



Net-Zero America - Oregon data

October 29, 2021 (updated January 9, 2022)

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

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Table 1: E+ scenario - IMPACTS - Health

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Electric Generation - Coal (deaths)		4.12	0.005	0.005	0.003	0.002	0
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		4.36	2.52	2.1	1.94	1.57	1.18
Premature deaths from air pollution - Mobile - On-Road (deaths)		46.6	43.5	33.1	19.1	8.76	3.52
Premature deaths from air pollution - Gas Stations (deaths)		3.25	2.99	2.26	1.34	0.669	0.333
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		4.99	3.84	2.42	1.22	0.511	0.171
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.791	0.611	0.415	0.252	0.135	0.061
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.443	0.377	0.287	0.202	0.132	0.089
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.062	0.059	0.056	0.053	0.049	0.046
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		3.93	3.51	2.58	1.62	0.942	0.486
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		0.717	0.568	0.444	0.336	0.239	0.153
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.293	0.242	0.195	0.151	0.109	0.071
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.068	0.009	0.008	0.007	0.006	0.006
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		10	9.33	8.42	6.51	4.8	2.95
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019)		36.5	0.043	0.043	0.027	0.016	0
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019)		38.6	22.4	18.6	17.2	14	10.5
Monetary damages from air pollution - Mobile - On-Road (million \$2019)		414	387	294	170	77.9	31.3
Monetary damages from air pollution - Gas Stations (million \$2019)		28.8	26.5	20	11.9	5.92	2.95
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019)		44.2	34	21.4	10.8	4.53	1.52
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019)		7.01	5.41	3.67	2.24	1.19	0.545
Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019)		3.92	3.34	2.54	1.79	1.17	0.789
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019)		0.551	0.524	0.496	0.467	0.437	0.406
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019)		34.8	31.1	22.8	14.4	8.34	4.3

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)		6.35	5.02	3.93	2.97	2.11	1.36
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019)		2.59	2.14	1.73	1.34	0.966	0.625
Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019)		0.596	0.076	0.069	0.061	0.055	0.053
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019)		88.8	82.8	74.7	57.8	42.6	26.2

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		183	298	156	105	256	520
By economic sector - Construction (jobs)		11,000	12,548	16,224	18,354	20,626	32,388
By economic sector - Manufacturing (jobs)		1,545	1,973	2,297	2,402	2,542	4,082
By economic sector - Mining (jobs)		1,109	788	503	297	160	80.2
By economic sector - Other (jobs)		1,607	1,842	2,397	2,993	3,590	6,343
By economic sector - Pipeline (jobs)		259	218	358	124	109	129
By economic sector - Professional (jobs)		5,114	6,754	9,041	11,555	14,129	21,422
By economic sector - Trade (jobs)		3,230	3,950	5,205	6,632	8,133	12,915
By economic sector - Utilities (jobs)		4,708	6,323	9,757	11,344	13,342	23,004
By resource sector - Biomass (jobs)		647	788	400	290	936	2,234
By resource sector - CO2 (jobs)		0	0	1,544	0	250	659
By resource sector - Coal (jobs)		86.9	0	0	0	0	0
By resource sector - Grid (jobs)		7,011	10,266	15,244	19,726	23,628	43,041
By resource sector - Natural Gas (jobs)		2,131	1,792	1,840	1,654	1,259	1,113
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		2,619	2,054	1,431	922	562	300
By resource sector - Solar (jobs)		10,881	10,280	11,623	12,847	14,013	25,967
By resource sector - Wind (jobs)		5,381	9,515	13,856	18,367	22,241	27,570
By education level - All sectors - High school diploma or less (jobs)		12,235	14,554	19,033	21,954	25,449	41,206
By education level - All sectors - Associates degree or some college (jobs)		9,095	11,028	14,825	17,370	20,279	32,601
By education level - All sectors - Bachelors degree (jobs)		5,724	6,991	9,258	11,046	13,054	20,641
By education level - All sectors - Masters or professional degree (jobs)		1,460	1,816	2,422	2,940	3,509	5,525
By education level - All sectors - Doctoral degree (jobs)		243	304	400	495	596	911
Related work experience - All sectors - None (jobs)		4,156	5,005	6,641	7,744	9,052	14,636
Related work experience - All sectors - Up to 1 year (jobs)		5,919	7,078	9,220	10,740	12,510	20,146
Related work experience - All sectors - 1 to 4 years (jobs)		10,268	12,419	16,472	19,350	22,660	36,330
Related work experience - All sectors - 4 to 10 years (jobs)		6,715	8,134	10,865	12,756	14,913	23,781
Related work experience - All sectors - Over 10 years (jobs)		1,698	2,058	2,739	3,215	3,753	5,992
On-the-Job Training - All sectors - None (jobs)		1,627	1,940	2,536	2,985	3,494	5,588
On-the-Job Training - All sectors - Up to 1 year (jobs)		18,537	22,406	29,503	34,633	40,578	65,174

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)		6,152	7,422	9,962	11,617	13,517	21,669
On-the-Job Training - All sectors - 4 to 10 years (jobs)		2,150	2,584	3,494	4,062	4,716	7,535
On-the-Job Training - All sectors - Over 10 years (jobs)		291	342	444	509	582	916
On-Site or In-Plant Training - All sectors - None (jobs)		4,747	5,735	7,562	8,896	10,421	16,601
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		16,855	20,347	26,826	31,460	36,825	59,209
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		4,751	5,722	7,650	8,916	10,373	16,663
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		2,150	2,582	3,480	4,045	4,697	7,492
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		253	309	420	490	571	919
Wage income - All (million \$2019)		1,675	2,054	2,769	3,292	3,905	6,341

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

Item	2020	2025	2030	2035	2040	2045	2050
Oil consumption - Annual (million bbls)		58.9	50.4	38	26.4	17.2	9.78
Oil consumption - Cumulative (million bbls)							1,173
Oil production - Annual (million bbls)		0	0	0	0	0	0
Natural gas consumption - Annual (tcf)		198	167	134	101	63.4	44
Natural gas consumption - Cumulative (tcf)							4,030
Natural gas production - Annual (tcf)		0.609	0.576	0.502	0.424	0.336	0.261

