Net-Zero America - Nevada data

October 29, 2021 (updated January 9, 2022)

See the Data Sheet Guide for explanations of the contents of this document. The data herein underlie graphs and tables found in Princeton's Net-Zero America report:

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Table 1: *E+ scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Electric Generation - Coal (deaths)		5.62	0.008	0.008	0.005	0.003	0
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		4.59	2.44	2.09	1.96	1.32	0.543
Premature deaths from air pollution - Mobile - On-Road (deaths)		53.2	52.4	41.8	25.2	11.8	4.54
Premature deaths from air pollution - Gas Stations (deaths)		3.32	3.22	2.53	1.55	0.754	0.332
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		9.21	7.74	5.14	2.82	1.38	0.669
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.281	0.252	0.216	0.176	0.138	0.101
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.588	0.536	0.43	0.317	0.218	0.153
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.054	0.055	0.056	0.056	0.056	0.055
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		13.2	12	9.17	5.87	3.37	1.77
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		1.8	1.53	1.27	1.01	0.762	0.516
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.798	0.704	0.604	0.495	0.379	0.259
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.085	0.012	0.012	0.011	0.011	0.011
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		11.7	11.6	11.1	9.08	7.01	4.53
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million $2019)		49.8	0.067	0.067	0.044	0.027	0
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million $2019)		40.7	21.6	18.5	17.4	11.7	4.81
Monetary damages from air pollution - Mobile - On-Road (million $2019)		473	466	372	224	105	40.3
Monetary damages from air pollution - Gas Stations (million $2019)		29.4	28.5	22.4	13.7	6.68	2.94
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million $2019)		81.7	68.6	45.5	25	12.2	5.93
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million $2019)		2.49	2.23	1.91	1.56	1.23	0.893
Monetary damages from air pollution - Fuel Comb - Residential - Other (million $2019)		5.21	4.75	3.81	2.81	1.93	1.36
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million $2019)		0.48	0.491	0.497	0.497	0.494	0.487
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million $2019)		117	107	81.2	52	29.9	15.7

Table 1: *E+ scenario - IMPACTS - Health (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million $2019)		15.9	13.5	11.2	8.96	6.74	4.57
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million $2019)		7.06	6.24	5.35	4.38	3.35	2.29
Monetary damages from air pollution - Industrial Processes - Coal Mining (million $2019)		0.753	0.107	0.105	0.098	0.096	0.097
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million $2019)		104	103	98.1	80.6	62.2	40.2

Table 2: *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)		5,431	5,765	12,451	12,340	11,938	13,556
By economic sector - Manufacturing (jobs)		1,296	1,567	1,984	2,015	1,868	1,995
By economic sector - Mining (jobs)		1,000	705	460	278	154	81.4
By economic sector - Other (jobs)		696	772	2,333	2,405	2,521	3,274
By economic sector - Pipeline (jobs)		264	236	203	156	109	61.4
By economic sector - Professional (jobs)		2,074	2,273	4,978	5,186	5,272	6,317
By economic sector - Trade (jobs)		1,562	1,600	3,390	3,520	3,642	4,528
By economic sector - Utilities (jobs)		4,265	4,911	7,774	8,993	9,094	9,702
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)		6,122	7,793	13,650	15,992	16,221	18,332
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)		4,789	4,796	15,145	14,321	14,131	17,740
By resource sector - Wind (jobs)		431	892	1,142	1,201	1,251	1,537
By education level - All sectors - High school diploma or less (jobs)		7,081	7,620	14,446	14,926	14,727	16,770
By education level - All sectors - Associates degree or some college (jobs)		5,326	5,770	10,924	11,410	11,340	12,938
By education level - All sectors - Bachelors degree (jobs)		3,272	3,477	6,361	6,630	6,599	7,567
By education level - All sectors - Masters or professional degree (jobs)		800	854	1,604	1,682	1,685	1,950
By education level - All sectors - Doctoral degree (jobs)		113	119	241	247	248	292
Related work experience - All sectors - None (jobs)		2,430	2,619	4,942	5,151	5,116	5,845
Related work experience - All sectors - Up to 1 year (jobs)		3,291	3,544	6,858	7,066	6,986	8,019
Related work experience - All sectors - 1 to 4 years (jobs)		5,970	6,410	11,982	12,479	12,388	14,152
Related work experience - All sectors - 4 to 10 years (jobs)		3,899	4,188	7,817	8,139	8,070	9,183
Related work experience - All sectors - Over 10 years (jobs)		1,002	1,079	1,978	2,061	2,040	2,317
On-the-Job Training - All sectors - None (jobs)		898	954	1,849	1,904	1,889	2,185
On-the-Job Training - All sectors - Up to 1 year (jobs)		10,694	11,495	21,501	22,357	22,182	25,387

Table 2: *E+ scenario - IMPACTS - Jobs (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
On-the-Job Training - All sectors - 1 to 4 years (jobs)		3,611	3,896	7,333	7,639	7,567	8,588
On-the-Job Training - All sectors - 4 to 10 years (jobs)		1,229	1,324	2,566	2,665	2,638	2,989
On-the-Job Training - All sectors - Over 10 years (jobs)		160	170	328	331	324	367
On-Site or In-Plant Training - All sectors - None (jobs)		2,655	2,846	5,436	5,623	5,577	6,401
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		9,763	10,495	19,633	20,420	20,257	23,170
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		2,789	3,008	5,661	5,893	5,837	6,633
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		1,236	1,327	2,540	2,636	2,607	2,950
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		150	163	307	323	320	363
Wage income - All (million $2019)		932	1,011	1,893	2,001	2,012	2,320

Table 3: *E+ scenario - IMPACTS - Fossil fuel industries*

Item	2020	2025	2030	2035	2040	2045	2050
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
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

Table 4: *E+ scenario - PILLAR 1: Efficiency/Electrification - Overview*

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	291	274	249	218	190	171	162
Final energy use - Residential (PJ)	94.5	92.3	87.6	79.2	71.6	67.4	65.8
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

Table 5: *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 6: *E+ scenario - PILLAR 1: Efficiency/Electrification - Transportation*

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	43.2	246	450	1,161	1,873	2,441	3,010
Vehicle stocks - LDV – All others (1000 units)	2,510	2,390	2,270	1,654	1,038	588	137
Light-duty vehicle capital costs vs. REF - 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

Table 7: *E+ scenario - PILLAR 1: Efficiency/Electrification - Residential*

Item	2020	2025	2030	2035	2040	2045	2050
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 - Gas (%)	74.6	49	18.5	3.73	1.9	1.81	1.81
Sales of space heating units - Fossil (%)	2.25	3.38	1.94	1.18	1.02	0.999	1.02
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
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
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018)		3.41	4.55				

Table 8: *E+ scenario - PILLAR 1: Efficiency/Electrification - Commercial*

Item	2020	2025	2030	2035	2040	2045	2050
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 - Gas Furnace (%)	92.4	76.1	32.4	4.78	0.723	0.51	0.507
Sales of space heating units - Fossil (%)	0.985	0.209	0.04	0.002	0	0	0
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
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
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		7,465	8,314				

