



## Net-Zero America - New Mexico data

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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)		11.1	0.009	0.009	0.007	0.004	0
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		3.19	2.12	1.55	1.43	0.89	0.391
Premature deaths from air pollution - Mobile - On-Road (deaths)		24.2	23	17.8	10.5	4.84	1.9
Premature deaths from air pollution - Gas Stations (deaths)		1.97	1.85	1.43	0.867	0.438	0.22
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		3.65	3.08	2.08	1.14	0.537	0.219
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.041	0.035	0.028	0.02	0.013	0.009
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.485	0.435	0.334	0.225	0.131	0.073
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.082	0.08	0.078	0.075	0.072	0.068
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		2.72	2.38	1.75	1.09	0.602	0.305
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		0.393	0.322	0.26	0.201	0.147	0.097
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.291	0.248	0.206	0.164	0.122	0.082
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.36	0.042	0.039	0.035	0.032	0.031
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		67.9	65	60.3	47.8	36.1	22.8
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019)		98.7	0.084	0.083	0.061	0.038	0
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019)		28.2	18.7	13.7	12.7	7.88	3.46
Monetary damages from air pollution - Mobile - On-Road (million \$2019)		215	204	159	93.1	43	16.9
Monetary damages from air pollution - Gas Stations (million \$2019)		17.5	16.4	12.6	7.67	3.88	1.95
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019)		32.3	27.3	18.4	10.1	4.76	1.94
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019)		0.359	0.314	0.245	0.174	0.117	0.076
Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019)		4.3	3.85	2.96	1.99	1.16	0.646
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019)		0.729	0.71	0.689	0.664	0.636	0.604
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019)		24	21.1	15.5	9.61	5.33	2.7

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)		3.48	2.85	2.3	1.78	1.3	0.862
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019)		2.57	2.2	1.82	1.45	1.08	0.722
Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019)		3.17	0.374	0.346	0.305	0.281	0.271
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019)		603	577	535	424	321	202

Table 2: *E+ scenario - IMPACTS - Jobs*

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		1.68	3.41	1.3	24.8	108	185
By economic sector - Construction (jobs)		14,979	19,068	23,318	22,049	21,347	22,286
By economic sector - Manufacturing (jobs)		9,691	11,725	12,739	11,189	9,576	9,205
By economic sector - Mining (jobs)		12,759	10,124	7,932	5,181	3,363	1,824
By economic sector - Other (jobs)		1,576	2,333	3,204	3,060	3,085	3,451
By economic sector - Pipeline (jobs)		1,194	1,122	1,031	808	649	521
By economic sector - Professional (jobs)		7,678	9,560	11,819	11,855	12,181	13,420
By economic sector - Trade (jobs)		8,152	8,721	9,666	8,826	8,482	8,756
By economic sector - Utilities (jobs)		8,348	11,363	14,880	16,208	16,675	18,424
By resource sector - Biomass (jobs)		7.22	9.41	3.72	74.7	395	792
By resource sector - CO2 (jobs)		2.01	52.4	65.5	75.4	394	1,115
By resource sector - Coal (jobs)		742	121	10.2	7.55	5.87	4.93
By resource sector - Grid (jobs)		11,793	18,738	26,703	29,583	31,103	34,471
By resource sector - Natural Gas (jobs)		11,032	9,084	6,953	5,555	3,588	2,220
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		24,959	22,653	20,474	14,926	11,195	6,939
By resource sector - Solar (jobs)		11,053	14,862	19,260	16,083	14,560	15,377
By resource sector - Wind (jobs)		4,791	8,500	11,120	12,897	14,226	17,156
By education level - All sectors - High school diploma or less (jobs)		26,638	30,929	35,505	33,134	31,460	32,403
By education level - All sectors - Associates degree or some college (jobs)		19,138	22,507	26,156	24,822	23,847	24,956
By education level - All sectors - Bachelors degree (jobs)		14,619	16,148	17,935	16,565	15,656	16,028
By education level - All sectors - Masters or professional degree (jobs)		3,475	3,867	4,349	4,076	3,914	4,070
By education level - All sectors - Doctoral degree (jobs)		508	568	644	605	589	618
Related work experience - All sectors - None (jobs)		9,068	10,517	12,100	11,380	10,877	11,285
Related work experience - All sectors - Up to 1 year (jobs)		12,489	14,549	16,753	15,648	14,913	15,470
Related work experience - All sectors - 1 to 4 years (jobs)		23,669	27,014	30,734	28,731	27,342	28,205
Related work experience - All sectors - 4 to 10 years (jobs)		15,050	17,276	19,734	18,535	17,690	18,333
Related work experience - All sectors - Over 10 years (jobs)		4,103	4,664	5,267	4,908	4,644	4,781
On-the-Job Training - All sectors - None (jobs)		3,665	4,141	4,678	4,320	4,093	4,215
On-the-Job Training - All sectors - Up to 1 year (jobs)		43,120	49,234	55,925	52,126	49,504	51,024

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)		13,059	15,237	17,615	16,662	15,967	16,633
On-the-Job Training - All sectors - 4 to 10 years (jobs)		3,900	4,675	5,544	5,334	5,192	5,477
On-the-Job Training - All sectors - Over 10 years (jobs)		635	732	828	759	710	725
On-Site or In-Plant Training - All sectors - None (jobs)		10,412	11,962	13,654	12,758	12,162	12,626
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		39,084	44,654	50,764	47,342	44,970	46,353
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		10,236	11,914	13,740	12,956	12,389	12,868
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		4,154	4,895	5,727	5,464	5,284	5,530
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		492	595	705	681	661	697
Wage income - All (million \$2019)		3,533	4,048	4,633	4,384	4,221	4,402

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

Item	2020	2025	2030	2035	2040	2045	2050
Oil consumption - Annual (million bbls)		45.5	39.3	30	21.1	14.1	8.13
Oil consumption - Cumulative (million bbls)							919
Oil production - Annual (million bbls)		323	324	323	256	208	139
Natural gas consumption - Annual (tcf)		210	177	142	107	67.3	46.7
Natural gas consumption - Cumulative (tcf)							4,279
Natural gas production - Annual (tcf)		1,660	1,569	1,367	1,156	917	712

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	268	250	222	187	156	137	129
Final energy use - Residential (PJ)	73.6	69.9	64.4	56.2	48.8	44.3	42
Final energy use - Commercial (PJ)	61.7	61.5	59.1	55.3	51.5	49.4	48.9
Final energy use - Industry (PJ)	35.8	36.3	35.9	36.6	38.7	39.4	40.1

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)		1.12	1.17	2.25	2.43	2.16	2.28

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	11.1	160	309	830	1,351	1,767	2,184
Vehicle stocks - LDV – All others (1000 units)	1,821	1,734	1,647	1,200	753	426	99.1
Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018)		350	897	1,453	2,201	2,395	2,284
Public EV charging plugs - DC Fast (1000 units)	0.099		0.64		2.8		4.53
Public EV charging plugs - L2 (1000 units)	0.151		15.4		67.5		109

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 (%)	5.11	20.2	63.3	85.3	88.8	89.3	89
Sales of space heating units - Electric Resistance (%)	6.51	10.4	5.63	3.21	2.94	2.96	2.97
Sales of space heating units - Gas (%)	78.2	54.7	20.9	4.15	2.05	1.95	1.94
Sales of space heating units - Fossil (%)	10.2	14.7	10.2	7.32	6.18	5.78	6.11
Sales of water heating units - Electric Heat Pump (%)	0	7.63	42.7	57.5	59.2	59.2	59.2
Sales of water heating units - Electric Resistance (%)	11.7	24.2	31.3	38.3	39.4	39.5	39.5
Sales of water heating units - Gas Furnace (%)	87.3	67	24.8	2.98	0.155	0	0
Sales of water heating units - Other (%)	1.03	1.2	1.22	1.23	1.24	1.24	1.25
Sales of cooking units - Electric Resistance (%)	41.9	54.2	92.2	99.6	100	100	100
Sales of cooking units - Gas (%)	58.1	45.8	7.83	0.394	0	0	0
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018)		1.87	2.24				

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 (%)	1.58	19.8	62.6	88.7	92.5	92.6	92.7
Sales of space heating units - Electric Resistance (%)	1.76	3.39	4.14	6.37	6.83	6.86	6.85
Sales of space heating units - Gas Furnace (%)	96.7	76.6	33.3	4.92	0.721	0.496	0.493
Sales of space heating units - Fossil (%)	0	0.199	0.038	0.002	0	0	0
Sales of water heating units - Electric Heat Pump (%)	0.016	7.95	44.7	60.9	62.8	62.9	62.9
Sales of water heating units - Electric Resistance (%)	0.796	4.99	22.9	34.8	36.6	36.7	36.7
Sales of water heating units - Gas Furnace (%)	99	86.7	32.1	3.86	0.201	0	0
Sales of water heating units - Other (%)	0.192	0.382	0.382	0.383	0.381	0.382	0.382
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)		5,003	5,574				