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	334	313	278	236	197	173	163
Final energy use - Residential (PJ)	151	140	123	104	88.4	78.3	72.2
Final energy use - Commercial (PJ)	93.8	95	93.3	89	85.5	84.8	85.9
Final energy use - Industry (PJ)	209	215	214	219	226	230	236

Table 5: *E+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand*

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested - Cumulative 5-yr (billion \$2018)		2.38	2.48	3.93	4.2	3.62	3.78

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	136	450	764	1,864	2,963	3,842	4,720
Vehicle stocks - LDV – All others (1000 units)	3,936	3,748	3,560	2,594	1,628	921	214
Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018)		737	1,953	3,062	4,679	5,048	4,837
Public EV charging plugs - DC Fast (1000 units)	0.347		1.51		5.84		9.31
Public EV charging plugs - L2 (1000 units)	1.3		36.3		141		224

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 (%)	12.4	24.5	48.3	57.6	58.8	58.8	58.7
Sales of space heating units - Electric Resistance (%)	31	37.4	34.1	31.4	31	31.2	31.3
Sales of space heating units - Gas (%)	48.3	24.7	7.17	1.4	0.846	0.812	0.816
Sales of space heating units - Fossil (%)	8.35	13.5	10.5	9.63	9.42	9.21	9.21
Sales of water heating units - Electric Heat Pump (%)	0	7.68	41.4	51	51.8	51.8	51.8
Sales of water heating units - Electric Resistance (%)	40.2	54.8	44.8	43.1	43.1	43.1	43.1
Sales of water heating units - Gas Furnace (%)	53.4	32.3	8.69	0.78	0.033	0	0
Sales of water heating units - Other (%)	6.41	5.3	5.09	5.09	5.1	5.11	5.12
Sales of cooking units - Electric Resistance (%)	65.6	73	95.4	99.8	100	100	100
Sales of cooking units - Gas (%)	34.4	27	4.63	0.233	0	0	0
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018)		2.54	2.66				

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 (%)	2.5	16.7	41.2	54.8	56.6	56.7	56.7
Sales of space heating units - Electric Resistance (%)	16.7	17.5	36.3	42	42.6	42.6	42.6
Sales of space heating units - Gas Furnace (%)	80.8	65.8	22.5	3.25	0.79	0.695	0.695
Sales of space heating units - Fossil (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Heat Pump (%)	1	10.3	52.2	64.9	66	66	66
Sales of water heating units - Electric Resistance (%)	3.08	6.46	25	32.5	33.3	33.3	33.3
Sales of water heating units - Gas Furnace (%)	95.1	82.6	22.2	1.99	0.085	0	0
Sales of water heating units - Other (%)	0.791	0.625	0.628	0.63	0.63	0.629	0.629
Sales of cooking units - Electric Resistance (%)	27.5	41.7	78.2	85.4	85.8	85.8	85.8
Sales of cooking units - Gas (%)	72.5	58.3	21.8	14.6	14.2	14.2	14.2
Commercial HVAC investment in 2020s - Cumulative 5-yr (million \$2018)		13,358	14,518				

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	642	0	0	0	0	0	0
Installed thermal - Natural gas (MW)	2,857	2,832	2,832	3,764	4,078	4,320	5,770
Installed thermal - Nuclear (MW)	0	0	0	0	0	0	0
Installed renewables - Rooftop PV (MW)	2,443	3,766	5,029	6,555	8,366	10,477	12,977
Installed renewables - Solar - Base land use assumptions (MW)	837	837	837	837	837	837	837
Installed renewables - Wind - Base land use assumptions (MW)	4,154	4,154	5,605	6,394	7,175	7,762	7,889
Installed renewables - Offshore Wind - Base land use assumptions (MW)	0	109	109	109	197	197	9,353
Installed renewables - Solar - Constrained land use assumptions (MW)	728	728	728	728	728	728	728
Installed renewables - Wind - Constrained land use assumptions (MW)	4,154	4,154	5,500	7,117	11,811	16,223	16,552

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed renewables - Offshore Wind - Constrained land use assumptions (MW)	0	120	120	120	120	261	10,816
Capital invested - Solar PV - Base (billion \$2018)		0	0	0	0	0	0
Capital invested - Wind - Base (billion \$2018)		0	2.51	1.27	1.2	0.855	0.175
Capital invested - Offshore Wind - Base (billion \$2018)		0.417	0	0	0.179	0	12.3
Capital invested - Solar PV - Constrained (billion \$2018)		1.68	0	0	0	0	0
Capital invested - Wind - Constrained (billion \$2018)		0	2.32	2.86	7.4	6.28	0.499
Capital invested - Offshore Wind - Constrained (billion \$2018)		0.46	0	0	0	0.231	14.1
Capital invested - Biomass power plant (billion \$2018)	0	0	0	0	0	0	0
Capital invested - Biomass w/ccu allam power plant (billion \$2018)	0	0	0	0	0	0	0
Capital invested - Biomass w/ccu power plant (billion \$2018)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	2,011	2,011	2,011	2,011	2,011	2,011	2,011
Wind - Base land use assumptions (GWh)	14,129	14,129	19,419	22,163	24,777	26,676	27,057
OffshoreWind - Base land use assumptions (GWh)	0	522	522	522	945	945	39,327
Solar - Constrained land use assumptions (GWh)	1,737	1,737	1,737	1,737	1,737	1,737	1,737
Wind - Constrained land use assumptions (GWh)	14,129	14,129	18,888	23,821	37,206	49,139	50,021
OffshoreWind - Constrained land use assumptions (GWh)	0	522	522	522	945	945	39,327
Biomass power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu allam power plant (GWh)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Number of facilities - Power (quantity)	0	0	0	0	0	0	0
Number of facilities - Power ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Allam power w ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Beccs hydrogen (quantity)	0	0	0	0	0	4	11
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	2,271	5,019
Biomass purchases (million \$2018/y)		0	0	0	0	124	398