Table 9: *E+ scenario - PILLAR 2: Clean Electricity - Generating capacity*

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	809	242	0	0	0	0	0
Installed thermal - Natural gas (MW)	6,545	5,969	6,674	7,057	8,597	6,543	4,690
Installed thermal - Nuclear (MW)	0	0	0.001	0.004	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)	4,971	4,971	4,971	13,631	19,500	24,398	28,779
Installed renewables - Wind - Base land use assumptions (MW)	985	1,335	4,050	7,632	9,418	10,219	12,897
Installed renewables - Solar - Constrained land use assumptions (MW)	4,880	4,965	4,965	6,533	8,473	9,843	13,638
Installed renewables - Wind - Constrained land use assumptions (MW)	222	437	1,128	1,610	2,374	2,417	3,217
Capital invested - Solar PV - Base (billion $2018)		0	0	9.55	6.1	4.81	4.06

Table 9: *E+ scenario - PILLAR 2: Clean Electricity - Generating capacity (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Capital invested - Wind - Base (billion $2018)		0.755	3.61	4.44	2.11	0.898	2.84
Capital invested - Solar PV - Constrained (billion $2018)		3.93	0	4.62	3.7	2.12	1.58
Capital invested - Wind - Constrained (billion $2018)		0.262	1.01	0.429	0.94	0.089	0.787
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 10: *E+ scenario - PILLAR 2: Clean Electricity - Generation*

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	13,021	13,021	13,021	34,562	49,077	61,165	71,940
Wind - Base land use assumptions (GWh)	2,421	3,919	11,540	21,442	26,325	28,482	35,708
OffshoreWind - Base land use assumptions (GWh)	0	0	0	0	0	0	0
Solar - Constrained land use assumptions (GWh)	12,657	12,657	12,657	16,469	20,892	24,040	32,842
Wind - Constrained land use assumptions (GWh)	657	1,195	2,853	3,945	5,397	5,474	7,205
OffshoreWind - Constrained land use assumptions (GWh)	0	0	0	0	0	0	0
Biomass power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu allam power plant (GWh)	0	0	0	0	0	0	0

Table 11: *E+ scenario - PILLAR 3: Clean fuels - Bioenergy*

Item	2020	2025	2030	2035	2040	2045	2050
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 - 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 - 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
Conversion capital investment - Cumulative 5-yr (million $2018)		0	0	0	0	0	0
Biomass purchases (million $2018/y)		0	0	0	0	0	0

Table 12: *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 - NGCC (MMT)		0	0.01	0.03	0.05	0.04	0.03
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - All (MMT)		0	0.01	0.04	0.09	0.13	0.16
Cumulative - BECCS (MMT)		0	0	0	0	0	0

Table 12: *E+ scenario - PILLAR 4: CCUS - CO2 capture (continued)*

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

Table 13: *E+ scenario - PILLAR 4: CCUS - CO2 pipelines*

Item	2020	2025	2030	2035	2040	2045	2050
Trunk (km)		0	0	0	0	0	0
Spur (km)		0	51.1	102	102	102	102
All (km)		0	51.1	102	102	102	102
Cumulative investment - Trunk (million $2018)		0	0	0	0	0	0
Cumulative investment - Spur (million $2018)		0	26.6	53.3	53.4	53.4	53.3
Cumulative investment - All (million $2018)		0	26.6	53.3	53.4	53.4	53.3

Table 14: *E+ scenario - PILLAR 4: CCUS - CO2 storage*

Item	2020	2025	2030	2035	2040	2045	2050
Annual (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 15: *E+ scenario - PILLAR 6: Land sinks - Forests*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-791
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 - Low - All (not counting overlap) (1000 tCO2e/y)							-3,666
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-1,185
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 15: *E+ 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
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-6,960
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-1,579
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 - All (not counting overlap) (1000 tCO2e/y)							-10,254
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,495
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 15: *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
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

Table 16: *E+ scenario - PILLAR 6: Land sinks - Agriculture*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0

Table 16: *E+ scenario - PILLAR 6: Land sinks - Agriculture (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-114
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-0.807
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-115
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
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
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

Table 17: *E- scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Electric Generation - Coal (deaths)		5.62	0.008	0.008	0.005	0.003	0
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		4.68	1.85	1.21	0.624	0.295	0.151
Premature deaths from air pollution - Mobile - On-Road (deaths)		54.2	57.9	59.3	55.9	46.5	33.1
Premature deaths from air pollution - Gas Stations (deaths)		3.4	3.62	3.68	3.45	2.85	2.04
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		9.33	9.15	8.64	7.44	5.58	3.63
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.292	0.28	0.263	0.241	0.217	0.192

Table 17: *E- scenario - IMPACTS - Health (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.596	0.618	0.631	0.598	0.507	0.402
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.054	0.055	0.056	0.056	0.056	0.055
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		13.3	13.7	13.7	12.6	10.4	7.72
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		1.8	1.64	1.49	1.34	1.2	1.05
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.798	0.755	0.709	0.654	0.593	0.527
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.081	0.012	0.013	0.013	0.011	0.008
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		11.7	11.1	10.1	9.14	8.42	6.23
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million $2019)		49.8	0.067	0.067	0.044	0.027	0
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million $2019)		41.5	16.3	10.7	5.53	2.61	1.34
Monetary damages from air pollution - Mobile - On-Road (million $2019)		482	515	527	497	413	295
Monetary damages from air pollution - Gas Stations (million $2019)		30.1	32.1	32.6	30.5	25.3	18
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million $2019)		82.7	81	76.6	66	49.4	32.2
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million $2019)		2.59	2.48	2.33	2.14	1.93	1.7
Monetary damages from air pollution - Fuel Comb - Residential - Other (million $2019)		5.29	5.48	5.59	5.3	4.49	3.56
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million $2019)		0.48	0.491	0.497	0.497	0.494	0.487
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million $2019)		117	122	121	111	91.9	68.4
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million $2019)		15.9	14.5	13.2	11.9	10.6	9.32
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million $2019)		7.06	6.69	6.28	5.79	5.25	4.67
Monetary damages from air pollution - Industrial Processes - Coal Mining (million $2019)		0.711	0.109	0.112	0.111	0.097	0.07
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million $2019)		104	98.8	89.3	81.2	74.8	55.4