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	2,817	812	0	0	0	0	0
Installed thermal - Natural gas (MW)	3,072	2,406	3,854	3,872	5,259	4,108	3,706
Installed thermal - Nuclear (MW)	0	0	0	0	0	0	0
Installed renewables - Rooftop PV (MW)	209	318	427	564	734	941	1,198
Installed renewables - Solar - Base land use assumptions (MW)	853	6,698	14,428	24,525	29,704	33,028	35,151
Installed renewables - Wind - Base land use assumptions (MW)	10,544	16,928	31,213	47,864	59,287	67,230	79,939
Installed renewables - Solar - Constrained land use assumptions (MW)	831	1,024	1,024	1,663	3,344	3,796	4,363
Installed renewables - Wind - Constrained land use assumptions (MW)	7,298	16,188	26,023	42,410	52,711	56,858	61,283
Capital invested - Solar PV - Base (billion \$2018)		7.83	9.25	11.1	5.38	3.26	1.97

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)		14.4	19	20.7	13.5	8.91	13.5
Capital invested - Solar PV - Constrained (billion \$2018)		0.876	0	0	1.04	1.02	1.11
Capital invested - Wind - Constrained (billion \$2018)		14.6	12.8	18.5	13.6	5.1	14.3
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	0.01	0.021
Capital invested - Biomass w/ccu power plant (billion \$2018)	0	0	0	0	0	0.014	0.004

Table 10: E+ scenario - PILLAR 2: Clean Electricity - Generation

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	2,269	16,269	34,759	58,929	71,311	79,263	84,328
Wind - Base land use assumptions (GWh)	24,562	56,279	100,693	149,990	182,982	206,596	243,385
OffshoreWind - Base land use assumptions (GWh)	0	0	0	0	0	0	0
Solar - Constrained land use assumptions (GWh)	1,588	2,051	2,051	3,596	7,637	8,723	10,044
Wind - Constrained land use assumptions (GWh)	24,176	49,750	74,379	111,222	133,115	140,843	150,049
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	16	20.1
Biomass w/ccu allam power plant (GWh)	0	0	0	0	0	9.98	30.8

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	1	1
Number of facilities - Allam power w ccu (quantity)	0	0	0	0	0	1	1
Number of facilities - Beccs hydrogen (quantity)	0	0	0	0	1	3	6
Number of facilities - Diesel (quantity)	0	0	0	0	0	0	0
Number of facilities - Diesel ccu (quantity)	0	0	0	0	0	1	1
Number of facilities - Pyrolysis (quantity)	0	0	0	0	0	0	0
Number of facilities - Pyrolysis ccu (quantity)	0	0	0	0	0	1	1
Number of facilities - Sng (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng ccu (quantity)	0	0	0	0	0	1	1
Conversion capital investment - Cumulative 5-yr (million \$2018)		0	0	0	203	1,035	1,602
Biomass purchases (million \$2018/y)		0	0	0	14.2	85.6	195

Table 12: E+ scenario - PILLAR 4: CCUS - CO2 capture

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0	0	0.26	1.57	3.58
Annual - BECCS (MMT)		0	0	0	0.26	1.57	3.58
Annual - NGCC (MMT)		0	0	0	0	0	0
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - All (MMT)		0	0	0	0.26	1.83	5.41
Cumulative - BECCS (MMT)		0	0	0	0.26	1.83	5.41



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

Item	2020	2025	2030	2035	2040	2045	2050
Cumulative - NGCC (MMT)		0	0	0	0	0	0
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	0	0	35.9	681	1,245
All (km)		0	0	0	35.9	681	1,245
Cumulative investment - Trunk (million \$2018)		0	0	0	0	0	0
Cumulative investment - Spur (million \$2018)		0	0	0	20.2	379	709
Cumulative investment - All (million \$2018)		0	0	0	20.2	379	709

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual (MMT)		0	0	3.52	5.42	10.3	13.1
Injection wells (wells)		0	0	4	6	12	14
Resource characterization, appraisal, permitting costs (million \$2020)		5.15	92.7	147	147	147	147
Wells and facilities construction costs (million \$2020)		0	28.4	111	197	330	410

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)							-1,622
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-193
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,718
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-5.92
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-34.4
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-128
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,680
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-92.1
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,150
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-10,623
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-2,429
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-674
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-6,700
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-8.68
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-68.9

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)							-247
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,020
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-654
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-4,264
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-19,065
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-3,236
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,156
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-9,681
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-11.6
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-103
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-365
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,360
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-1,215
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-27,508
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-6,378
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							265
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							147
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,891
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							2.15
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)							18.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							177
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							5.99
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,279
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,786
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							397

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)							152
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,414
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							3.23
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)							26.5
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							266
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							43.3
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,576
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							6,878
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							529
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							157
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,937
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							4.29
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)							34.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							354
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							34.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,114
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							8,165

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)							-261
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-15.8
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-277
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-506
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-31.7
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-538
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)							358
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							24.3
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							382
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)							691
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							48.6
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							739

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)		11.1	0.009	0.009	0.007	0.004	0
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		3.24	1.65	1.05	0.62	0.289	0.166
Premature deaths from air pollution - Mobile - On-Road (deaths)		24.5	25.2	25.1	23.1	18.8	13.1
Premature deaths from air pollution - Gas Stations (deaths)		2.01	2.06	2.02	1.85	1.5	1.06
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		3.69	3.52	3.27	2.79	2.09	1.37
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.042	0.04	0.037	0.033	0.029	0.024

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)		0.491	0.493	0.49	0.452	0.365	0.267
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.082	0.08	0.078	0.075	0.072	0.068
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		2.74	2.7	2.59	2.31	1.85	1.34
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		0.393	0.346	0.306	0.268	0.232	0.198
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.291	0.266	0.242	0.217	0.191	0.166
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.339	0.043	0.042	0.04	0.032	0.02
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		67.8	62.7	55.7	49.7	44.8	31.8
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019)		98.7	0.084	0.083	0.061	0.038	0
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019)		28.7	14.7	9.34	5.49	2.56	1.47
Monetary damages from air pollution - Mobile - On-Road (million \$2019)		218	224	223	205	167	117
Monetary damages from air pollution - Gas Stations (million \$2019)		17.8	18.2	17.9	16.4	13.3	9.4
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019)		32.7	31.2	29	24.7	18.6	12.1
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019)		0.371	0.357	0.331	0.294	0.253	0.21
Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019)		4.35	4.37	4.35	4	3.24	2.37
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019)		0.729	0.71	0.689	0.664	0.636	0.604
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019)		24.2	23.9	22.9	20.4	16.4	11.9
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019)		3.48	3.06	2.71	2.37	2.06	1.75
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019)		2.57	2.35	2.14	1.92	1.69	1.47
Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019)		2.99	0.382	0.374	0.352	0.285	0.175
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019)		602	556	494	442	398	282