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0	0	0	2.92	9.37
Annual - BECCS (MMT)		0	0	0	0	2.92	9.37
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	2.92	12.3
Cumulative - BECCS (MMT)		0	0	0	0	2.92	12.3
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	497	497	497	497
Spur (km)		0	0	0	0	373	926
All (km)		0	0	497	497	871	1,423
Cumulative investment - Trunk (million \$2018)		0	0	1,561	1,561	1,561	1,561
Cumulative investment - Spur (million \$2018)		0	0	0	0	234	583
Cumulative investment - All (million \$2018)		0	0	1,561	1,561	1,794	2,143

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual (MMT)		0	0	0	0	0	0
Injection wells (wells)		0	0	0	0	0	0
Resource characterization, appraisal, permitting costs (million \$2020)		0	0	0	0	0	0
Wells and facilities construction costs (million \$2020)		0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-1,538
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-211
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-4,235
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-2,923
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-6,699
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-231
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-3,282
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-286
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,705
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-22,111
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-2,304
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-739

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-7,630
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-4,284
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-13,398
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-446
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,923
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,033
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-5,365
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-41,121
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-3,070
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,267
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-11,025
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-5,746
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-20,097
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-660
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-6,564
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,779
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-60,233
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-8,025
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							251
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							161
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							2,154
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							1,058
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)							33
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							217
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							18.6
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,609

Table 15: E+ 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)							5,503
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							377
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							166
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,888
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,593
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)							479
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							325
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							135
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							3,241
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							9,773
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							502
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							172
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							5,622
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							2,117
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)							62.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							434
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							107
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,660
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							11,677

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)							-558
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-37
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-595
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-1,084
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-74.1
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-1,158
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)							926
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							62.8
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							988
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)							1,788
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							126
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							1,914

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)		4.12	0.005	0.005	0.003	0.002	0
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		4.58	2.37	1.55	1.12	0.854	0.853
Premature deaths from air pollution - Mobile - On-Road (deaths)		47.3	47.8	46.5	41.9	33.3	22.9
Premature deaths from air pollution - Gas Stations (deaths)		3.32	3.33	3.21	2.87	2.28	1.58

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

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		5.03	4.34	3.61	2.78	1.94	1.2
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.806	0.718	0.649	0.548	0.409	0.268
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.448	0.426	0.405	0.363	0.294	0.225
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.062	0.059	0.056	0.053	0.049	0.046
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		3.97	4.07	3.97	3.55	2.86	2.09
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		0.717	0.609	0.522	0.444	0.375	0.312
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.293	0.26	0.229	0.199	0.171	0.144
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.064	0.009	0.008	0.008	0.006	0.004
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		9.98	8.98	7.74	6.73	5.91	4.11
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019)		36.5	0.043	0.043	0.027	0.016	0
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019)		40.6	21	13.7	9.96	7.56	7.55
Monetary damages from air pollution - Mobile - On-Road (million \$2019)		421	425	414	372	296	204
Monetary damages from air pollution - Gas Stations (million \$2019)		29.4	29.5	28.4	25.4	20.2	14
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019)		44.6	38.4	32	24.6	17.2	10.6
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019)		7.14	6.36	5.75	4.86	3.62	2.37
Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019)		3.97	3.78	3.59	3.21	2.61	1.99
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019)		0.551	0.524	0.496	0.467	0.437	0.406
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019)		35.1	36	35.1	31.4	25.3	18.5
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019)		6.35	5.39	4.62	3.93	3.32	2.76
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019)		2.59	2.3	2.03	1.77	1.51	1.27
Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019)		0.562	0.078	0.074	0.069	0.056	0.037

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019)		88.6	79.8	68.8	59.7	52.5	36.5

Table 18: E- scenario - IMPACTS - Jobs

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		208	246	136	80.2	326	521
By economic sector - Construction (jobs)		10,990	12,604	15,900	17,714	22,054	36,973
By economic sector - Manufacturing (jobs)		1,550	1,989	2,106	2,335	3,025	4,889
By economic sector - Mining (jobs)		1,120	821	600	427	287	160
By economic sector - Other (jobs)		1,609	1,853	2,334	2,932	3,720	6,790
By economic sector - Pipeline (jobs)		260	215	499	149	172	220
By economic sector - Professional (jobs)		5,139	6,778	8,648	11,201	15,331	24,626
By economic sector - Trade (jobs)		3,242	4,016	5,081	6,537	8,801	14,711
By economic sector - Utilities (jobs)		4,570	6,177	9,006	10,356	14,419	27,546
By resource sector - Biomass (jobs)		683	632	375	267	1,390	2,160
By resource sector - CO2 (jobs)		0	0	2,647	0	429	1,130
By resource sector - Coal (jobs)		86.9	0	0	0	0	0
By resource sector - Grid (jobs)		6,698	9,879	13,118	17,757	25,431	51,533
By resource sector - Natural Gas (jobs)		2,131	1,781	1,330	1,591	1,324	1,152
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		2,650	2,214	1,857	1,481	1,111	670
By resource sector - Solar (jobs)		10,905	10,307	11,544	12,775	14,051	25,975
By resource sector - Wind (jobs)		5,535	9,886	13,440	17,860	24,401	33,815
By education level - All sectors - High school diploma or less (jobs)		12,209	14,534	18,387	21,091	27,567	47,465
By education level - All sectors - Associates degree or some college (jobs)		9,062	11,033	14,288	16,656	21,910	37,650
By education level - All sectors - Bachelors degree (jobs)		5,716	7,008	8,922	10,666	14,201	23,887
By education level - All sectors - Masters or professional degree (jobs)		1,458	1,819	2,327	2,837	3,811	6,387
By education level - All sectors - Doctoral degree (jobs)		244	306	386	481	647	1,046
Related work experience - All sectors - None (jobs)		4,144	5,000	6,409	7,437	9,801	16,872
Related work experience - All sectors - Up to 1 year (jobs)		5,913	7,074	8,899	10,337	13,552	23,142
Related work experience - All sectors - 1 to 4 years (jobs)		10,243	12,422	15,882	18,608	24,557	41,966
Related work experience - All sectors - 4 to 10 years (jobs)		6,695	8,143	10,483	12,259	16,153	27,512
Related work experience - All sectors - Over 10 years (jobs)		1,693	2,060	2,637	3,090	4,073	6,943
On-the-Job Training - All sectors - None (jobs)		1,625	1,945	2,454	2,886	3,784	6,411
On-the-Job Training - All sectors - Up to 1 year (jobs)		18,502	22,400	28,430	33,327	44,041	75,201
On-the-Job Training - All sectors - 1 to 4 years (jobs)		6,129	7,425	9,612	11,136	14,604	25,065
On-the-Job Training - All sectors - 4 to 10 years (jobs)		2,141	2,585	3,382	3,890	5,077	8,705
On-the-Job Training - All sectors - Over 10 years (jobs)		291	343	432	492	630	1,053
On-Site or In-Plant Training - All sectors - None (jobs)		4,742	5,741	7,302	8,569	11,286	19,114
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		16,818	20,343	25,853	30,263	39,954	68,331