Table 18: *E- scenario - IMPACTS - Jobs*

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		5.76	7.39	2.82	1.81	1.64	1.58
By economic sector - Construction (jobs)		5,474	5,759	10,997	10,938	12,194	13,927
By economic sector - Manufacturing (jobs)		1,309	1,584	1,818	1,846	2,062	2,218
By economic sector - Mining (jobs)		1,007	724	526	376	257	146
By economic sector - Other (jobs)		707	780	2,027	2,143	2,586	3,307
By economic sector - Pipeline (jobs)		265	240	223	194	166	98.7
By economic sector - Professional (jobs)		2,089	2,258	4,380	4,573	5,372	6,524
By economic sector - Trade (jobs)		1,576	1,617	3,046	3,191	3,777	4,681
By economic sector - Utilities (jobs)		4,232	4,732	6,837	7,480	8,869	9,980
By resource sector - Biomass (jobs)		21.9	19.9	9.36	7.63	6.99	6.51
By resource sector - CO2 (jobs)		0	199	400	398	397	105
By resource sector - Coal (jobs)		173	32.1	0	0	0	0
By resource sector - Grid (jobs)		6,047	7,539	11,870	13,221	15,661	18,712
By resource sector - Natural Gas (jobs)		2,984	2,311	1,905	1,863	2,222	1,728
By resource sector - Nuclear (jobs)		0	0.005	0.009	0	0	0
By resource sector - Oil (jobs)		2,096	1,759	1,481	1,190	905	554
By resource sector - Solar (jobs)		4,894	4,911	13,125	12,893	14,640	17,806
By resource sector - Wind (jobs)		449	931	1,066	1,169	1,453	1,973
By education level - All sectors - High school diploma or less (jobs)		7,114	7,570	12,846	13,164	15,029	17,340
By education level - All sectors - Associates degree or some college (jobs)		5,347	5,714	9,689	10,012	11,533	13,369
By education level - All sectors - Bachelors degree (jobs)		3,286	3,453	5,680	5,863	6,750	7,853
By education level - All sectors - Masters or professional degree (jobs)		803	847	1,428	1,482	1,718	2,020
By education level - All sectors - Doctoral degree (jobs)		114	118	214	220	254	303
Related work experience - All sectors - None (jobs)		2,440	2,597	4,392	4,532	5,212	6,042
Related work experience - All sectors - Up to 1 year (jobs)		3,308	3,525	6,090	6,238	7,135	8,287
Related work experience - All sectors - 1 to 4 years (jobs)		5,995	6,359	10,663	10,995	12,634	14,648
Related work experience - All sectors - 4 to 10 years (jobs)		3,915	4,152	6,951	7,161	8,223	9,505
Related work experience - All sectors - Over 10 years (jobs)		1,006	1,070	1,761	1,814	2,081	2,403
On-the-Job Training - All sectors - None (jobs)		903	950	1,645	1,687	1,934	2,258
On-the-Job Training - All sectors - Up to 1 year (jobs)		10,742	11,415	19,140	19,722	22,649	26,286
On-the-Job Training - All sectors - 1 to 4 years (jobs)		3,624	3,858	6,508	6,704	7,694	8,877
On-the-Job Training - All sectors - 4 to 10 years (jobs)		1,233	1,309	2,271	2,334	2,675	3,082
On-the-Job Training - All sectors - Over 10 years (jobs)		161	170	292	294	333	381
On-Site or In-Plant Training - All sectors - None (jobs)		2,669	2,828	4,830	4,963	5,697	6,621
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		9,805	10,420	17,475	18,007	20,676	23,985
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		2,799	2,980	5,027	5,177	5,940	6,857
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		1,241	1,313	2,252	2,313	2,647	3,045
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		150	161	272	282	325	375
Wage income - All (million $2019)		935	1,002	1,685	1,760	2,049	2,402

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	291	276	258	242	229	214	195
Final energy use - Residential (PJ)	94.5	92.7	91.9	90.1	85.9	79.9	74.4
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

Table 20: *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 21: *E- scenario - PILLAR 1: Efficiency/Electrification - Transportation*

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	33.5	93.1	153	429	705	1,317	1,928
Vehicle stocks - LDV – All others (1000 units)	2,520	2,520	2,520	2,390	2,261	1,742	1,224
Light-duty vehicle capital costs vs. REF - 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

Table 22: *E- scenario - PILLAR 1: Efficiency/Electrification - Residential*

Item	2020	2025	2030	2035	2040	2045	2050
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 - Gas (%)	74.6	54.3	50.8	40.6	23.5	10.1	4.22
Sales of space heating units - Fossil (%)	2.25	3.63	3.53	2.94	1.99	1.35	1.13
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
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
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018)		3.39	4.49				

Table 23: *E- scenario - PILLAR 1: Efficiency/Electrification - Commercial*

Item	2020	2025	2030	2035	2040	2045	2050
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 - Gas Furnace (%)	92.4	83.3	78.3	63.4	37.5	15.3	4.96
Sales of space heating units - Fossil (%)	0.985	0.242	0.226	0.167	0.082	0.026	0.007
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

Table 23: *E- scenario - PILLAR 1: Efficiency/Electrification - Commercial (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
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
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
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		7,460	8,285				

Table 24: *E- scenario - PILLAR 2: Clean Electricity - Generating capacity*

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	809	242	0	0	0	0	0
Installed thermal - Natural gas (MW)	6,545	5,969	6,094	6,024	5,473	4,547	3,599
Installed thermal - Nuclear (MW)	0	0	0.002	0.005	0	0	0

Table 25: *E- scenario - PILLAR 6: Land sinks - Forests*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-791
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 - Low - All (not counting overlap) (1000 tCO2e/y)							-3,666
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-1,185
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
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-6,960

Table 25: *E- scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-1,579
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 - All (not counting overlap) (1000 tCO2e/y)							-10,254
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,495
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

Table 25: *E- scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)							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
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

Table 26: *E- scenario - PILLAR 6: Land sinks - Agriculture*

Item	2020	2025	2030	2035	2040	2045	2050
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 26: *E- scenario - PILLAR 6: Land sinks - Agriculture (continued)*

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
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
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

Table 27: *E+RE+ scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Electric Generation - Coal (deaths)		5.62	0.008	0.008	0.005	0.003	0
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		4.21	2.21	1.15	0.775	0.387	0.134
Premature deaths from air pollution - Mobile - On-Road (deaths)		53.2	52.4	41.8	25.2	11.8	4.54
Premature deaths from air pollution - Gas Stations (deaths)		3.32	3.22	2.53	1.55	0.754	0.332
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		9.21	7.74	5.14	2.82	1.38	0.669
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.281	0.252	0.216	0.176	0.138	0.101
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.588	0.536	0.43	0.317	0.218	0.153
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.054	0.055	0.056	0.056	0.056	0.055
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		13.2	12	9.17	5.87	3.37	1.77

Table 27: *E+RE+ scenario - IMPACTS - Health (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		1.8	1.53	1.27	1.01	0.762	0.516
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.798	0.704	0.604	0.495	0.379	0.259
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.098	0.012	0.012	0.011	0.011	0.004
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		11.5	11.4	10.3	7.78	4.92	0.711
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million $2019)		49.8	0.067	0.067	0.044	0.027	0
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million $2019)		37.3	19.5	10.2	6.87	3.43	1.19
Monetary damages from air pollution - Mobile - On-Road (million $2019)		473	466	372	224	105	40.3
Monetary damages from air pollution - Gas Stations (million $2019)		29.4	28.5	22.4	13.7	6.68	2.94
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million $2019)		81.7	68.6	45.5	25	12.2	5.93
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million $2019)		2.49	2.23	1.91	1.56	1.23	0.893
Monetary damages from air pollution - Fuel Comb - Residential - Other (million $2019)		5.21	4.75	3.81	2.81	1.93	1.36
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million $2019)		0.48	0.491	0.497	0.497	0.494	0.487
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million $2019)		117	107	81.2	52	29.9	15.7
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million $2019)		15.9	13.5	11.2	8.96	6.74	4.57
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million $2019)		7.06	6.24	5.35	4.38	3.35	2.29
Monetary damages from air pollution - Industrial Processes - Coal Mining (million $2019)		0.862	0.108	0.104	0.097	0.095	0.037
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million $2019)		102	101	91.3	69	43.7	6.32