Table 18: E- scenario - IMPACTS - Jobs

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		2.05	2.62	1	43.8	152	185
By economic sector - Construction (jobs)		15,434	19,401	20,779	20,461	23,698	25,829
By economic sector - Manufacturing (jobs)		9,822	11,849	11,686	11,339	12,202	11,506
By economic sector - Mining (jobs)		12,750	9,978	7,722	5,934	4,572	2,674
By economic sector - Other (jobs)		1,654	2,427	2,784	2,744	3,238	3,715
By economic sector - Pipeline (jobs)		1,194	1,097	995	914	893	796
By economic sector - Professional (jobs)		7,857	9,686	10,725	11,251	13,603	15,675
By economic sector - Trade (jobs)		8,258	8,810	9,010	8,846	9,810	10,375
By economic sector - Utilities (jobs)		8,517	11,120	12,731	13,798	18,168	21,314
By resource sector - Biomass (jobs)		7.77	7.06	3.33	184	648	765
By resource sector - CO2 (jobs)		2.39	84.1	111	133	675	1,906
By resource sector - Coal (jobs)		733	121	11.2	8.95	5.99	2.73
By resource sector - Grid (jobs)		12,122	18,723	22,880	25,406	33,778	39,167
By resource sector - Natural Gas (jobs)		11,000	8,181	5,688	4,191	3,560	2,709
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		24,982	22,774	20,800	18,618	16,362	10,499
By resource sector - Solar (jobs)		11,665	15,622	16,428	14,249	15,074	15,419
By resource sector - Wind (jobs)		4,975	8,859	10,513	12,543	16,232	21,600
By education level - All sectors - High school diploma or less (jobs)		27,121	31,116	32,035	31,502	36,046	38,171
By education level - All sectors - Associates degree or some college (jobs)		19,497	22,607	23,481	23,303	27,050	29,308
By education level - All sectors - Bachelors degree (jobs)		14,827	16,197	16,368	16,027	18,089	19,049
By education level - All sectors - Masters or professional degree (jobs)		3,527	3,879	3,960	3,915	4,479	4,811
By education level - All sectors - Doctoral degree (jobs)		516	572	589	586	671	729
Related work experience - All sectors - None (jobs)		9,229	10,563	10,908	10,779	12,414	13,281
Related work experience - All sectors - Up to 1 year (jobs)		12,724	14,663	15,116	14,874	17,051	18,173
Related work experience - All sectors - 1 to 4 years (jobs)		24,060	27,124	27,819	27,406	31,333	33,314
Related work experience - All sectors - 4 to 10 years (jobs)		15,306	17,342	17,824	17,592	20,200	21,639
Related work experience - All sectors - Over 10 years (jobs)		4,168	4,679	4,766	4,681	5,336	5,661
On-the-Job Training - All sectors - None (jobs)		3,728	4,169	4,245	4,144	4,691	4,964
On-the-Job Training - All sectors - Up to 1 year (jobs)		43,833	49,473	50,662	49,858	56,897	60,283
On-the-Job Training - All sectors - 1 to 4 years (jobs)		13,298	15,296	15,830	15,665	18,123	19,563
On-the-Job Training - All sectors - 4 to 10 years (jobs)		3,982	4,695	4,948	4,939	5,807	6,400
On-the-Job Training - All sectors - Over 10 years (jobs)		647	738	749	726	816	858
On-Site or In-Plant Training - All sectors - None (jobs)		10,596	12,032	12,342	12,142	13,896	14,870
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		39,733	44,866	45,965	45,238	51,651	54,748
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		10,421	11,963	12,363	12,218	14,095	15,145
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		4,235	4,912	5,132	5,102	5,947	6,487
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		502	597	630	633	746	818
Wage income - All (million \$2019)		3,588	4,058	4,196	4,185	4,843	5,211

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	268	252	231	214	201	186	169
Final energy use - Residential (PJ)	73.6	70.2	68	65.4	60.8	55.1	49.4
Final energy use - Commercial (PJ)	61.7	61.6	61.1	60.2	58.4	56.2	54.2
Final energy use - Industry (PJ)	35.8	36.3	36.1	37.2	39.6	40.4	41.1

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)		0.866	0.891	1.24	1.3	1.97	2.11

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	8.61	52.4	96.1	299	502	950	1,399
Vehicle stocks - LDV – All others (1000 units)	1,828	1,828	1,828	1,734	1,640	1,264	888
Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018)		0	56.7	119	402	1,263	1,841
Public EV charging plugs - DC Fast (1000 units)	0.099		0.199		1.04		2.9
Public EV charging plugs - L2 (1000 units)	0.151		4.8		25.1		69.9

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 (%)	5.11	12.8	17.7	32.4	57.3	77.2	85.4
Sales of space heating units - Electric Resistance (%)	6.51	11.2	10.6	9.06	6.48	4.32	3.36
Sales of space heating units - Gas (%)	78.2	60.4	56.3	45.5	27	11.7	4.76
Sales of space heating units - Fossil (%)	10.2	15.5	15.4	13.1	9.22	6.81	6.5
Sales of water heating units - Electric Heat Pump (%)	0	1.41	5.41	17.1	36.2	50.8	56.8
Sales of water heating units - Electric Resistance (%)	11.7	23.2	24.2	26.7	31.4	36	38.4
Sales of water heating units - Gas Furnace (%)	87.3	74.1	69.2	55	31.1	12	3.54
Sales of water heating units - Other (%)	1.03	1.2	1.22	1.23	1.24	1.24	1.25
Sales of cooking units - Electric Resistance (%)	41.7	43.2	48.5	62.6	82.2	94.2	98.5
Sales of cooking units - Gas (%)	58.3	56.8	51.5	37.4	17.8	5.75	1.55
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018)		1.86	2.24				

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 (%)	1.58	12.8	17.7	32.2	57.3	78.6	88.4
Sales of space heating units - Electric Resistance (%)	1.76	3.37	3.45	3.77	4.61	5.79	6.51
Sales of space heating units - Gas Furnace (%)	96.7	83.6	78.7	63.9	38	15.6	5.05
Sales of space heating units - Fossil (%)	0	0.23	0.214	0.159	0.078	0.025	0.007
Sales of water heating units - Electric Heat Pump (%)	0.016	1.51	5.7	18	38.2	53.7	60.3
Sales of water heating units - Electric Resistance (%)	0.796	2.19	4.23	10.3	21	30.4	34.7

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 (%)	99	95.9	89.7	71.3	40.4	15.6	4.61
Sales of water heating units - Other (%)	0.192	0.382	0.382	0.383	0.381	0.382	0.382
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)		5,000	5,547				

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	2,817	812	0	0	0	0	0
Installed thermal - Natural gas (MW)	3,072	2,406	2,362	2,362	1,910	3,364	3,730
Installed thermal - Nuclear (MW)	0	0	0	0	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)							-1,622
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-193
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,718
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-5.92
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-34.4
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-128
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,680
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-92.1
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,150
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-10,623
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-2,429
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-674
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-6,700
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-8.68
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-68.9
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-247
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,020
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-654
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-4,264
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-19,065



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)							-3,236
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,156
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-9,681
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-11.6
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-103
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-365
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,360
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-1,215
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-27,508
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-6,378
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							265
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							147
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,891
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							2.15
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)							18.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							177
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							5.99
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,279
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,786
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							397
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							152
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,414
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							3.23

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)							26.5
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							266
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							43.3
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,576
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							6,878
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							529
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							157
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,937
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							4.29
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)							34.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							354
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							34.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,114
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							8,165

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)							-261
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-15.8
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-277

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)							-506
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-31.7
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-538
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)							358
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							24.3
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							382
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)							691
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							48.6
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							739

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)		11.1	0.009	0.009	0.007	0.004	0
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		2.86	1.69	0.808	0.626	0.31	0.144
Premature deaths from air pollution - Mobile - On-Road (deaths)		24.2	23	17.8	10.5	4.84	1.9
Premature deaths from air pollution - Gas Stations (deaths)		1.97	1.85	1.43	0.867	0.438	0.22
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		3.65	3.08	2.08	1.14	0.537	0.219
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.041	0.035	0.028	0.02	0.013	0.009
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.485	0.435	0.334	0.225	0.131	0.073
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.082	0.08	0.078	0.075	0.072	0.068
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		2.72	2.38	1.75	1.09	0.602	0.305

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)		0.393	0.322	0.26	0.201	0.147	0.097
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.291	0.248	0.206	0.164	0.122	0.082
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.413	0.042	0.039	0.034	0.031	0.006
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		66.8	64.1	56.5	41.4	25.9	4
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019)		98.7	0.084	0.083	0.061	0.038	0
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019)		25.3	15	7.16	5.55	2.74	1.27
Monetary damages from air pollution - Mobile - On-Road (million \$2019)		215	204	159	93.1	43	16.9
Monetary damages from air pollution - Gas Stations (million \$2019)		17.5	16.4	12.6	7.67	3.88	1.95
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019)		32.3	27.3	18.4	10.1	4.76	1.94
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019)		0.359	0.314	0.245	0.174	0.117	0.076
Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019)		4.3	3.85	2.96	1.99	1.16	0.646
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019)		0.729	0.71	0.689	0.664	0.636	0.604
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019)		24	21.1	15.5	9.61	5.33	2.7
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019)		3.48	2.85	2.3	1.78	1.3	0.862
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019)		2.57	2.2	1.82	1.45	1.08	0.722
Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019)		3.64	0.375	0.343	0.3	0.276	0.056
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019)		594	569	501	367	230	35.5

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		1.69	3.51	1.3	22.7	92.4	186
By economic sector - Construction (jobs)		15,621	23,531	23,220	23,531	30,669	33,523
By economic sector - Manufacturing (jobs)		10,508	12,563	14,565	14,026	12,936	17,786
By economic sector - Mining (jobs)		12,645	10,001	7,514	4,571	2,473	388
By economic sector - Other (jobs)		1,675	3,287	3,034	3,019	4,799	5,504
By economic sector - Pipeline (jobs)		1,178	1,106	966	698	448	96.6
By economic sector - Professional (jobs)		7,974	11,276	12,235	13,361	17,822	21,411