Table 18: E- 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)		4,734	5,723	7,382	8,552	11,213	19,263
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		2,142	2,584	3,370	3,878	5,066	8,663
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		252	308	404	468	617	1,065
Wage income - All (million \$2019)		1,670	2,053	2,668	3,161	4,233	7,340

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	334	315	290	270	254	235	213
Final energy use - Residential (PJ)	151	140	128	117	105	92.8	81.8
Final energy use - Commercial (PJ)	93.8	95.2	96.6	96.8	95.9	94.4	93.4
Final energy use - Industry (PJ)	209	215	215	222	230	234	240

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)		1.88	1.92	2.22	2.29	3.56	3.78

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	105	197	289	715	1,140	2,082	3,023
Vehicle stocks - LDV – All others (1000 units)	3,952	3,952	3,952	3,749	3,545	2,732	1,919
Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018)		0	130	249	865	2,649	3,885
Public EV charging plugs - DC Fast (1000 units)	0.347		0.57		2.25		5.96
Public EV charging plugs - L2 (1000 units)	1.3		13.7		54.1		144

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 (%)	12.4	20.2	22.9	30.9	43.8	53.4	57.2
Sales of space heating units - Electric Resistance (%)	31	37.9	37.5	36.3	34.2	32.4	31.5
Sales of space heating units - Gas (%)	48.3	27.9	25.9	20.1	10.9	4.35	1.81
Sales of space heating units - Fossil (%)	8.35	14	13.7	12.7	11	9.88	9.53
Sales of water heating units - Electric Heat Pump (%)	0	1.35	5.19	16.3	33.7	45.7	50.1
Sales of water heating units - Electric Resistance (%)	40.2	56.7	55.5	52.2	47.4	44.4	43.4
Sales of water heating units - Gas Furnace (%)	53.4	36.6	34	26.2	13.7	4.82	1.35
Sales of water heating units - Other (%)	6.41	5.35	5.33	5.3	5.21	5.14	5.13
Sales of cooking units - Electric Resistance (%)	65.5	66.4	69.6	77.9	89.5	96.6	99.1
Sales of cooking units - Gas (%)	34.5	33.6	30.4	22.1	10.5	3.4	0.915
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018)		2.53	2.65				

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 (%)	2.5	12.5	15.3	23.6	37.7	49.3	54.5
Sales of space heating units - Electric Resistance (%)	16.7	13.9	16.1	22.4	32.2	39	41.6
Sales of space heating units - Gas Furnace (%)	80.8	73.6	68.6	54	30.1	11.7	3.87
Sales of space heating units - Fossil (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Heat Pump (%)	1	2.5	7.27	21.1	42.9	58.1	63.8
Sales of water heating units - Electric Resistance (%)	3.08	3.16	5.27	11.4	21.5	29	32.1
Sales of water heating units - Gas Furnace (%)	95.1	93.7	86.8	66.8	35	12.3	3.44
Sales of water heating units - Other (%)	0.791	0.625	0.628	0.63	0.63	0.629	0.629
Sales of cooking units - Electric Resistance (%)	27.5	31	36.1	49.7	68.6	80.2	84.3
Sales of cooking units - Gas (%)	72.5	69	63.9	50.3	31.4	19.8	15.7
Commercial HVAC investment in 2020s - Cumulative 5-yr (million \$2018)		13,324	14,288				

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	642	0	0	0	0	0	0
Installed thermal - Natural gas (MW)	2,857	2,832	2,331	2,557	3,436	3,678	4,918
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)							-1,538
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-211
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-4,235
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-2,923
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-6,699
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-231
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-3,282
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-286
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,705
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-22,111
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-2,304
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-739
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-7,630
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-4,284
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-13,398

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-446
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,923
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,033
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-5,365
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-41,121
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-3,070
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,267
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-11,025
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-5,746
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-20,097
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-660
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-6,564
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,779
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-60,233
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-8,025
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							251
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							161
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							2,154
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							1,058
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)							33
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							217
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							18.6
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,609
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							5,503
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							377

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 - Avoid deforestation (over 30 years) (1000 hectares)							166
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,888
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,593
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)							479
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							325
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							135
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							3,241
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							9,773
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							502
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							172
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							5,622
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							2,117
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)							62.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							434
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							107
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,660
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							11,677

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

Table 26: E- scenario - PILLAR 6: Land sinks - Agriculture (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-558
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-37
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-595
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-1,084
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-74.1
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-1,158
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)							926
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							62.8
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							988
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)							1,788
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							126
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							1,914

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)		4.12	0.005	0.005	0.003	0.002	0
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		4.02	1.85	1.11	0.958	0.786	0.143
Premature deaths from air pollution - Mobile - On-Road (deaths)		46.6	43.5	33.1	19.1	8.76	3.52
Premature deaths from air pollution - Gas Stations (deaths)		3.25	2.99	2.26	1.34	0.669	0.333
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		4.99	3.84	2.42	1.22	0.511	0.171
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.791	0.611	0.415	0.252	0.135	0.061