Table 28: *E+RE+ scenario - IMPACTS - Jobs*

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		4.76	9.88	3.65	2.33	1.88	1.38
By economic sector - Construction (jobs)		5,519	6,825	14,869	14,517	15,952	17,236
By economic sector - Manufacturing (jobs)		1,409	1,692	2,402	2,532	2,587	3,474
By economic sector - Mining (jobs)		988	687	418	224	96.3	18
By economic sector - Other (jobs)		710	1,014	2,871	2,929	3,489	4,088
By economic sector - Pipeline (jobs)		256	213	148	93.9	50.9	23.4
By economic sector - Professional (jobs)		2,120	2,687	6,021	6,217	7,202	8,218

Table 28: *E+RE+ scenario - IMPACTS - Jobs (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Trade (jobs)		1,585	1,873	4,065	4,192	4,935	5,766
By economic sector - Utilities (jobs)		4,337	5,098	8,895	10,007	11,550	12,637
By resource sector - Biomass (jobs)		18.5	27.9	9.83	7.6	6.97	6.05
By resource sector - CO2 (jobs)		0	0	0	0	0	0
By resource sector - Coal (jobs)		173	32.1	0	0	0	0
By resource sector - Grid (jobs)		6,325	8,434	16,419	18,848	21,767	24,507
By resource sector - Natural Gas (jobs)		2,903	2,341	1,886	1,730	1,908	1,411
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		2,073	1,619	1,120	663	302	5.53
By resource sector - Solar (jobs)		4,917	6,676	18,692	17,589	19,687	22,011
By resource sector - Wind (jobs)		519	969	1,566	1,876	2,194	3,521
By education level - All sectors - High school diploma or less (jobs)		7,226	8,618	17,093	17,427	19,522	21,815
By education level - All sectors - Associates degree or some college (jobs)		5,434	6,494	12,904	13,289	15,011	16,845
By education level - All sectors - Bachelors degree (jobs)		3,337	3,890	7,508	7,737	8,753	9,885
By education level - All sectors - Masters or professional degree (jobs)		815	961	1,899	1,968	2,244	2,539
By education level - All sectors - Doctoral degree (jobs)		115	138	288	293	335	378
Related work experience - All sectors - None (jobs)		2,478	2,947	5,835	5,997	6,768	7,589
Related work experience - All sectors - Up to 1 year (jobs)		3,362	4,039	8,149	8,297	9,313	10,455
Related work experience - All sectors - 1 to 4 years (jobs)		6,089	7,203	14,151	14,545	16,407	18,420
Related work experience - All sectors - 4 to 10 years (jobs)		3,976	4,702	9,223	9,473	10,675	11,958
Related work experience - All sectors - Over 10 years (jobs)		1,024	1,207	2,335	2,403	2,701	3,039
On-the-Job Training - All sectors - None (jobs)		916	1,088	2,196	2,234	2,519	2,834
On-the-Job Training - All sectors - Up to 1 year (jobs)		10,919	12,943	25,436	26,125	29,440	33,143
On-the-Job Training - All sectors - 1 to 4 years (jobs)		3,681	4,378	8,648	8,878	9,997	11,161
On-the-Job Training - All sectors - 4 to 10 years (jobs)		1,249	1,496	3,024	3,088	3,479	3,843
On-the-Job Training - All sectors - Over 10 years (jobs)		164	195	389	389	431	481
On-Site or In-Plant Training - All sectors - None (jobs)		2,710	3,226	6,441	6,582	7,418	8,343
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		9,965	11,813	23,218	23,849	26,873	30,228
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		2,843	3,382	6,681	6,856	7,717	8,623
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		1,257	1,495	2,990	3,052	3,435	3,796
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		152	183	362	374	422	471
Wage income - All (million $2019)		950	1,132	2,230	2,325	2,658	3,016

Table 29: *E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Overview*

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	291	274	249	218	190	171	162
Final energy use - Residential (PJ)	94.5	92.3	87.6	79.2	71.6	67.4	65.8
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

Table 30: *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 31: *E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Transportation*

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	43.2	246	450	1,161	1,873	2,441	3,010
Vehicle stocks - LDV – All others (1000 units)	2,510	2,390	2,270	1,654	1,038	588	137
Light-duty vehicle capital costs vs. REF - 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

Table 32: *E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Residential*

Item	2020	2025	2030	2035	2040	2045	2050
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 - Gas (%)	74.6	49	18.5	3.73	1.9	1.81	1.81
Sales of space heating units - Fossil (%)	2.25	3.38	1.94	1.18	1.02	0.999	1.02
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
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
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018)		3.41	4.55				

Table 33: *E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Commercial*

Item	2020	2025	2030	2035	2040	2045	2050
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 - Gas Furnace (%)	92.4	76.1	32.4	4.78	0.723	0.51	0.507
Sales of space heating units - Fossil (%)	0.985	0.209	0.04	0.002	0	0	0
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
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
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		7,465	8,314				

Table 34: *E+RE+ scenario - PILLAR 2: Clean Electricity - Generating capacity*

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	809	242	0	0	0	0	0
Installed thermal - Natural gas (MW)	6,545	5,969	6,095	6,516	6,459	5,963	3,581
Installed thermal - Nuclear (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)	4,971	4,971	6,259	17,580	24,957	32,297	39,397
Installed renewables - Wind - Base land use assumptions (MW)	822	1,738	4,729	9,316	12,802	15,530	22,067
Installed renewables - Solar - Constrained land use assumptions (MW)	4,973	4,973	6,098	8,166	11,339	15,744	21,340
Installed renewables - Wind - Constrained land use assumptions (MW)	244	813	1,272	2,440	2,826	2,928	3,426
Installed renewables - Offshore Wind - Constrained land use assumptions (MW)	0	0	0	0	0	0	0
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

Table 35: *E+RE+ scenario - PILLAR 2: Clean Electricity - Generation*

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	13,021	13,021	16,228	44,271	62,484	80,384	97,813
Wind - Base land use assumptions (GWh)	2,421	5,086	13,422	26,074	35,514	42,609	58,960
OffshoreWind - Base land use assumptions (GWh)	0	0	0	0	0	0	0
Solar - Constrained land use assumptions (GWh)	26,042	26,042	31,596	41,365	56,454	77,211	103,659
Wind - Constrained land use assumptions (GWh)	1,314	4,057	6,274	11,021	12,636	13,105	15,221
OffshoreWind - Constrained land use assumptions (GWh)	0	0	0	0	0	0	0

Table 36: *E+RE+ scenario - PILLAR 6: Land sinks - Forests*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-791
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 - Low - All (not counting overlap) (1000 tCO2e/y)							-3,666

Table 36: *E+RE+ scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-1,185
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
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-6,960
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-1,579
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 - All (not counting overlap) (1000 tCO2e/y)							-10,254
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,495
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

Table 36: *E+RE+ scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
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
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

Table 36: *E+RE+ scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							3,612

Table 37: *E+RE+ scenario - PILLAR 6: Land sinks - Agriculture*

Item	2020	2025	2030	2035	2040	2045	2050
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
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
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
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

Table 38: *E+RE- scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Electric Generation - Coal (deaths)		5.62	0.008	0.008	0.005	0.003	0

