20.2	19.9	19.6	18.9	17.9	16.3
Sales of space heating units - Fossil (%)	2.27	2.79	2.82	2.75	2.59	2.52	2.58
Sales of space heating units - Gas (%)	75.5	49.2	48.8	48.1	47.9	47.8	47.7
Sales of water heating units - Electric Heat Pump (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Resistance (%)	23.2	38.8	38.9	38.9	39	39	39
Sales of water heating units - Gas Furnace (%)	75.1	59.4	59.3	59.3	59.2	59.2	59.2
Sales of water heating units - Other (%)	1.72	1.82	1.82	1.82	1.81	1.81	1.81

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 (%)	1.45	1.88	2.17	2.02	1.81	1.69	1.6
Vehicle sales - Light-duty - EV (%)	3.92	6.06	6.87	8.47	10.3	11.8	13
Vehicle sales - Light-duty - gasoline (%)	89.6	86	83.7	81.7	79.6	77.6	76.1
Vehicle sales - Light-duty - hybrid (%)	4.79	5.62	6.85	7.41	7.95	8.48	8.86
Vehicle sales - Light-duty - hydrogen FC (%)	0.11	0.373	0.34	0.3	0.296	0.296	0.306
Vehicle sales - Light-duty - other (%)	0.097	0.101	0.097	0.098	0.097	0.096	0.098
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)							-1,579
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-10,254
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-691
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-4,703
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-2.49
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-4.57
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-186
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-593
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,495
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-791
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-3,666
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-115
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-1,806
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-1.27
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-1.52
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-65.1
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-44.9
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-841
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-1,185
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-6,960
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-403
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-3,254
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-1.86
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-3.05

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)							-126
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-319
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-1,668
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							258
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							93.6
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							2,398
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							0.918
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)							17.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							16.8
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							827
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							3,612
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							129
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							87.9
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							919
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							0.459
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)							9.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							2.92
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							500

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)							1,649
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							194
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							90.7
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							1,658
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							0.69
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)							13.5
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							21.1
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							1,008
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							2,986

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)	0.51		1.5				0.43
Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y)	-0.001		-0.003				-0.003
Business-as-usual carbon sink - Total (Mt CO2e/y)	0.509		1.5				0.428

Table 66: *REF scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019$)		79.7	47.1	25.4	19.3	18	16.9
Monetary damages from air pollution - Natural Gas (million 2019$)		47.8	32.2	35	32.9	50.9	46.9
Monetary damages from air pollution - Transportation (million 2019$)		480	521	561	604	648	695
Premature deaths from air pollution - Coal (deaths)		9.01	5.31	2.87	2.18	2.03	1.91
Premature deaths from air pollution - Natural Gas (deaths)		5.4	3.64	3.95	3.71	5.74	5.29
Premature deaths from air pollution - Transportation (deaths)		54	58.6	63.1	67.9	72.9	78.1