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

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.443	0.377	0.287	0.202	0.132	0.089
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.062	0.059	0.056	0.053	0.049	0.046
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		3.93	3.51	2.58	1.62	0.942	0.486
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		0.717	0.568	0.444	0.336	0.239	0.153
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.293	0.242	0.195	0.151	0.109	0.071
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.077	0.009	0.008	0.007	0.006	0.002
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		9.83	9.19	7.87	5.63	3.42	0.505
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019)		36.5	0.043	0.043	0.027	0.016	0
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019)		35.6	16.4	9.85	8.49	6.96	1.27
Monetary damages from air pollution - Mobile - On-Road (million \$2019)		414	387	294	170	77.9	31.3
Monetary damages from air pollution - Gas Stations (million \$2019)		28.8	26.5	20	11.9	5.92	2.95
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019)		44.2	34	21.4	10.8	4.53	1.52
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019)		7.01	5.41	3.67	2.24	1.19	0.545
Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019)		3.92	3.34	2.54	1.79	1.17	0.789
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019)		0.551	0.524	0.496	0.467	0.437	0.406
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019)		34.8	31.1	22.8	14.4	8.34	4.3
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019)		6.35	5.02	3.93	2.97	2.11	1.36
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019)		2.59	2.14	1.73	1.34	0.966	0.625
Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019)		0.683	0.076	0.069	0.06	0.055	0.018
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019)		87.3	81.6	69.9	50	30.4	4.49

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		184	305	155	92.3	221	518
By economic sector - Construction (jobs)		11,225	13,079	17,702	22,465	27,896	60,131
By economic sector - Manufacturing (jobs)		1,671	2,118	2,742	3,166	3,642	8,626
By economic sector - Mining (jobs)		1,099	770	463	241	93.9	14.1
By economic sector - Other (jobs)		1,629	1,894	2,609	3,436	4,426	11,029
By economic sector - Pipeline (jobs)		252	210	146	92.4	47.7	19.9
By economic sector - Professional (jobs)		5,258	7,194	10,712	14,965	20,368	38,878
By economic sector - Trade (jobs)		3,293	4,142	6,008	8,332	11,364	23,339
By economic sector - Utilities (jobs)		4,827	6,646	10,434	14,297	18,923	46,925
By resource sector - Biomass (jobs)		604	820	386	266	823	2,292
By resource sector - CO2 (jobs)		0	0	0	0	0	0
By resource sector - Coal (jobs)		86.9	0	0	0	0	0
By resource sector - Grid (jobs)		7,250	10,866	17,850	25,162	34,124	91,553
By resource sector - Natural Gas (jobs)		2,061	1,711	1,617	1,388	1,068	819
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		2,619	2,027	1,374	791	321	0.052
By resource sector - Solar (jobs)		10,960	10,375	11,676	12,991	14,218	42,480
By resource sector - Wind (jobs)		5,855	10,556	18,069	26,487	36,426	52,335
By education level - All sectors - High school diploma or less (jobs)		12,513	15,208	20,935	27,141	34,803	77,481
By education level - All sectors - Associates degree or some college (jobs)		9,316	11,560	16,392	21,659	28,072	61,454
By education level - All sectors - Bachelors degree (jobs)		5,863	7,352	10,427	13,927	18,308	38,600
By education level - All sectors - Masters or professional degree (jobs)		1,496	1,914	2,754	3,727	4,952	10,288
By education level - All sectors - Doctoral degree (jobs)		249	322	464	633	847	1,657
Related work experience - All sectors - None (jobs)		4,250	5,237	7,322	9,613	12,449	27,476
Related work experience - All sectors - Up to 1 year (jobs)		6,057	7,408	10,231	13,325	17,163	37,653
Related work experience - All sectors - 1 to 4 years (jobs)		10,512	13,018	18,299	24,153	31,396	68,275
Related work experience - All sectors - 4 to 10 years (jobs)		6,877	8,533	12,068	15,963	20,741	44,751
Related work experience - All sectors - Over 10 years (jobs)		1,741	2,160	3,052	4,031	5,232	11,325
On-the-Job Training - All sectors - None (jobs)		1,663	2,032	2,826	3,712	4,811	10,382
On-the-Job Training - All sectors - Up to 1 year (jobs)		18,978	23,485	32,833	43,210	56,133	122,291
On-the-Job Training - All sectors - 1 to 4 years (jobs)		6,299	7,777	10,990	14,481	18,721	40,919
On-the-Job Training - All sectors - 4 to 10 years (jobs)		2,198	2,705	3,832	5,051	6,517	14,180
On-the-Job Training - All sectors - Over 10 years (jobs)		299	358	490	631	800	1,708
On-Site or In-Plant Training - All sectors - None (jobs)		4,861	6,016	8,429	11,112	14,432	30,983
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		17,254	21,321	29,819	39,225	50,914	111,209
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		4,864	5,993	8,441	11,103	14,343	31,455
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		2,198	2,703	3,821	5,034	6,499	14,094
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		259	324	462	612	793	1,739
Wage income - All (million \$2019)		1,714	2,154	3,074	4,115	5,426	11,946

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	334	313	278	236	197	173	163
Final energy use - Residential (PJ)	151	140	123	104	88.4	78.3	72.2
Final energy use - Commercial (PJ)	93.8	95	93.3	89	85.5	84.8	85.9
Final energy use - Industry (PJ)	209	215	214	219	226	230	236

Table 30: E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested - Cumulative 5-yr (billion \$2018)		2.38	2.48	3.93	4.2	3.62	3.78

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	136	450	764	1,864	2,963	3,842	4,720
Vehicle stocks - LDV – All others (1000 units)	3,936	3,748	3,560	2,594	1,628	921	214
Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018)		737	1,953	3,062	4,679	5,048	4,837
Public EV charging plugs - DC Fast (1000 units)	0.347		1.51		5.84		9.31
Public EV charging plugs - L2 (1000 units)	1.3		36.3		141		224

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 (%)	12.4	24.5	48.3	57.6	58.8	58.8	58.7
Sales of space heating units - Electric Resistance (%)	31	37.4	34.1	31.4	31	31.2	31.3
Sales of space heating units - Gas (%)	48.3	24.7	7.17	1.4	0.846	0.812	0.816
Sales of space heating units - Fossil (%)	8.35	13.5	10.5	9.63	9.42	9.21	9.21
Sales of water heating units - Electric Heat Pump (%)	0	7.68	41.4	51	51.8	51.8	51.8
Sales of water heating units - Electric Resistance (%)	40.2	54.8	44.8	43.1	43.1	43.1	43.1
Sales of water heating units - Gas Furnace (%)	53.4	32.3	8.69	0.78	0.033	0	0
Sales of water heating units - Other (%)	6.41	5.3	5.09	5.09	5.1	5.11	5.12
Sales of cooking units - Electric Resistance (%)	65.6	73	95.4	99.8	100	100	100
Sales of cooking units - Gas (%)	34.4	27	4.63	0.233	0	0	0
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018)		2.54	2.66				