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Trade (jobs)		8,308	9,832	9,662	9,279	11,506	12,848
By economic sector - Utilities (jobs)		8,669	12,372	15,348	18,570	24,231	28,592
By resource sector - Biomass (jobs)		6.58	9.9	3.49	74.3	343	819
By resource sector - CO2 (jobs)		0	0	0	0	0	0
By resource sector - Coal (jobs)		764	121	10.1	7.39	5.75	0.016
By resource sector - Grid (jobs)		12,530	21,017	27,996	34,594	46,524	55,796
By resource sector - Natural Gas (jobs)		10,681	8,506	5,944	4,471	2,657	937
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		24,960	22,635	19,951	13,703	8,759	1,748
By resource sector - Solar (jobs)		12,102	22,431	17,483	14,764	22,713	24,409
By resource sector - Wind (jobs)		5,537	9,251	15,158	19,466	23,975	36,626
By education level - All sectors - High school diploma or less (jobs)		27,603	35,303	36,263	36,308	43,667	49,715
By education level - All sectors - Associates degree or some college (jobs)		19,851	25,719	26,810	27,443	33,593	38,927
By education level - All sectors - Bachelors degree (jobs)		15,035	17,973	18,372	18,188	21,462	24,503
By education level - All sectors - Masters or professional degree (jobs)		3,569	4,328	4,446	4,478	5,431	6,243
By education level - All sectors - Doctoral degree (jobs)		521	647	657	662	824	947
Related work experience - All sectors - None (jobs)		9,380	11,963	12,349	12,475	15,143	17,320
Related work experience - All sectors - Up to 1 year (jobs)		12,968	16,708	17,169	17,239	20,904	24,097
Related work experience - All sectors - 1 to 4 years (jobs)		24,439	30,509	31,412	31,522	37,862	43,228
Related work experience - All sectors - 4 to 10 years (jobs)		15,551	19,553	20,197	20,409	24,632	28,261
Related work experience - All sectors - Over 10 years (jobs)		4,242	5,238	5,419	5,434	6,436	7,429
On-the-Job Training - All sectors - None (jobs)		3,784	4,718	4,766	4,711	5,688	6,476
On-the-Job Training - All sectors - Up to 1 year (jobs)		44,588	55,607	57,326	57,369	68,559	78,675
On-the-Job Training - All sectors - 1 to 4 years (jobs)		13,516	17,375	17,999	18,344	22,382	25,694
On-the-Job Training - All sectors - 4 to 10 years (jobs)		4,032	5,430	5,604	5,816	7,357	8,350
On-the-Job Training - All sectors - Over 10 years (jobs)		660	841	851	838	990	1,139
On-Site or In-Plant Training - All sectors - None (jobs)		10,779	13,629	13,997	14,066	17,020	19,656
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		40,409	50,454	51,997	52,062	62,286	71,379
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		10,594	13,571	14,039	14,249	17,318	19,842
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		4,286	5,634	5,792	5,949	7,418	8,377
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		511	683	722	753	935	1,081
Wage income - All (million \$2019)		3,641	4,538	4,734	4,808	5,813	6,707

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	268	250	222	187	156	137	129
Final energy use - Residential (PJ)	73.6	69.9	64.4	56.2	48.8	44.3	42
Final energy use - Commercial (PJ)	61.7	61.5	59.1	55.3	51.5	49.4	48.9
Final energy use - Industry (PJ)	35.8	36.3	35.9	36.6	38.7	39.4	40.1

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)		1.12	1.17	2.25	2.43	2.16	2.28

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV - EV (1000 units)	11.1	160	309	830	1,351	1,767	2,184
Vehicle stocks - LDV - All others (1000 units)	1,821	1,734	1,647	1,200	753	426	99.1
Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018)		350	897	1,453	2,201	2,395	2,284
Public EV charging plugs - DC Fast (1000 units)	0.099		0.64		2.8		4.53
Public EV charging plugs - L2 (1000 units)	0.151		15.4		67.5		109

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 (%)	5.11	20.2	63.3	85.3	88.8	89.3	89
Sales of space heating units - Electric Resistance (%)	6.51	10.4	5.63	3.21	2.94	2.96	2.97
Sales of space heating units - Gas (%)	78.2	54.7	20.9	4.15	2.05	1.95	1.94
Sales of space heating units - Fossil (%)	10.2	14.7	10.2	7.32	6.18	5.78	6.11
Sales of water heating units - Electric Heat Pump (%)	0	7.63	42.7	57.5	59.2	59.2	59.2
Sales of water heating units - Electric Resistance (%)	11.7	24.2	31.3	38.3	39.4	39.5	39.5
Sales of water heating units - Gas Furnace (%)	87.3	67	24.8	2.98	0.155	0	0
Sales of water heating units - Other (%)	1.03	1.2	1.22	1.23	1.24	1.24	1.25
Sales of cooking units - Electric Resistance (%)	41.9	54.2	92.2	99.6	100	100	100
Sales of cooking units - Gas (%)	58.1	45.8	7.83	0.394	0	0	0
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018)		1.87	2.24				

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 (%)	1.58	19.8	62.6	88.7	92.5	92.6	92.7
Sales of space heating units - Electric Resistance (%)	1.76	3.39	4.14	6.37	6.83	6.86	6.85
Sales of space heating units - Gas Furnace (%)	96.7	76.6	33.3	4.92	0.721	0.496	0.493
Sales of space heating units - Fossil (%)	0	0.199	0.038	0.002	0	0	0
Sales of water heating units - Electric Heat Pump (%)	0.016	7.95	44.7	60.9	62.8	62.9	62.9
Sales of water heating units - Electric Resistance (%)	0.796	4.99	22.9	34.8	36.6	36.7	36.7
Sales of water heating units - Gas Furnace (%)	99	86.7	32.1	3.86	0.201	0	0
Sales of water heating units - Other (%)	0.192	0.382	0.382	0.383	0.381	0.382	0.382
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)		5,003	5,574				

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	2,817	812	0	0	0	0	0
Installed thermal - Natural gas (MW)	3,072	2,406	2,406	2,380	4,647	5,423	4,909
Installed thermal - Nuclear (MW)	0	0	0	0	0	0	0
Installed renewables - Rooftop PV (MW)	209	318	427	564	734	941	1,198
Installed renewables - Solar - Base land use assumptions (MW)	853	7,175	19,767	26,615	29,036	37,616	45,657
Installed renewables - Wind - Base land use assumptions (MW)	5,620	18,717	33,579	55,498	72,289	82,540	103,564
Installed renewables - Solar - Constrained land use assumptions (MW)	853	969	969	969	2,950	11,628	22,435
Installed renewables - Wind - Constrained land use assumptions (MW)	5,904	17,383	28,488	49,240	60,412	63,058	102,958
Installed renewables - Offshore Wind - Constrained land use assumptions (MW)	0	0	0	0	0	0	0
Capital invested - Solar PV - Base (billion \$2018)		8.47	15.1	7.55	2.52	8.42	7.45
Capital invested - Wind - Base (billion \$2018)		19.3	19.8	27.2	19.8	11.5	22.3

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	2,269	17,408	47,543	63,939	69,709	90,217	109,372
Wind - Base land use assumptions (GWh)	19,677	62,006	107,820	172,102	221,519	250,819	310,206
OffshoreWind - Base land use assumptions (GWh)	0	0	0	0	0	0	0
Solar - Constrained land use assumptions (GWh)	4,538	5,088	5,088	5,088	14,623	55,796	106,997
Wind - Constrained land use assumptions (GWh)	38,350	104,574	159,129	250,712	295,091	310,573	561,320
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 tCO <sub>2</sub> e/y)							-1,622
Carbon sink potential - Low - Avoid deforestation (1000 tCO <sub>2</sub> e/y)							-193
Carbon sink potential - Low - Extend rotation length (1000 tCO <sub>2</sub> e/y)							-3,718
Carbon sink potential - Low - Improve plantations (1000 tCO <sub>2</sub> e/y)							-5.92
Carbon sink potential - Low - Increase retention of HWP (1000 tCO <sub>2</sub> e/y)							-34.4
Carbon sink potential - Low - Increase trees outside forests (1000 tCO <sub>2</sub> e/y)							-128
Carbon sink potential - Low - Reforest cropland (1000 tCO <sub>2</sub> e/y)							-2,680
Carbon sink potential - Low - Reforest pasture (1000 tCO <sub>2</sub> e/y)							-92.1
Carbon sink potential - Low - Restore productivity (1000 tCO <sub>2</sub> e/y)							-2,150
Carbon sink potential - Low - All (not counting overlap) (1000 tCO <sub>2</sub> e/y)							-10,623