Table 38: *E+RE- scenario - IMPACTS - Health (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		5.27	3.23	3.28	3.87	2.54	0.573
Premature deaths from air pollution - Mobile - On-Road (deaths)		53.2	52.4	41.8	25.2	11.8	4.54
Premature deaths from air pollution - Gas Stations (deaths)		3.32	3.22	2.53	1.55	0.754	0.332
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		9.21	7.74	5.14	2.82	1.38	0.669
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.281	0.252	0.216	0.176	0.138	0.101
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.588	0.536	0.43	0.317	0.218	0.153
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.054	0.055	0.056	0.056	0.056	0.055
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		13.2	12	9.17	5.87	3.37	1.77
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		1.8	1.53	1.27	1.01	0.762	0.516
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.798	0.704	0.604	0.495	0.379	0.259
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.073	0.012	0.012	0.011	0.011	0.004
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		11.9	12.2	12.6	11.3	9.93	7.77
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million $2019)		49.8	0.067	0.067	0.044	0.027	0
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million $2019)		46.7	28.6	29.1	34.3	22.5	5.07
Monetary damages from air pollution - Mobile - On-Road (million $2019)		473	466	372	224	105	40.3
Monetary damages from air pollution - Gas Stations (million $2019)		29.4	28.5	22.4	13.7	6.68	2.94
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million $2019)		81.7	68.6	45.5	25	12.2	5.93
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million $2019)		2.49	2.23	1.91	1.56	1.23	0.893
Monetary damages from air pollution - Fuel Comb - Residential - Other (million $2019)		5.21	4.75	3.81	2.81	1.93	1.36
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million $2019)		0.48	0.491	0.497	0.497	0.494	0.487
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million $2019)		117	107	81.2	52	29.9	15.7
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million $2019)		15.9	13.5	11.2	8.96	6.74	4.57

Table 38: *E+RE- scenario - IMPACTS - Health (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million $2019)		7.06	6.24	5.35	4.38	3.35	2.29
Monetary damages from air pollution - Industrial Processes - Coal Mining (million $2019)		0.645	0.106	0.105	0.098	0.096	0.036
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million $2019)		105	108	112	100	88.2	69

Table 39: *E+RE- scenario - IMPACTS - Jobs*

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		5.41	7.75	2.59	2.14	1.97	1.71
By economic sector - Construction (jobs)		5,699	6,696	9,480	9,443	8,434	8,797
By economic sector - Manufacturing (jobs)		1,354	1,527	1,764	1,784	1,495	1,485
By economic sector - Mining (jobs)		1,012	725	504	330	209	135
By economic sector - Other (jobs)		753	911	1,540	1,579	1,484	1,919
By economic sector - Pipeline (jobs)		271	264	267	235	197	129
By economic sector - Professional (jobs)		2,151	2,620	3,711	3,813	3,517	4,094
By economic sector - Trade (jobs)		1,618	1,812	2,508	2,556	2,389	2,848
By economic sector - Utilities (jobs)		4,254	5,992	7,663	8,521	8,081	8,502
By resource sector - Biomass (jobs)		18.9	19.9	8.89	7.99	7.71	7.11
By resource sector - CO2 (jobs)		0	225	452	450	448	119
By resource sector - Coal (jobs)		173	32.1	0	0	0	0
By resource sector - Grid (jobs)		6,009	8,892	12,442	14,057	12,905	12,188
By resource sector - Natural Gas (jobs)		3,080	3,563	3,223	3,368	3,514	2,679
By resource sector - Nuclear (jobs)		0	0.006	0.021	0	0	1,704
By resource sector - Oil (jobs)		2,072	1,639	1,165	767	507	348
By resource sector - Solar (jobs)		5,370	5,659	9,429	8,864	7,788	10,241
By resource sector - Wind (jobs)		396	523	720	750	635	623
By education level - All sectors - High school diploma or less (jobs)		7,318	8,760	11,755	12,068	10,972	11,247
By education level - All sectors - Associates degree or some college (jobs)		5,496	6,689	8,974	9,291	8,516	8,741
By education level - All sectors - Bachelors degree (jobs)		3,365	3,985	5,222	5,370	4,910	5,122
By education level - All sectors - Masters or professional degree (jobs)		822	983	1,304	1,347	1,238	1,311
By education level - All sectors - Doctoral degree (jobs)		117	136	185	187	171	192
Related work experience - All sectors - None (jobs)		2,506	3,029	4,053	4,186	3,832	3,939
Related work experience - All sectors - Up to 1 year (jobs)		3,408	4,060	5,493	5,624	5,107	5,328
Related work experience - All sectors - 1 to 4 years (jobs)		6,153	7,387	9,827	10,133	9,263	9,548
Related work experience - All sectors - 4 to 10 years (jobs)		4,019	4,840	6,432	6,634	6,067	6,223
Related work experience - All sectors - Over 10 years (jobs)		1,033	1,238	1,635	1,686	1,538	1,574
On-the-Job Training - All sectors - None (jobs)		929	1,094	1,473	1,503	1,368	1,448
On-the-Job Training - All sectors - Up to 1 year (jobs)		11,028	13,191	17,561	18,084	16,498	17,076
On-the-Job Training - All sectors - 1 to 4 years (jobs)		3,724	4,521	6,044	6,245	5,714	5,821
On-the-Job Training - All sectors - 4 to 10 years (jobs)		1,269	1,553	2,102	2,170	1,989	2,022

Table 39: *E+RE- scenario - IMPACTS - Jobs (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
On-the-Job Training - All sectors - Over 10 years (jobs)		167	194	261	263	236	246
On-Site or In-Plant Training - All sectors - None (jobs)		2,745	3,275	4,388	4,501	4,105	4,287
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		10,066	12,052	16,051	16,536	15,089	15,589
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		2,876	3,483	4,657	4,809	4,397	4,487
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		1,276	1,553	2,087	2,152	1,972	2,001
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		154	190	256	266	244	247
Wage income - All (million $2019)		959	1,169	1,566	1,638	1,519	1,575

Table 40: *E+RE- scenario - PILLAR 1: Efficiency/Electrification - Overview*

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	291	274	249	218	190	171	162
Final energy use - Residential (PJ)	94.5	92.3	87.6	79.2	71.6	67.4	65.8
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

Table 41: *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 42: *E+RE- scenario - PILLAR 1: Efficiency/Electrification - Transportation*

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	43.2	246	450	1,161	1,873	2,441	3,010
Vehicle stocks - LDV – All others (1000 units)	2,510	2,390	2,270	1,654	1,038	588	137
Light-duty vehicle capital costs vs. REF - 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

Table 43: *E+RE- scenario - PILLAR 1: Efficiency/Electrification - Residential*

Item	2020	2025	2030	2035	2040	2045	2050
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 - Gas (%)	74.6	49	18.5	3.73	1.9	1.81	1.81
Sales of space heating units - Fossil (%)	2.25	3.38	1.94	1.18	1.02	0.999	1.02
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
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

Table 43: *E+RE- scenario - PILLAR 1: Efficiency/Electrification - Residential (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018)		3.41	4.55				

Table 44: *E+RE- scenario - PILLAR 1: Efficiency/Electrification - Commercial*

Item	2020	2025	2030	2035	2040	2045	2050
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 - Gas Furnace (%)	92.4	76.1	32.4	4.78	0.723	0.51	0.507
Sales of space heating units - Fossil (%)	0.985	0.209	0.04	0.002	0	0	0
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
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
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		7,465	8,314				