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 (%)	2.5	16.7	41.2	54.8	56.6	56.7	56.7
Sales of space heating units - Electric Resistance (%)	16.7	17.5	36.3	42	42.6	42.6	42.6
Sales of space heating units - Gas Furnace (%)	80.8	65.8	22.5	3.25	0.79	0.695	0.695
Sales of space heating units - Fossil (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Heat Pump (%)	1	10.3	52.2	64.9	66	66	66
Sales of water heating units - Electric Resistance (%)	3.08	6.46	25	32.5	33.3	33.3	33.3

Table 33: E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Commercial (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Sales of water heating units - Gas Furnace (%)	95.1	82.6	22.2	1.99	0.085	0	0
Sales of water heating units - Other (%)	0.791	0.625	0.628	0.63	0.63	0.629	0.629
Sales of cooking units - Electric Resistance (%)	27.5	41.7	78.2	85.4	85.8	85.8	85.8
Sales of cooking units - Gas (%)	72.5	58.3	21.8	14.6	14.2	14.2	14.2
Commercial HVAC investment in 2020s - Cumulative 5-yr (million \$2018)		13,358	14,518				

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	642	0	0	0	0	0	0
Installed thermal - Natural gas (MW)	2,857	2,832	2,832	3,789	4,078	4,320	4,918
Installed thermal - Nuclear (MW)	0	0	0	0	0	0	0
Installed renewables - Rooftop PV (MW)	2,443	3,766	5,029	6,555	8,366	10,477	12,977
Installed renewables - Solar - Base land use assumptions (MW)	837	837	837	837	837	837	19,062
Installed renewables - Wind - Base land use assumptions (MW)	4,188	4,188	5,678	7,051	9,692	13,427	17,751
Installed renewables - Offshore Wind - Base land use assumptions (MW)	0	109	109	109	197	330	20,274
Installed renewables - Solar - Constrained land use assumptions (MW)	838	838	838	838	838	838	20,578
Installed renewables - Wind - Constrained land use assumptions (MW)	4,629	4,629	6,085	11,190	22,983	32,823	57,406
Installed renewables - Offshore Wind - Constrained land use assumptions (MW)	0	120	120	120	157	1,593	20,347
Capital invested - Solar PV - Base (billion \$2018)		0	0	0	0	0	16.9
Capital invested - Wind - Base (billion \$2018)		0	2.58	2.21	4.06	5.44	5.95
Capital invested - Offshore Wind - Base (billion \$2018)		0.417	0	0	0.179	0.218	26.6

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	2,011	2,011	2,011	2,011	2,011	2,011	38,275
Wind - Base land use assumptions (GWh)	14,258	14,258	19,673	24,363	32,645	43,716	56,058
OffshoreWind - Base land use assumptions (GWh)	0	522	522	522	945	1,574	90,985
Solar - Constrained land use assumptions (GWh)	4,022	4,022	4,022	4,022	4,022	4,022	83,079
Wind - Constrained land use assumptions (GWh)	28,258	28,258	38,434	68,294	130,933	179,695	279,622
OffshoreWind - Constrained land use assumptions (GWh)	0	1,136	1,136	1,136	1,446	14,844	179,881

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)							-1,538
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-211
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-4,235
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-2,923

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-6,699
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-231
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-3,282
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-286
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,705
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-22,111
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-2,304
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-739
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-7,630
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-4,284
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-13,398
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-446
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,923
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,033
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-5,365
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-41,121
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-3,070
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,267
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-11,025
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-5,746
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-20,097
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-660
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-6,564
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,779
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-60,233
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-8,025
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							251
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							161
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							2,154

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 - Improve plantations (1000 hectares)							1,058
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)							33
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							217
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							18.6
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,609
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							5,503
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							377
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							166
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,888
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,593
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)							47.9
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							325
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							135
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							3,241
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							9,773
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							502
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							172
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							5,622
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							2,117
Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares)							0

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares)							62.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							434
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							107
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,660
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							11,677

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)							-558
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-37
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-595
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-1,084
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-74.1
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-1,158
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)							926
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							62.8
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							988
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)							1,788
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							126

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							1,914

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)		4.12	0.005	0.005	0.003	0.002	0
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		4.29	1.96	2.25	2.57	1.64	0.748
Premature deaths from air pollution - Mobile - On-Road (deaths)		46.6	43.5	33.1	19.1	8.76	3.52
Premature deaths from air pollution - Gas Stations (deaths)		3.25	2.99	2.26	1.34	0.669	0.333
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		4.99	3.84	2.42	1.22	0.511	0.171
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.791	0.611	0.415	0.252	0.135	0.061
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.443	0.377	0.287	0.202	0.132	0.089
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.062	0.059	0.056	0.053	0.049	0.046
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		3.93	3.51	2.58	1.62	0.942	0.486
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		0.717	0.568	0.444	0.336	0.239	0.153
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.293	0.242	0.195	0.151	0.109	0.071
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.058	0.009	0.008	0.007	0.006	0.002
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		10.1	9.72	9.44	7.92	6.56	4.84
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019)		36.5	0.043	0.043	0.027	0.016	0
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019)		38	17.4	20	22.8	14.5	6.62
Monetary damages from air pollution - Mobile - On-Road (million \$2019)		414	387	294	170	77.9	31.3
Monetary damages from air pollution - Gas Stations (million \$2019)		28.8	26.5	20	11.9	5.92	2.95
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019)		44.2	34	21.4	10.8	4.53	1.52
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019)		7.01	5.41	3.67	2.24	1.19	0.545
Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019)		3.92	3.34	2.54	1.79	1.17	0.789

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019)		0.551	0.524	0.496	0.467	0.437	0.406
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019)		34.8	31.1	22.8	14.4	8.34	4.3
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019)		6.35	5.02	3.93	2.97	2.11	1.36
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019)		2.59	2.14	1.73	1.34	0.966	0.625
Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019)		0.51	0.075	0.069	0.06	0.056	0.018
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019)		89.9	86.3	83.8	70.4	58.2	43