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)							-2,429
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-674
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-6,700
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-8.68
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-68.9
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-247
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,020
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-654
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-4,264
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-19,065
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-3,236
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,156
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-9,681
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-11.6
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-103
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-365
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,360
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-1,215
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-27,508
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-6,378
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							265
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							147
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,891
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							2.15
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)							18.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							177



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)							5.99
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,279
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,786
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							397
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							152
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,414
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							3.23
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)							26.5
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							266
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							43.3
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,576
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							6,878
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							529
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							157
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,937
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							4.29
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)							34.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							354
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							34.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,114

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)							8,165

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 tCO <sub>2</sub> e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO <sub>2</sub> e/y)							-261
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO <sub>2</sub> e/y)							-15.8
Carbon sink potential - Moderate deployment - Total (1000 tCO <sub>2</sub> e/y)							-277
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO <sub>2</sub> e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO <sub>2</sub> e/y)							-506
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO <sub>2</sub> e/y)							-31.7
Carbon sink potential - Aggressive deployment - Total (1000 tCO <sub>2</sub> e/y)							-538
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)							358
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							24.3
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							382
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)							691
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							48.6
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							739

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)		11.1	0.009	0.009	0.007	0.004	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)		3.27	2.08	1.91	2.16	1.04	0.31
Premature deaths from air pollution - Mobile - On-Road (deaths)		24.2	23	17.8	10.5	4.84	1.9
Premature deaths from air pollution - Gas Stations (deaths)		1.97	1.85	1.43	0.867	0.438	0.22
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		3.65	3.08	2.08	1.14	0.537	0.219
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.041	0.035	0.028	0.02	0.013	0.009
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.485	0.435	0.334	0.225	0.131	0.073
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.082	0.08	0.078	0.075	0.072	0.068
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		2.72	2.38	1.75	1.09	0.602	0.305
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		0.393	0.322	0.26	0.201	0.147	0.097
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.291	0.248	0.206	0.164	0.122	0.082
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.307	0.042	0.039	0.034	0.032	0.006
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		68.7	67.6	67.3	57.6	48.8	36.7
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019)		98.7	0.084	0.083	0.061	0.038	0
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019)		29	18.4	16.9	19.1	9.21	2.75
Monetary damages from air pollution - Mobile - On-Road (million \$2019)		215	204	159	93.1	43	16.9
Monetary damages from air pollution - Gas Stations (million \$2019)		17.5	16.4	12.6	7.67	3.88	1.95
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019)		32.3	27.3	18.4	10.1	4.76	1.94
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019)		0.359	0.314	0.245	0.174	0.117	0.076
Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019)		4.3	3.85	2.96	1.99	1.16	0.646
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019)		0.729	0.71	0.689	0.664	0.636	0.604
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019)		24	21.1	15.5	9.61	5.33	2.7
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019)		3.48	2.85	2.3	1.78	1.3	0.862

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)		2.57	2.2	1.82	1.45	1.08	0.722
Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019)		2.71	0.37	0.345	0.302	0.281	0.055
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019)		610	600	597	512	433	326

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		1.92	2.75	0.921	35.4	122	185
By economic sector - Construction (jobs)		15,985	16,734	19,552	17,040	16,185	16,535
By economic sector - Manufacturing (jobs)		10,163	10,148	11,092	9,724	7,696	7,560
By economic sector - Mining (jobs)		12,865	10,403	8,494	5,814	4,074	2,547
By economic sector - Other (jobs)		1,827	2,069	2,652	2,342	2,300	2,353
By economic sector - Pipeline (jobs)		1,210	1,159	1,125	939	846	823
By economic sector - Professional (jobs)		7,910	8,291	9,617	8,720	8,563	9,007
By economic sector - Trade (jobs)		8,356	8,106	8,554	7,213	6,619	6,319
By economic sector - Utilities (jobs)		8,113	9,056	12,113	11,944	12,424	16,931
By resource sector - Biomass (jobs)		6.73	7.06	3.16	132	478	768
By resource sector - CO2 (jobs)		2.54	97.3	127	148	760	2,152
By resource sector - Coal (jobs)		720	121	10.2	7.46	5.88	0
By resource sector - Grid (jobs)		11,154	14,105	20,788	20,697	21,241	24,010
By resource sector - Natural Gas (jobs)		11,366	9,627	8,669	7,548	6,522	5,316
By resource sector - Nuclear (jobs)		0	0	0	0	0	3,538
By resource sector - Oil (jobs)		24,959	22,653	20,474	14,925	11,457	7,859
By resource sector - Solar (jobs)		14,021	13,954	16,253	13,070	11,500	11,695
By resource sector - Wind (jobs)		4,202	5,404	6,876	7,244	6,867	6,923
By education level - All sectors - High school diploma or less (jobs)		27,584	27,531	30,738	26,775	24,674	24,954
By education level - All sectors - Associates degree or some college (jobs)		19,788	19,870	22,440	19,774	18,425	18,934
By education level - All sectors - Bachelors degree (jobs)		14,979	14,576	15,694	13,480	12,268	12,204
By education level - All sectors - Masters or professional degree (jobs)		3,556	3,479	3,775	3,265	3,017	3,033
By education level - All sectors - Doctoral degree (jobs)		522	513	554	478	445	444
Related work experience - All sectors - None (jobs)		9,364	9,357	10,466	9,160	8,505	8,651
Related work experience - All sectors - Up to 1 year (jobs)		12,962	12,914	14,408	12,536	11,541	11,708
Related work experience - All sectors - 1 to 4 years (jobs)		24,375	24,146	26,684	23,210	21,388	21,577
Related work experience - All sectors - 4 to 10 years (jobs)		15,505	15,389	17,066	14,890	13,765	13,971
Related work experience - All sectors - Over 10 years (jobs)		4,224	4,163	4,576	3,976	3,631	3,663
On-the-Job Training - All sectors - None (jobs)		3,791	3,721	4,063	3,490	3,191	3,190
On-the-Job Training - All sectors - Up to 1 year (jobs)		44,449	43,981	48,531	42,161	38,693	38,995
On-the-Job Training - All sectors - 1 to 4 years (jobs)		13,487	13,497	15,164	13,313	12,394	12,685
On-the-Job Training - All sectors - 4 to 10 years (jobs)		4,041	4,116	4,727	4,193	3,997	4,145

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)		663	653	716	615	555	555
On-Site or In-Plant Training - All sectors - None (jobs)		10,768	10,656	11,777	10,230	9,414	9,536
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		40,288	39,884	44,055	38,285	35,165	35,454
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		10,572	10,570	11,849	10,382	9,639	9,832
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		4,294	4,338	4,919	4,337	4,102	4,216
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		509	521	601	538	509	530
Wage income - All (million \$2019)		3,629	3,628	4,040	3,559	3,321	3,390

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	268	250	222	187	156	137	129
Final energy use - Residential (PJ)	73.6	69.9	64.4	56.2	48.8	44.3	42
Final energy use - Commercial (PJ)	61.7	61.5	59.1	55.3	51.5	49.4	48.9
Final energy use - Industry (PJ)	35.8	36.3	35.9	36.6	38.7	39.4	40.1

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)		1.12	1.17	2.25	2.43	2.16	2.28

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	11.1	160	309	830	1,351	1,767	2,184
Vehicle stocks - LDV – All others (1000 units)	1,821	1,734	1,647	1,200	753	426	99.1
Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018)		350	897	1,453	2,201	2,395	2,284
Public EV charging plugs - DC Fast (1000 units)	0.099		0.64		2.8		4.53
Public EV charging plugs - L2 (1000 units)	0.151		15.4		67.5		109

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 (%)	5.11	20.2	63.3	85.3	88.8	89.3	89
Sales of space heating units - Electric Resistance (%)	6.51	10.4	5.63	3.21	2.94	2.96	2.97
Sales of space heating units - Gas (%)	78.2	54.7	20.9	4.15	2.05	1.95	1.94
Sales of space heating units - Fossil (%)	10.2	14.7	10.2	7.32	6.18	5.78	6.11
Sales of water heating units - Electric Heat Pump (%)	0	7.63	42.7	57.5	59.2	59.2	59.2
Sales of water heating units - Electric Resistance (%)	11.7	24.2	31.3	38.3	39.4	39.5	39.5
Sales of water heating units - Gas Furnace (%)	87.3	67	24.8	2.98	0.155	0	0
Sales of water heating units - Other (%)	1.03	1.2	1.22	1.23	1.24	1.24	1.25
Sales of cooking units - Electric Resistance (%)	41.9	54.2	92.2	99.6	100	100	100
Sales of cooking units - Gas (%)	58.1	45.8	7.83	0.394	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)		1.87	2.24				