Table 45: *E+RE- scenario - PILLAR 2: Clean Electricity - Generating capacity*

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	809	242	0	0	0	0	0
Installed thermal - Natural gas (MW)	6,575	6,047	11,087	12,141	12,861	11,853	9,125
Installed thermal - Nuclear (MW)	0	0	0.002	0.011	0	0	750
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)	4,971	5,733	6,780	10,691	13,843	15,034	15,034
Installed renewables - Wind - Base land use assumptions (MW)	672	1,169	1,806	3,801	6,015	7,122	8,751
Installed renewables - Solar - Constrained land use assumptions (MW)	4,973	5,877	6,935	8,598	9,911	10,168	10,168
Installed renewables - Wind - Constrained land use assumptions (MW)	152	259	391	1,091	1,323	1,406	2,307
Installed renewables - Offshore Wind - Constrained land use assumptions (MW)	0	0	0	0	0	0	0
Capital invested - Solar PV - Base (billion $2018)		1.02	1.25	4.31	3.28	1.17	0
Capital invested - Wind - Base (billion $2018)		0.732	0.847	2.48	2.62	1.24	1.86
Capital invested - Solar PV - Constrained (billion $2018)		1.21	1.27	1.83	1.36	0.252	0
Capital invested - Wind - Constrained (billion $2018)		0.158	0.176	0.868	0.274	0.093	0.954

Table 46: *E+RE- scenario - PILLAR 2: Clean Electricity - Generation*

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	13,021	14,913	17,524	27,219	34,994	37,937	37,937
Wind - Base land use assumptions (GWh)	1,971	3,423	5,281	10,860	16,962	20,030	24,862
OffshoreWind - Base land use assumptions (GWh)	0	0	0	0	0	0	0

Table 46: *E+RE- scenario - PILLAR 2: Clean Electricity - Generation (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Constrained land use assumptions (GWh)	13,021	15,248	17,820	21,754	24,732	25,315	25,315
Wind - Constrained land use assumptions (GWh)	448	757	1,085	2,768	3,322	3,520	5,281
OffshoreWind - Constrained land use assumptions (GWh)	0	0	0	0	0	0	0

Table 47: *E+RE- scenario - PILLAR 6: Land sinks - Forests*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-791
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 - Low - All (not counting overlap) (1000 tCO2e/y)							-3,666
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-1,185
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
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-6,960
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-1,579
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 47: *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 - All (not counting overlap) (1000 tCO2e/y)							-10,254
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,495
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
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

Table 47: *E+RE- scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
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
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

Table 48: *E+RE- scenario - PILLAR 6: Land sinks - Agriculture*

Item	2020	2025	2030	2035	2040	2045	2050
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
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

Table 48: *E+RE- scenario - PILLAR 6: Land sinks - Agriculture (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							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
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

Table 49: *E-B+ scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Electric Generation - Coal (deaths)		5.62	0.008	0.008	0.005	0.003	0
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		4.43	1.82	1.3	1.09	0.723	0.365
Premature deaths from air pollution - Mobile - On-Road (deaths)		54.2	57.9	59.3	55.9	46.5	33.1
Premature deaths from air pollution - Gas Stations (deaths)		3.4	3.62	3.68	3.45	2.85	2.04
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		9.33	9.15	8.64	7.44	5.58	3.63
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.292	0.28	0.263	0.241	0.217	0.192
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.596	0.618	0.631	0.598	0.507	0.402
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.054	0.055	0.056	0.056	0.056	0.055
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		13.3	13.7	13.7	12.6	10.4	7.72
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		1.8	1.64	1.49	1.34	1.2	1.05
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.798	0.755	0.709	0.654	0.593	0.527
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.085	0.012	0.013	0.013	0.012	0.012

Table 49: *E-B+ scenario - IMPACTS - Health (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		11.7	11.1	10.1	9.14	8.42	6.23
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million $2019)		49.8	0.067	0.067	0.044	0.027	0
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million $2019)		39.2	16.1	11.5	9.69	6.41	3.23
Monetary damages from air pollution - Mobile - On-Road (million $2019)		482	515	527	497	413	295
Monetary damages from air pollution - Gas Stations (million $2019)		30.1	32.1	32.6	30.5	25.3	18
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million $2019)		82.7	81	76.6	66	49.4	32.2
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million $2019)		2.59	2.48	2.33	2.14	1.93	1.7
Monetary damages from air pollution - Fuel Comb - Residential - Other (million $2019)		5.29	5.48	5.59	5.3	4.49	3.56
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million $2019)		0.48	0.491	0.497	0.497	0.494	0.487
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million $2019)		117	122	121	111	91.9	68.4
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million $2019)		15.9	14.5	13.2	11.9	10.6	9.32
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million $2019)		7.06	6.69	6.28	5.79	5.25	4.67
Monetary damages from air pollution - Industrial Processes - Coal Mining (million $2019)		0.748	0.109	0.112	0.112	0.109	0.105
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million $2019)		104	98.8	89.3	81.2	74.8	55.4

Table 50: *E-B+ scenario - IMPACTS - Jobs*

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		5.28	7.39	2.76	2.04	1.7	1.5
By economic sector - Construction (jobs)		5,446	5,745	10,135	9,358	9,902	12,274
By economic sector - Manufacturing (jobs)		1,311	1,594	1,695	1,546	1,661	1,894
By economic sector - Mining (jobs)		1,003	723	529	390	255	138
By economic sector - Other (jobs)		703	776	1,834	1,769	2,022	2,986
By economic sector - Pipeline (jobs)		262	240	227	199	165	94
By economic sector - Professional (jobs)		2,082	2,256	4,030	3,883	4,319	5,715
By economic sector - Trade (jobs)		1,572	1,615	2,812	2,727	3,040	4,144
By economic sector - Utilities (jobs)		4,210	4,726	6,483	6,752	7,640	8,532
By resource sector - Biomass (jobs)		21	19.9	9.35	8.57	7.84	7.07
By resource sector - CO2 (jobs)		0	204	411	409	407	108
By resource sector - Coal (jobs)		173	32.1	0	0	0	0
By resource sector - Grid (jobs)		6,022	7,523	11,121	11,613	13,048	15,776
By resource sector - Natural Gas (jobs)		2,954	2,305	1,943	1,996	2,320	1,674
By resource sector - Nuclear (jobs)		0	0.004	0.009	0	0	0
By resource sector - Oil (jobs)		2,096	1,759	1,481	1,244	911	521

