Net-Zero America - New Mexico data

October 29, 2021 (updated November 17, 2023)

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:

Contents

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 (%)	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 (%)	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
Capital invested - Wind - Base (billion $2018)		14.4	19	20.7	13.5	8.91	13.5

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

Item	2020	2025	2030	2035	2040	2045	2050
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
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
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-247
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,020

Table 15: *E+ scenario - PILLAR 6: Land sinks - Forests (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
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
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							152

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 - 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
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-261

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

Item	2020	2025	2030	2035	2040	2045	2050
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
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.491	0.493	0.49	0.452	0.365	0.267

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

Item	2020	2025	2030	2035	2040	2045	2050
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

Table 18: *E- scenario - IMPACTS - Jobs (continued)*

Item	2020	2025	2030	2035	2040	2045	2050
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 (%)	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 (%)	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

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

Item	2020	2025	2030	2035	2040	2045	2050
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
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-3,236
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,156

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

Item	2020	2025	2030	2035	2040	2045	2050
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
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

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 - 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
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

Table 26: *E- 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)							-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
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

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

Item	2020	2025	2030	2035	2040	2045	2050
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
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

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

Item	2020	2025	2030	2035	2040	2045	2050
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 (%)	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 (%)	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

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

Item	2020	2025	2030	2035	2040	2045	2050
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 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

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

Item	2020	2025	2030	2035	2040	2045	2050
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
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

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 - 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
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 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
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
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

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

Item	2020	2025	2030	2035	2040	2045	2050
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
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

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

Item	2020	2025	2030	2035	2040	2045	2050
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
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

Table 39: *E+RE- 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)		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
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 (%)	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 (%)	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
OffshoreWind - Base land use assumptions (GWh)	0	0	0	0	0	0	0
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
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

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 - 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
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

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 - 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
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

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares)							0
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares)							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
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

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

Item	2020	2025	2030	2035	2040	2045	2050
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
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

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

Item	2020	2025	2030	2035	2040	2045	2050
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 (%)	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 (%)	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
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
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

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 - 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
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

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 - 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
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

Table 63: *E-B+ 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)							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
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

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

Item	2020	2025	2030	2035	2040	2045	2050
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
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

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

Item	2020	2025	2030	2035	2040	2045	2050
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
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

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

Item	2020	2025	2030	2035	2040	2045	2050
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 (%)	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 (%)	99	98.1	98.1	98.1	98.1	98.1	98.1
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

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

Item	2020	2025	2030	2035	2040	2045	2050
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
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

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

Item	2020	2025	2030	2035	2040	2045	2050
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 73: *REF 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