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 (%)	1.58	19.8	62.6	88.7	92.5	92.6	92.7
Sales of space heating units - Electric Resistance (%)	1.76	3.39	4.14	6.37	6.83	6.86	6.85
Sales of space heating units - Gas Furnace (%)	96.7	76.6	33.3	4.92	0.721	0.496	0.493
Sales of space heating units - Fossil (%)	0	0.199	0.038	0.002	0	0	0
Sales of water heating units - Electric Heat Pump (%)	0.016	7.95	44.7	60.9	62.8	62.9	62.9
Sales of water heating units - Electric Resistance (%)	0.796	4.99	22.9	34.8	36.6	36.7	36.7
Sales of water heating units - Gas Furnace (%)	99	86.7	32.1	3.86	0.201	0	0
Sales of water heating units - Other (%)	0.192	0.382	0.382	0.383	0.381	0.382	0.382
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)		5,003	5,574				

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	2,817	812	0	0	0	0	0
Installed thermal - Natural gas (MW)	3,072	2,406	2,588	2,688	2,462	4,259	5,973
Installed thermal - Nuclear (MW)	0	0	0	0	0	0	1,557
Installed renewables - Rooftop PV (MW)	209	318	427	564	734	941	1,198
Installed renewables - Solar - Base land use assumptions (MW)	853	12,428	21,376	30,200	35,403	38,564	39,122
Installed renewables - Wind - Base land use assumptions (MW)	3,707	9,765	16,619	29,999	38,400	43,221	54,388
Installed renewables - Solar - Constrained land use assumptions (MW)	853	969	969	1,477	1,477	1,477	1,477
Installed renewables - Wind - Constrained land use assumptions (MW)	3,727	10,090	16,030	24,812	31,168	36,586	47,481
Installed renewables - Offshore Wind - Constrained land use assumptions (MW)	0	0	0	0	0	0	0
Capital invested - Solar PV - Base (billion \$2018)		12.8	9.98	9.31	5.41	3.1	0.516
Capital invested - Wind - Base (billion \$2018)		8.91	9.12	16.6	9.93	5.4	11.8
Capital invested - Solar PV - Constrained (billion \$2018)		0.154	0	0.56	0	0	0
Capital invested - Wind - Constrained (billion \$2018)		9.36	7.91	10.9	7.51	6.07	11.5

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	2,269	25,263	45,232	65,451	77,909	85,469	86,794
Wind - Base land use assumptions (GWh)	13,439	33,038	55,279	97,043	122,305	136,474	168,925
Offshore Wind - 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)	2,269	2,544	2,544	3,777	3,777	3,777	3,777
Wind - Constrained land use assumptions (GWh)	13,392	32,258	49,284	71,448	86,478	98,407	122,147
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)							-1,622
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-193
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,718
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-5.92
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-34.4
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-128
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,680
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-92.1
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,150
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-10,623
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-2,429
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-674
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-6,700
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-8.68
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-68.9
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-247
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,020
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-654
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-4,264
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-19,065
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-3,236
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,156
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-9,681
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-11.6
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-103

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)							-365
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,360
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-1,215
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-27,508
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-6,378
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							265
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							147
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,891
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							2.15
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)							18.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							177
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							5.99
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,279
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,786
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							397
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							152
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,414
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							3.23
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)							26.5
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							266
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							43.3



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)							2,576
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							6,878
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							529
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							157
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,937
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							4.29
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)							34.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							354
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							34.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,114
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							8,165

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)							-261
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-15.8
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-277
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-506
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-31.7
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-538

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)							358
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							24.3
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							382
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)							691
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							48.6
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							739

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)		11.1	0.009	0.009	0.007	0.004	0
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		3.03	1.57	1.14	0.899	0.622	0.302
Premature deaths from air pollution - Mobile - On-Road (deaths)		24.5	25.2	25.1	23.1	18.8	13.1
Premature deaths from air pollution - Gas Stations (deaths)		2.01	2.06	2.02	1.85	1.5	1.06
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		3.69	3.52	3.27	2.79	2.09	1.37
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.042	0.04	0.037	0.033	0.029	0.024
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.491	0.493	0.49	0.452	0.365	0.267
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.082	0.08	0.078	0.075	0.072	0.068
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		2.74	2.7	2.59	2.31	1.85	1.34
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		0.393	0.346	0.306	0.268	0.232	0.198
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.291	0.266	0.242	0.217	0.191	0.166
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.357	0.043	0.042	0.04	0.037	0.034

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)		67.8	62.7	55.7	49.7	44.8	31.8
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019)		98.7	0.084	0.083	0.061	0.038	0
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019)		26.9	13.9	10.1	7.96	5.51	2.67
Monetary damages from air pollution - Mobile - On-Road (million \$2019)		218	224	223	205	167	117
Monetary damages from air pollution - Gas Stations (million \$2019)		17.8	18.2	17.9	16.4	13.3	9.4
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019)		32.7	31.2	29	24.7	18.6	12.1
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019)		0.371	0.357	0.331	0.294	0.253	0.21
Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019)		4.35	4.37	4.35	4	3.24	2.37
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019)		0.729	0.71	0.689	0.664	0.636	0.604
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019)		24.2	23.9	22.9	20.4	16.4	11.9
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019)		3.48	3.06	2.71	2.37	2.06	1.75
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019)		2.57	2.35	2.14	1.92	1.69	1.47
Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019)		3.15	0.381	0.374	0.356	0.33	0.3
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019)		602	556	494	442	398	282

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		1.87	2.62	0.981	0.725	50.8	90.5
By economic sector - Construction (jobs)		15,391	19,386	19,271	17,143	18,502	20,705
By economic sector - Manufacturing (jobs)		9,856	11,935	10,994	9,379	9,772	9,849
By economic sector - Mining (jobs)		12,712	9,962	7,760	5,994	4,601	2,571
By economic sector - Other (jobs)		1,641	2,411	2,505	2,197	2,415	3,002
By economic sector - Pipeline (jobs)		1,188	1,096	1,002	924	896	778
By economic sector - Professional (jobs)		7,859	9,714	10,063	9,428	10,491	12,065
By economic sector - Trade (jobs)		8,251	8,813	8,607	7,815	8,045	8,312
By economic sector - Utilities (jobs)		8,538	11,167	11,753	11,297	13,656	16,697
By resource sector - Biomass (jobs)		7.45	7.06	3.32	3.05	235	427
By resource sector - CO2 (jobs)		2.4	79	110	141	696	1,949
By resource sector - Coal (jobs)		741	121	11.2	9.05	7.16	5.58
By resource sector - Grid (jobs)		12,206	18,819	20,850	20,064	24,731	30,210
By resource sector - Natural Gas (jobs)		10,882	8,142	5,822	4,639	3,586	2,490
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		24,982	22,774	20,800	18,666	16,443	10,118

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

Item	2020	2025	2030	2035	2040	2045	2050
By resource sector - Solar (jobs)		11,502	15,419	14,538	11,222	11,104	13,691
By resource sector - Wind (jobs)		5,116	9,124	9,821	9,433	11,627	15,180
By education level - All sectors - High school diploma or less (jobs)		27,098	31,156	30,107	26,781	28,561	30,835
By education level - All sectors - Associates degree or some college (jobs)		19,482	22,644	22,023	19,699	21,260	23,515
By education level - All sectors - Bachelors degree (jobs)		14,818	16,226	15,516	13,828	14,509	15,314
By education level - All sectors - Masters or professional degree (jobs)		3,525	3,886	3,750	3,365	3,566	3,831
By education level - All sectors - Doctoral degree (jobs)		516	573	558	504	533	575
Related work experience - All sectors - None (jobs)		9,221	10,578	10,257	9,171	9,824	10,691
Related work experience - All sectors - Up to 1 year (jobs)		12,715	14,684	14,186	12,580	13,432	14,621
Related work experience - All sectors - 1 to 4 years (jobs)		24,043	27,166	26,230	23,431	24,920	26,816
Related work experience - All sectors - 4 to 10 years (jobs)		15,294	17,370	16,788	15,001	16,013	17,381
Related work experience - All sectors - Over 10 years (jobs)		4,166	4,688	4,495	3,995	4,241	4,561
On-the-Job Training - All sectors - None (jobs)		3,724	4,173	4,001	3,542	3,731	3,997
On-the-Job Training - All sectors - Up to 1 year (jobs)		43,806	49,555	47,755	42,553	45,210	48,563
On-the-Job Training - All sectors - 1 to 4 years (jobs)		13,286	15,319	14,866	13,291	14,293	15,707
On-the-Job Training - All sectors - 4 to 10 years (jobs)		3,977	4,699	4,629	4,175	4,549	5,108
On-the-Job Training - All sectors - Over 10 years (jobs)		646	739	703	616	648	695
On-Site or In-Plant Training - All sectors - None (jobs)		10,587	12,051	11,611	10,316	10,981	11,936
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		39,707	44,938	43,321	38,610	41,040	44,111
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		10,412	11,981	11,616	10,379	11,136	12,177
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		4,230	4,917	4,817	4,338	4,690	5,191
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		502	598	590	533	584	654
Wage income - All (million \$2019)		3,586	4,064	3,964	3,590	3,862	4,193