Table 50: *E-B+ scenario - IMPACTS - Jobs (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
By resource sector - Solar (jobs)		4,866	4,881	11,800	10,508	11,285	16,315
By resource sector - Wind (jobs)		462	959	982	848	1,027	1,378
By education level - All sectors - High school diploma or less (jobs)		7,083	7,561	11,931	11,393	12,347	15,183
By education level - All sectors - Associates degree or some college (jobs)		5,323	5,707	9,005	8,674	9,490	11,699
By education level - All sectors - Bachelors degree (jobs)		3,274	3,450	5,287	5,088	5,552	6,865
By education level - All sectors - Masters or professional degree (jobs)		800	846	1,327	1,284	1,410	1,765
By education level - All sectors - Doctoral degree (jobs)		113	118	198	188	206	266
Related work experience - All sectors - None (jobs)		2,429	2,594	4,083	3,930	4,289	5,291
Related work experience - All sectors - Up to 1 year (jobs)		3,294	3,521	5,645	5,376	5,835	7,263
Related work experience - All sectors - 1 to 4 years (jobs)		5,970	6,352	9,916	9,535	10,395	12,815
Related work experience - All sectors - 4 to 10 years (jobs)		3,898	4,147	6,466	6,214	6,773	8,312
Related work experience - All sectors - Over 10 years (jobs)		1,002	1,069	1,639	1,574	1,714	2,098
On-the-Job Training - All sectors - None (jobs)		899	949	1,525	1,454	1,580	1,983
On-the-Job Training - All sectors - Up to 1 year (jobs)		10,698	11,404	17,789	17,077	18,607	22,998
On-the-Job Training - All sectors - 1 to 4 years (jobs)		3,608	3,853	6,052	5,818	6,342	7,764
On-the-Job Training - All sectors - 4 to 10 years (jobs)		1,227	1,307	2,110	2,026	2,206	2,699
On-the-Job Training - All sectors - Over 10 years (jobs)		161	170	270	253	272	335
On-Site or In-Plant Training - All sectors - None (jobs)		2,658	2,825	4,483	4,285	4,668	5,803
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		9,764	10,410	16,243	15,597	16,992	20,984
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		2,787	2,976	4,674	4,491	4,893	5,998
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		1,235	1,311	2,094	2,009	2,185	2,666
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		149	161	253	245	268	327
Wage income - All (million $2019)		931	1,001	1,568	1,530	1,690	2,099

Table 51: *E-B+ scenario - PILLAR 1: Efficiency/Electrification - Overview*

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	291	276	258	242	229	214	195
Final energy use - Residential (PJ)	94.5	92.7	91.9	90.1	85.9	79.9	74.4
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

Table 52: *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 53: *E-B+ scenario - PILLAR 1: Efficiency/Electrification - Transportation*

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	33.5	93.1	153	429	705	1,317	1,928
Vehicle stocks - LDV – All others (1000 units)	2,520	2,520	2,520	2,390	2,261	1,742	1,224
Light-duty vehicle capital costs vs. REF - 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

Table 54: *E-B+ scenario - PILLAR 1: Efficiency/Electrification - Residential*

Item	2020	2025	2030	2035	2040	2045	2050
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 - Gas (%)	74.6	54.3	50.8	40.6	23.5	10.1	4.22
Sales of space heating units - Fossil (%)	2.25	3.63	3.53	2.94	1.99	1.35	1.13
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
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
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018)		3.39	4.49				

Table 55: *E-B+ scenario - PILLAR 1: Efficiency/Electrification - Commercial*

Item	2020	2025	2030	2035	2040	2045	2050
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 - Gas Furnace (%)	92.4	83.3	78.3	63.4	37.5	15.3	4.96
Sales of space heating units - Fossil (%)	0.985	0.242	0.226	0.167	0.082	0.026	0.007
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
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
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		7,460	8,285				

Table 56: *E-B+ scenario - PILLAR 2: Clean Electricity - Generating capacity*

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	809	242	0	0	0	0	0
Installed thermal - Natural gas (MW)	6,545	5,969	6,092	5,977	6,196	5,545	3,839
Installed thermal - Nuclear (MW)	0	0	0.002	0.005	0	0	0

Table 56: *E-B+ scenario - PILLAR 2: Clean Electricity - Generating capacity (continued)*

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 57: *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 power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu allam power plant (GWh)	0	0	0	0	0	0	0

Table 58: *E-B+ scenario - PILLAR 3: Clean fuels - Bioenergy*

Item	2020	2025	2030	2035	2040	2045	2050
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 - 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 - 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
Conversion capital investment - Cumulative 5-yr (million $2018)		0	0	0	0	0	0
Biomass purchases (million $2018/y)		0	0	0	0	0	0

Table 59: *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 - NGCC (MMT)		0	0.01	0.04	0.06	0.04	0.05
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - All (MMT)		0	0.01	0.05	0.11	0.15	0.2
Cumulative - BECCS (MMT)		0	0	0	0	0	0
Cumulative - NGCC (MMT)		0	0.01	0.05	0.11	0.15	0.2
Cumulative - Cement and lime (MMT)		0	0	0	0	0	0

Table 60: *E-B+ scenario - PILLAR 4: CCUS - CO2 pipelines*

Item	2020	2025	2030	2035	2040	2045	2050
Trunk (km)		0	0	0	0	0	0
Spur (km)		0	51.1	102	102	102	102
All (km)		0	51.1	102	102	102	102
Cumulative investment - Trunk (million $2018)		0	0	0	0	0	0
Cumulative investment - Spur (million $2018)		0	26.6	53.4	53.5	53.4	53.4
Cumulative investment - All (million $2018)		0	26.6	53.4	53.5	53.4	53.4

Table 61: *E-B+ scenario - PILLAR 4: CCUS - CO2 storage*

Item	2020	2025	2030	2035	2040	2045	2050
Annual (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 62: *E-B+ scenario - PILLAR 6: Land sinks - Forests*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-791
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 - Low - All (not counting overlap) (1000 tCO2e/y)							-3,666
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-1,185
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
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-6,960
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-1,579
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

Table 62: *E-B+ scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
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 - All (not counting overlap) (1000 tCO2e/y)							-10,254
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,495
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
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

Table 62: *E-B+ scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
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
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

Table 63: *E-B+ scenario - PILLAR 6: Land sinks - Agriculture*

Item	2020	2025	2030	2035	2040	2045	2050
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 - 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 - Total (1000 tCO2e/y)							-115
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

Table 63: *E-B+ scenario - PILLAR 6: Land sinks - Agriculture (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-1.61
Carbon sink potential - Aggressive deployment - Cropland to woody energy crops (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Pasture to energy crops (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-229
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 - 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 - Total (1000 hectares)							162
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 - Permanent conservation cover (1000 hectares)							2.48
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 - Total (1000 hectares)							791

Table 64: *REF scenario - IMPACTS - Health*

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Electric Generation - Coal (deaths)		9.01	5.31	2.87	2.18	2.03	1.91
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		5.4	3.64	3.95	3.71	5.74	5.29
Premature deaths from air pollution - Mobile - On-Road (deaths)		54	58.6	63.1	67.9	72.9	78.1
Premature deaths from air pollution - Gas Stations (deaths)		3.38	3.65	3.91	4.2	4.49	4.77

Table 64: *REF scenario - IMPACTS - Health (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		9.27	9.24	9.28	9.57	10	10.6
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.313	0.321	0.323	0.323	0.327	0.334
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.588	0.623	0.672	0.733	0.796	0.861
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.057	0.061	0.064	0.068	0.071	0.074
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		13.4	13.8	13.5	13.1	13.3	14.2
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		1.88	1.93	2.01	2.1	2.2	2.3
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.834	0.896	0.964	1.03	1.1	1.16
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.227	0.156	0.126	0.124	0.123	0.118
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		11.8	13.2	14.4	14.5	15.2	15
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million $2019)		79.8	47.1	25.4	19.4	18	16.9
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million $2019)		47.8	32.2	35	32.9	50.9	46.9
Monetary damages from air pollution - Mobile - On-Road (million $2019)		480	521	561	604	648	695
Monetary damages from air pollution - Gas Stations (million $2019)		29.9	32.3	34.6	37.2	39.8	42.2
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million $2019)		82.1	81.9	82.3	84.8	89	93.5
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million $2019)		2.78	2.84	2.86	2.87	2.9	2.96
Monetary damages from air pollution - Fuel Comb - Residential - Other (million $2019)		5.21	5.52	5.96	6.5	7.05	7.63
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million $2019)		0.502	0.537	0.57	0.601	0.63	0.657
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million $2019)		118	122	119	116	117	126
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million $2019)		16.6	17.1	17.8	18.6	19.5	20.4
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million $2019)		7.38	7.93	8.53	9.12	9.71	10.3
Monetary damages from air pollution - Industrial Processes - Coal Mining (million $2019)		2	1.38	1.11	1.09	1.08	1.04