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		199	254	130	87.8	278	522
By economic sector - Construction (jobs)		12,264	11,819	14,211	14,459	16,290	22,533
By economic sector - Manufacturing (jobs)		1,664	1,696	1,893	1,891	1,898	2,375
By economic sector - Mining (jobs)		1,120	805	541	342	209	132
By economic sector - Other (jobs)		1,868	1,860	2,207	2,681	3,302	5,567
By economic sector - Pipeline (jobs)		265	230	566	169	189	256
By economic sector - Professional (jobs)		5,427	5,801	6,604	7,867	9,590	13,427
By economic sector - Trade (jobs)		3,462	3,584	4,083	4,857	5,908	8,748
By economic sector - Utilities (jobs)		5,068	5,739	8,780	8,466	9,852	12,251
By resource sector - Biomass (jobs)		615	632	363	276	1,091	2,183
By resource sector - CO2 (jobs)		0	0	2,990	0	484	1,276
By resource sector - Coal (jobs)		86.9	0	0	0	0	0
By resource sector - Grid (jobs)		7,716	9,222	12,367	14,601	17,077	21,274
By resource sector - Natural Gas (jobs)		2,202	1,998	2,147	1,992	1,723	1,464
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		2,618	2,054	1,431	922	590	394
By resource sector - Solar (jobs)		13,193	11,418	12,456	14,038	16,301	28,464
By resource sector - Wind (jobs)		4,908	6,465	7,261	8,993	10,252	10,755
By education level - All sectors - High school diploma or less (jobs)		13,417	13,478	16,479	17,000	19,692	27,348
By education level - All sectors - Associates degree or some college (jobs)		9,936	10,120	12,670	13,201	15,337	21,221
By education level - All sectors - Bachelors degree (jobs)		6,159	6,301	7,610	8,139	9,544	13,157
By education level - All sectors - Masters or professional degree (jobs)		1,566	1,622	1,950	2,132	2,527	3,499
By education level - All sectors - Doctoral degree (jobs)		259	268	307	349	418	585
Related work experience - All sectors - None (jobs)		4,539	4,610	5,708	5,933	6,922	9,639
Related work experience - All sectors - Up to 1 year (jobs)		6,483	6,522	7,864	8,249	9,603	13,435
Related work experience - All sectors - 1 to 4 years (jobs)		11,172	11,360	13,949	14,631	17,052	23,588
Related work experience - All sectors - 4 to 10 years (jobs)		7,300	7,423	9,187	9,592	11,144	15,321

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

Item	2020	2025	2030	2035	2040	2045	2050
Related work experience - All sectors - Over 10 years (jobs)		1,844	1,874	2,309	2,416	2,797	3,828
On-the-Job Training - All sectors - None (jobs)		1,773	1,783	2,140	2,275	2,657	3,740
On-the-Job Training - All sectors - Up to 1 year (jobs)		20,168	20,491	24,947	26,238	30,627	42,511
On-the-Job Training - All sectors - 1 to 4 years (jobs)		6,720	6,816	8,534	8,824	10,211	14,029
On-the-Job Training - All sectors - 4 to 10 years (jobs)		2,357	2,383	3,013	3,092	3,577	4,914
On-the-Job Training - All sectors - Over 10 years (jobs)		320	315	381	391	446	617
On-Site or In-Plant Training - All sectors - None (jobs)		5,170	5,238	6,365	6,715	7,838	10,915
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		18,348	18,631	22,737	23,873	27,836	38,614
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		5,192	5,260	6,560	6,792	7,862	10,823
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		2,351	2,377	2,994	3,071	3,551	4,868
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		276	283	360	371	431	590
Wage income - All (million \$2019)		1,820	1,876	2,344	2,478	2,924	4,073

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	334	313	278	236	197	173	163
Final energy use - Residential (PJ)	151	140	123	104	88.4	78.3	72.2
Final energy use - Commercial (PJ)	93.8	95	93.3	89	85.5	84.8	85.9
Final energy use - Industry (PJ)	209	215	214	219	226	230	236

Table 41: *E+RE- scenario - PILLAR 1: Efficiency/Electrification - Electricity demand*

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested - Cumulative 5-yr (billion \$2018)		2.38	2.48	3.93	4.2	3.62	3.78

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV - EV (1000 units)	136	450	764	1,864	2,963	3,842	4,720
Vehicle stocks - LDV - All others (1000 units)	3,936	3,748	3,560	2,594	1,628	921	214
Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018)		737	1,953	3,062	4,679	5,048	4,837
Public EV charging plugs - DC Fast (1000 units)	0.347		1.51		5.84		9.31
Public EV charging plugs - L2 (1000 units)	1.3		36.3		141		224

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 (%)	12.4	24.5	48.3	57.6	58.8	58.8	58.7
Sales of space heating units - Electric Resistance (%)	31	37.4	34.1	31.4	31	31.2	31.3
Sales of space heating units - Gas (%)	48.3	24.7	7.17	1.4	0.846	0.812	0.816
Sales of space heating units - Fossil (%)	8.35	13.5	10.5	9.63	9.42	9.21	9.21

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of water heating units - Electric Heat Pump (%)	0	7.68	41.4	51	51.8	51.8	51.8
Sales of water heating units - Electric Resistance (%)	40.2	54.8	44.8	43.1	43.1	43.1	43.1
Sales of water heating units - Gas Furnace (%)	53.4	32.3	8.69	0.78	0.033	0	0
Sales of water heating units - Other (%)	6.41	5.3	5.09	5.09	5.1	5.11	5.12
Sales of cooking units - Electric Resistance (%)	65.6	73	95.4	99.8	100	100	100
Sales of cooking units - Gas (%)	34.4	27	4.63	0.233	0	0	0
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018)		2.54	2.66				