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	268	252	231	214	201	186	169
Final energy use - Residential (PJ)	73.6	70.2	68	65.4	60.8	55.1	49.4
Final energy use - Commercial (PJ)	61.7	61.6	61.1	60.2	58.4	56.2	54.2
Final energy use - Industry (PJ)	35.8	36.3	36.1	37.2	39.6	40.4	41.1

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)		0.866	0.891	1.24	1.3	1.97	2.11

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	8.61	52.4	96.1	299	502	950	1,399
Vehicle stocks - LDV – All others (1000 units)	1,828	1,828	1,828	1,734	1,640	1,264	888
Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018)		0	56.7	119	402	1,263	1,841
Public EV charging plugs - DC Fast (1000 units)	0.099		0.199		1.04		2.9
Public EV charging plugs - L2 (1000 units)	0.151		4.8		25.1		69.9

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 (%)	5.11	12.8	17.7	32.4	57.3	77.2	85.4
Sales of space heating units - Electric Resistance (%)	6.51	11.2	10.6	9.06	6.48	4.32	3.36
Sales of space heating units - Gas (%)	78.2	60.4	56.3	45.5	27	11.7	4.76
Sales of space heating units - Fossil (%)	10.2	15.5	15.4	13.1	9.22	6.81	6.5
Sales of water heating units - Electric Heat Pump (%)	0	1.41	5.41	17.1	36.2	50.8	56.8
Sales of water heating units - Electric Resistance (%)	11.7	23.2	24.2	26.7	31.4	36	38.4
Sales of water heating units - Gas Furnace (%)	87.3	74.1	69.2	55	31.1	12	3.54
Sales of water heating units - Other (%)	1.03	1.2	1.22	1.23	1.24	1.24	1.25
Sales of cooking units - Electric Resistance (%)	41.7	43.2	48.5	62.6	82.2	94.2	98.5
Sales of cooking units - Gas (%)	58.3	56.8	51.5	37.4	17.8	5.75	1.55
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018)		1.86	2.24				

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 (%)	1.58	12.8	17.7	32.2	57.3	78.6	88.4
Sales of space heating units - Electric Resistance (%)	1.76	3.37	3.45	3.77	4.61	5.79	6.51
Sales of space heating units - Gas Furnace (%)	96.7	83.6	78.7	63.9	38	15.6	5.05
Sales of space heating units - Fossil (%)	0	0.23	0.214	0.159	0.078	0.025	0.007
Sales of water heating units - Electric Heat Pump (%)	0.016	1.51	5.7	18	38.2	53.7	60.3
Sales of water heating units - Electric Resistance (%)	0.796	2.19	4.23	10.3	21	30.4	34.7
Sales of water heating units - Gas Furnace (%)	99	95.9	89.7	71.3	40.4	15.6	4.61
Sales of water heating units - Other (%)	0.192	0.382	0.382	0.383	0.381	0.382	0.382
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)		5,000	5,547				

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	2,817	812	0	0	0	0	0
Installed thermal - Natural gas (MW)	3,072	2,406	2,362	2,362	3,475	4,077	3,301
Installed thermal - Nuclear (MW)	0	0	0	0	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	0.058
Capital invested - Biomass w/ccu power plant (billion \$2018)	0	0	0	0	0	0	1.59

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	1,784
Biomass w/ccu allam power plant (GWh)	0	0	0	0	0	0	57.5

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	1
Number of facilities - Allam power w ccu (quantity)	0	0	0	0	0	0	1
Number of facilities - Beccs hydrogen (quantity)	0	0	0	0	0	1	1
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	683	1,529
Biomass purchases (million \$2018/y)		0	0	0	0	59.9	173

Table 59: E-B+ scenario - PILLAR 4: CCUS - CO2 capture

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0	0	0	0.88	2.68
Annual - BECCS (MMT)		0	0	0	0	0.88	2.68
Annual - NGCC (MMT)		0	0	0	0	0	0
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - All (MMT)		0	0	0	0	0.88	3.56
Cumulative - BECCS (MMT)		0	0	0	0	0.88	3.56
Cumulative - NGCC (MMT)		0	0	0	0	0	0
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	0	0	0	9.01	200
All (km)		0	0	0	0	9.01	200
Cumulative investment - Trunk (million \$2018)		0	0	0	0	0	0
Cumulative investment - Spur (million \$2018)		0	0	0	0	6.22	152
Cumulative investment - All (million \$2018)		0	0	0	0	6.22	152

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual (MMT)		0	1.85	6.42	11.9	15.8	16.7
Injection wells (wells)		0	2	6	10	16	20
Resource characterization, appraisal, permitting costs (million \$2020)		5.15	127	204	204	204	204
Wells and facilities construction costs (million \$2020)		0	40.3	157	280	468	581

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)							-1,622
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-193
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,718
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-5.92
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-34.4
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-128
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,680
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-92.1
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,150
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-10,623
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-2,429
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-674
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-6,700
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-8.68
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-68.9
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-247
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,020
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-654
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-4,264
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-19,065
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-3,236
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,156
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-9,681
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-11.6

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 tCO <sub>2</sub> e/y)							-103
Carbon sink potential - High - Increase trees outside forests (1000 tCO <sub>2</sub> e/y)							-365
Carbon sink potential - High - Reforest cropland (1000 tCO <sub>2</sub> e/y)							-5,360
Carbon sink potential - High - Reforest pasture (1000 tCO <sub>2</sub> e/y)							-1,215
Carbon sink potential - High - All (not counting overlap) (1000 tCO <sub>2</sub> e/y)							-27,508
Carbon sink potential - High - Restore productivity (1000 tCO <sub>2</sub> e/y)							-6,378
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							265
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							147
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,891
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							2.15
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)							18.3
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							177
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							5.99
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,279
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,786
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							397
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							152
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,414
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							3.23
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)							26.5
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							266
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							43.3



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)							2,576
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							6,878
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							529
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							157
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,937
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							4.29
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)							34.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							354
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							34.5
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,114
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							8,165

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)							-34.2
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-248
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-14.5
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)							-297
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							-34.2
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-482

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)							-29
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)							-546
Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses (1000 hectares)							37.6
Land impacted for carbon sink - Moderate deployment - Cropland measures (1000 hectares)							338
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							22.3
Land impacted for carbon sink - Moderate deployment - Cropland to woody energy crops (1000 hectares)							3.18
Land impacted for carbon sink - Moderate deployment - Pasture to energy crops (1000 hectares)							0
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							401
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							37.6
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							1,615
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							44.5
Land impacted for carbon sink - Aggressive deployment - Cropland to woody energy crops (1000 hectares)							3.18
Land impacted for carbon sink - Aggressive deployment - Pasture to energy crops (1000 hectares)							0
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							1,700

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)		20.8	12	5.38	4.14	3.71	3.52
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		3.59	3.85	4	3.08	3.21	2.76
Premature deaths from air pollution - Mobile - On-Road (deaths)		24.5	25.6	26.8	28.1	29.5	30.9
Premature deaths from air pollution - Gas Stations (deaths)		2.01	2.08	2.15	2.23	2.31	2.39