Table 64: *REF scenario - IMPACTS - Health (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million $2019)		104	117	128	129	135	134

Table 65: *REF scenario - IMPACTS - Jobs*

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		5	4.49	4.43	3.61	3.6	3.91
By economic sector - Construction (jobs)		2,428	4,515	5,047	5,188	5,644	6,837
By economic sector - Manufacturing (jobs)		888	1,082	1,275	1,273	1,228	1,237
By economic sector - Mining (jobs)		1,022	842	694	556	473	398
By economic sector - Other (jobs)		114	565	703	797	902	1,480
By economic sector - Pipeline (jobs)		270	283	287	271	274	271
By economic sector - Professional (jobs)		1,024	1,711	1,935	2,050	2,312	2,966
By economic sector - Trade (jobs)		896	1,324	1,455	1,531	1,710	2,290
By economic sector - Utilities (jobs)		3,530	3,870	4,344	4,476	5,355	4,987
By resource sector - Biomass (jobs)		19.3	18.1	16.8	15	15.3	15.6
By resource sector - CO2 (jobs)		0	0	0	0	0	0
By resource sector - Coal (jobs)		173	90.5	85.8	31	0	0
By resource sector - Grid (jobs)		4,681	5,389	6,201	6,419	7,269	7,244
By resource sector - Natural Gas (jobs)		3,053	3,051	3,203	3,202	4,123	3,346
By resource sector - Nuclear (jobs)		0	0.002	0.005	0.005	0.012	0
By resource sector - Oil (jobs)		2,118	1,813	1,601	1,486	1,420	1,369
By resource sector - Solar (jobs)			3,499	4,220	4,524	4,707	8,094
By resource sector - Wind (jobs)		135	334	417	468	367	403
By education level - All sectors - High school diploma or less (jobs)		4,242	6,051	6,723	6,886	7,596	8,699
By education level - All sectors - Associates degree or some college (jobs)		3,252	4,571	5,100	5,247	5,858	6,675
By education level - All sectors - Bachelors degree (jobs)		2,114	2,797	3,067	3,133	3,469	3,956
By education level - All sectors - Masters or professional degree (jobs)		508	682	751	771	860	996
By education level - All sectors - Doctoral degree (jobs)		63.2	94.2	104	107	119	146
Related work experience - All sectors - None (jobs)		1,495	2,087	2,321	2,385	2,656	3,036
Related work experience - All sectors - Up to 1 year (jobs)		1,903	2,789	3,106	3,188	3,504	4,091
Related work experience - All sectors - 1 to 4 years (jobs)		3,720	5,118	5,666	5,809	6,449	7,355
Related work experience - All sectors - 4 to 10 years (jobs)		2,427	3,342	3,701	3,793	4,219	4,781
Related work experience - All sectors - Over 10 years (jobs)		633	859	950	970	1,073	1,208
On-the-Job Training - All sectors - None (jobs)		528	760	841	863	950	1,122
On-the-Job Training - All sectors - Up to 1 year (jobs)		6,614	9,143	10,131	10,382	11,481	13,154
On-the-Job Training - All sectors - 1 to 4 years (jobs)		2,218	3,101	3,447	3,537	3,944	4,457
On-the-Job Training - All sectors - 4 to 10 years (jobs)		729	1,056	1,177	1,211	1,361	1,546
On-the-Job Training - All sectors - Over 10 years (jobs)		89.6	135	149	152	166	193
On-Site or In-Plant Training - All sectors - None (jobs)		1,587	2,258	2,505	2,571	2,843	3,298
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		6,042	8,352	9,254	9,483	10,493	12,006

Table 65: *REF scenario - IMPACTS - Jobs (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		1,711	2,393	2,660	2,729	3,037	3,441
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		747	1,064	1,181	1,213	1,360	1,538
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		92.3	129	145	149	168	188
Wage income - All (million $2019)		591	811	906	940	1,060	1,211

Table 66: *REF scenario - PILLAR 1: Efficiency/Electrification - Overview*

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	291	280	269	263	267	277	288
Final energy use - Residential (PJ)	94.5	93.4	95	97.3	101	105	108
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

Table 67: *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 68: *REF scenario - PILLAR 1: Efficiency/Electrification - Residential*

Item	2020	2025	2030	2035	2040	2045	2050
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 - Gas (%)	75.5	49.2	48.8	48.1	47.9	47.8	47.7
Sales of space heating units - Fossil (%)	2.27	2.79	2.82	2.75	2.59	2.52	2.58
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
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
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion $2018)		3.21	3.39				

Table 69: *REF scenario - PILLAR 1: Efficiency/Electrification - Commercial*

Item	2020	2025	2030	2035	2040	2045	2050
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 - Gas Furnace (%)	92.4	70.9	25.9	6.85	1.34	0.57	0.508
Sales of space heating units - Fossil (%)	0.985	0.211	0.092	0.03	0.004	0	0
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
Sales of water heating units - Gas Furnace (%)	98.1	98.1	98.1	98.1	98.1	98.1	98.1

Table 69: *REF scenario - PILLAR 1: Efficiency/Electrification - Commercial (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Sales of water heating units - Other (%)	0.365	0.384	0.383	0.384	0.383	0.384	0.383
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
Commercial HVAC investment in 2020s - Cumulative 5-yr (million $2018)		7,365	7,706				

Table 70: *REF scenario - PILLAR 2: Clean Electricity - Generating capacity*

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	809	242	242	242	0	0	0
Installed thermal - Natural gas (MW)	6,564	6,056	6,315	6,808	6,833	7,895	6,118
Installed thermal - Nuclear (MW)	0	0	0.001	0.003	0.005	0.009	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)	4,809	4,809	4,809	4,809	4,809	4,809	4,809
Installed renewables - Wind - Base land use assumptions (MW)	1,083	1,083	2,113	2,457	2,869	3,437	4,780
Installed renewables - Solar - Constrained land use assumptions (MW)	162	162	162	162	162	162	162

Table 71: *REF scenario - PILLAR 2: Clean Electricity - Generation*

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	13,021	13,021	13,021	13,021	13,021	13,021	13,021
Wind - Base land use assumptions (GWh)	3,183	3,183	6,139	7,102	8,269	9,863	13,558
OffshoreWind - Base land use assumptions (GWh)	0	0	0	0	0	0	0

Table 72: *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 73: *REF scenario - PILLAR 6: Land sinks - Forests*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-791
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

Table 73: *REF scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-3,666
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-1,185
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
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-6,960
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-1,579
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 - All (not counting overlap) (1000 tCO2e/y)							-10,254
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-2,495
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

Table 73: *REF scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							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
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

Table 73: *REF scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
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