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)		3.66	3.55	3.47	3.48	3.55	3.63
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.044	0.042	0.038	0.033	0.03	0.028
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.478	0.483	0.499	0.521	0.537	0.552
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.086	0.088	0.089	0.091	0.092	0.092
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		2.76	2.74	2.57	2.39	2.31	2.37
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		0.411	0.409	0.413	0.418	0.424	0.431
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.304	0.316	0.329	0.341	0.354	0.366
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.97	0.637	0.493	0.466	0.446	0.414
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		68.1	72.8	75.6	73.6	74.2	70.2
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019)		184	106	47.7	36.7	32.9	31.2
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019)		31.8	34.1	35.5	27.3	28.5	24.5
Monetary damages from air pollution - Mobile - On-Road (million \$2019)		218	228	238	250	262	274
Monetary damages from air pollution - Gas Stations (million \$2019)		17.8	18.4	19	19.8	20.5	21.2
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019)		32.5	31.5	30.8	30.8	31.4	32.2
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019)		0.386	0.374	0.337	0.295	0.266	0.25
Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019)		4.24	4.28	4.42	4.62	4.76	4.89
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019)		0.762	0.777	0.791	0.802	0.811	0.815
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019)		24.4	24.3	22.8	21.1	20.5	21
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019)		3.63	3.62	3.66	3.7	3.75	3.82
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019)		2.69	2.79	2.91	3.02	3.13	3.24
Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019)		8.56	5.62	4.35	4.11	3.94	3.65

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)		605	646	671	654	659	623

Table 65: REF scenario - IMPACTS - Jobs

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		1.78	1.59	1.57	1.28	1.28	1.39
By economic sector - Construction (jobs)		6,564	7,840	11,449	11,960	10,513	10,648
By economic sector - Manufacturing (jobs)		6,708	8,165	9,494	9,328	7,839	7,665
By economic sector - Mining (jobs)		12,994	11,018	9,238	7,441	6,150	4,740
By economic sector - Other (jobs)		191	368	1,110	1,231	959	1,175
By economic sector - Pipeline (jobs)		1,207	1,249	1,267	1,218	1,213	1,134
By economic sector - Professional (jobs)		4,348	4,752	6,189	6,352	5,765	5,861
By economic sector - Trade (jobs)		6,327	6,069	6,598	6,339	5,668	5,408
By economic sector - Utilities (jobs)		4,252	4,959	6,766	7,857	7,118	7,135
By resource sector - Biomass (jobs)		6.86	6.42	5.96	5.33	5.45	5.54
By resource sector - CO2 (jobs)		0	0.008	0.011	0.011	0.013	0.013
By resource sector - Coal (jobs)		1,094	516	221	121	101	81.9
By resource sector - Grid (jobs)		3,605	5,073	8,438	11,046	9,378	9,682
By resource sector - Natural Gas (jobs)		11,270	11,389	11,403	10,346	10,133	9,439
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		24,999	22,816	20,901	18,887	17,246	14,421
By resource sector - Solar (jobs)			1,559	6,617	6,514	4,335	5,925
By resource sector - Wind (jobs)		1,618	3,062	4,527	4,808	4,028	4,215
By education level - All sectors - High school diploma or less (jobs)		17,197	18,156	21,618	21,590	18,855	18,305
By education level - All sectors - Associates degree or some college (jobs)		12,052	12,838	15,518	15,594	13,632	13,359
By education level - All sectors - Bachelors degree (jobs)		10,532	10,604	11,798	11,449	10,019	9,505
By education level - All sectors - Masters or professional degree (jobs)		2,462	2,471	2,775	2,704	2,373	2,265
By education level - All sectors - Doctoral degree (jobs)		351	353	404	392	347	335
Related work experience - All sectors - None (jobs)		5,906	6,208	7,371	7,367	6,460	6,281
Related work experience - All sectors - Up to 1 year (jobs)		7,920	8,353	10,008	9,959	8,622	8,397
Related work experience - All sectors - 1 to 4 years (jobs)		15,982	16,550	19,213	19,024	16,679	16,083
Related work experience - All sectors - 4 to 10 years (jobs)		9,995	10,412	12,184	12,090	10,598	10,249
Related work experience - All sectors - Over 10 years (jobs)		2,791	2,898	3,337	3,287	2,867	2,758
On-the-Job Training - All sectors - None (jobs)		2,464	2,516	2,909	2,846	2,465	2,370
On-the-Job Training - All sectors - Up to 1 year (jobs)		29,104	30,192	35,023	34,623	30,240	29,157
On-the-Job Training - All sectors - 1 to 4 years (jobs)		8,329	8,809	10,553	10,574	9,267	9,032
On-the-Job Training - All sectors - 4 to 10 years (jobs)		2,293	2,476	3,116	3,184	2,821	2,790
On-the-Job Training - All sectors - Over 10 years (jobs)		404	430	511	502	433	419
On-Site or In-Plant Training - All sectors - None (jobs)		6,821	7,103	8,351	8,246	7,164	6,942
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		26,331	27,320	31,726	31,390	27,426	26,450

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)		6,581	6,945	8,287	8,292	7,264	7,068
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		2,565	2,730	3,343	3,384	3,004	2,944
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		295	324	405	416	368	365
Wage income - All (million \$2019)		2,437	2,544	2,954	2,954	2,634	2,561

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	268	252	233	221	221	228	236
Final energy use - Residential (PJ)	73.6	70.7	70.1	70.3	71.2	72.7	74
Final energy use - Commercial (PJ)	61.7	62.9	63.8	63.9	64.3	66	69.1
Final energy use - Industry (PJ)	35.8	37.5	38.4	40	41.7	44.3	47

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)		0.941	0.974	1.68	1.79	1.79	1.89

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 (%)	3.87	20.3	20.9	21.9	22.8	23.5	24.1
Sales of space heating units - Electric Resistance (%)	6.66	10.4	10.2	10.1	9.98	9.54	8.77
Sales of space heating units - Gas (%)	79.2	55.7	55	54.5	55.3	55.9	55.2
Sales of space heating units - Fossil (%)	10.3	13.6	13.9	13.5	12	11	11.9
Sales of water heating units - Electric Heat Pump (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Resistance (%)	11.7	23	23.1	23.2	23.3	23.3	23.4
Sales of water heating units - Gas Furnace (%)	87.3	75.8	75.7	75.6	75.5	75.4	75.4
Sales of water heating units - Other (%)	1.03	1.2	1.22	1.23	1.24	1.24	1.25
Sales of cooking units - Electric Resistance (%)	41.1	41.1	41.1	41.1	41.1	41.1	41.1
Sales of cooking units - Gas (%)	58.9	58.9	58.9	58.9	58.9	58.9	58.9
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018)		1.8	1.89				

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 (%)	1.58	19.9	53.5	75.1	78.5	78.8	78.8
Sales of space heating units - Electric Resistance (%)	1.76	4.5	9.3	15.8	20	20.6	20.7
Sales of space heating units - Gas Furnace (%)	96.7	75.4	37.1	9.08	1.57	0.556	0.495
Sales of space heating units - Fossil (%)	0	0.211	0.115	0.034	0.005	0	0
Sales of water heating units - Electric Heat Pump (%)	0.016	0.03	0.03	0.03	0.03	0.03	0.03
Sales of water heating units - Electric Resistance (%)	0.796	1.46	1.46	1.47	1.46	1.47	1.47
Sales of water heating units - Gas Furnace (%)	99	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 (%)	0.192	0.382	0.382	0.383	0.381	0.382	0.382
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)		4,936	5,160				

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	2,817	1,181	555	0	0	0	0
Installed thermal - Natural gas (MW)	3,042	2,343	3,246	4,891	5,224	5,610	4,561
Installed thermal - Nuclear (MW)	0	0	0	0	0	0	0
Installed renewables - Rooftop PV (MW)	209	318	427	564	734	941	1,198
Installed renewables - Solar - Base land use assumptions (MW)	853	853	853	3,313	8,386	9,609	11,410
Installed renewables - Wind - Base land use assumptions (MW)	7,560	7,560	13,129	19,795	26,067	29,981	33,690
Installed renewables - Wind - Constrained land use assumptions (MW)	220	220	220	220	220	220	220

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	2,269	2,269	2,269	8,166	20,310	23,230	24,950
Wind - Base land use assumptions (GWh)	26,661	26,661	44,652	66,095	85,808	97,638	108,783
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)	-11.8		3.33				0.955
Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y)	-0.028		-0.058				-0.061
Business-as-usual carbon sink - Total (Mt CO2e/y)	-11.8		3.27				0.894

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)							-1,622
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-193
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-3,718
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-5.92
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-34.4
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-128
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-2,680
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-92.1
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,150

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)							-10,623
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-2,429
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-674
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-6,700
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-8.68
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-68.9
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-247
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,020
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-654
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-4,264
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-19,065
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-3,236
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,156
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-9,681
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-11.6
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-103
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-365
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-5,360
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-1,215
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-27,508
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-6,378
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							265
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							147
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							1,891
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							2.15
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)							18.3

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)							177
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							5.99
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,279
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							3,786
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							397
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							152
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,414
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							3.23
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)							26.5
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							266
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							43.3
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							2,576
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							6,878
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							529
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							157
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							4,937
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							4.29
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)							34.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							354
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							34.5



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)							2,114
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							8,165