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 (%)	2.5	16.7	41.2	54.8	56.6	56.7	56.7
Sales of space heating units - Electric Resistance (%)	16.7	17.5	36.3	42	42.6	42.6	42.6
Sales of space heating units - Gas Furnace (%)	80.8	65.8	22.5	3.25	0.79	0.695	0.695
Sales of space heating units - Fossil (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Heat Pump (%)	1	10.3	52.2	64.9	66	66	66
Sales of water heating units - Electric Resistance (%)	3.08	6.46	25	32.5	33.3	33.3	33.3
Sales of water heating units - Gas Furnace (%)	95.1	82.6	22.2	1.99	0.085	0	0
Sales of water heating units - Other (%)	0.791	0.625	0.628	0.63	0.63	0.629	0.629
Sales of cooking units - Electric Resistance (%)	27.5	41.7	78.2	85.4	85.8	85.8	85.8
Sales of cooking units - Gas (%)	72.5	58.3	21.8	14.6	14.2	14.2	14.2
Commercial HVAC investment in 2020s - Cumulative 5-yr (million \$2018)		13,358	14,518				

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	642	0	0	0	0	0	0
Installed thermal - Natural gas (MW)	2,857	2,832	2,561	4,176	3,483	3,724	4,725
Installed thermal - Nuclear (MW)	0	0	0	0	0	0	0
Installed renewables - Rooftop PV (MW)	2,443	3,766	5,029	6,555	8,366	10,477	12,977
Installed renewables - Solar - Base land use assumptions (MW)	2,047	3,815	4,305	4,497	5,179	7,255	8,850
Installed renewables - Wind - Base land use assumptions (MW)	4,188	4,223	5,042	5,605	6,554	6,911	6,911
Installed renewables - Offshore Wind - Base land use assumptions (MW)	0	109	109	109	109	109	895
Installed renewables - Solar - Constrained land use assumptions (MW)	1,616	2,607	3,866	5,088	6,116	9,059	10,972
Installed renewables - Wind - Constrained land use assumptions (MW)	4,154	4,198	5,392	5,500	7,353	9,465	9,465
Installed renewables - Offshore Wind - Constrained land use assumptions (MW)	0	120	120	120	120	120	959
Capital invested - Solar PV - Base (billion \$2018)		2.37	0.587	0.212	0.709	2.04	1.48
Capital invested - Wind - Base (billion \$2018)		0.067	1.42	0.908	1.46	0.52	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Capital invested - Offshore Wind - Base (billion \$2018)		0.417	0	0	0	0	1.04
Capital invested - Solar PV - Constrained (billion \$2018)		1.33	1.51	1.35	1.07	2.88	1.77
Capital invested - Wind - Constrained (billion \$2018)		0.084	2.07	0.174	2.85	3.08	0
Capital invested - Offshore Wind - Constrained (billion \$2018)		0.46	0	0	0	0	1.11

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	4,444	7,991	8,949	9,331	10,695	14,809	17,995
Wind - Base land use assumptions (GWh)	14,258	14,389	17,413	19,419	22,707	23,920	23,920
OffshoreWind - Base land use assumptions (GWh)	0	522	522	522	522	522	4,290
Solar - Constrained land use assumptions (GWh)	3,569	5,552	8,076	10,473	12,506	18,343	22,220
Wind - Constrained land use assumptions (GWh)	14,129	14,288	18,527	18,888	24,515	30,552	30,552
OffshoreWind - Constrained land use assumptions (GWh)	0	568	568	568	568	568	3,822

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)							-1,538
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-211
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-4,235
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-2,923
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-6,699
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-231
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-3,282
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-286
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,705
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-22,111
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-2,304
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-739
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-7,630
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-4,284
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-13,398
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-446
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							-4,923

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-2,033
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-5,365
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)							-41,121
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-3,070
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-1,267
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-11,025
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							-5,746
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)							-20,097
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)							-660
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							-6,564
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)							-3,779
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)							-60,233
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-8,025
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							251
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							161
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							2,154
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							1,058
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)							33
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							217
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							18.6
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,609
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							5,503
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							377
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							166

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,888
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,593
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)							47.9
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							325
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							135
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							3,241
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							9,773
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							502
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							172
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							5,622
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							2,117
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)							62.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							434
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							107
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,660
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							11,677

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 tCO ₂ e/y)							0
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO ₂ e/y)							-558

Table 48: E+RE- 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)							-37
Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y)							-595
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-1,084
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-74.1
Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y)							-1,158
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)							926
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							62.8
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							988
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)							1,788
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							126
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							1,914

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)		4.12	0.005	0.005	0.003	0.002	0
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		4.43	2.27	1.63	1.5	1.24	1
Premature deaths from air pollution - Mobile - On-Road (deaths)		47.3	47.8	46.5	41.9	33.3	22.9
Premature deaths from air pollution - Gas Stations (deaths)		3.32	3.33	3.21	2.87	2.28	1.58
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		5.03	4.34	3.61	2.78	1.94	1.2
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.806	0.718	0.649	0.548	0.409	0.268
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.448	0.426	0.405	0.363	0.294	0.225

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

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.062	0.059	0.056	0.053	0.049	0.046
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		3.97	4.07	3.97	3.55	2.86	2.09
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		0.717	0.609	0.522	0.444	0.375	0.312
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.293	0.26	0.229	0.199	0.171	0.144
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.067	0.009	0.008	0.008	0.007	0.006
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		9.98	8.98	7.74	6.73	5.91	4.11
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019)		36.5	0.043	0.043	0.027	0.016	0
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019)		39.2	20.1	14.5	13.3	11	8.87
Monetary damages from air pollution - Mobile - On-Road (million \$2019)		421	425	414	372	296	204
Monetary damages from air pollution - Gas Stations (million \$2019)		29.4	29.5	28.4	25.4	20.2	14
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019)		44.6	38.4	32	24.6	17.2	10.6
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019)		7.14	6.36	5.75	4.86	3.62	2.37
Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019)		3.97	3.78	3.59	3.21	2.61	1.99
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019)		0.551	0.524	0.496	0.467	0.437	0.406
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019)		35.1	36	35.1	31.4	25.3	18.5
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019)		6.35	5.39	4.62	3.93	3.32	2.76
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019)		2.59	2.3	2.03	1.77	1.51	1.27
Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019)		0.591	0.077	0.074	0.069	0.064	0.057
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019)		88.6	79.8	68.8	59.7	52.5	36.5

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		196	246	134	360	637	601
By economic sector - Construction (jobs)		11,040	12,741	15,701	16,231	19,086	31,116

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

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Manufacturing (jobs)		1,556	2,012	2,013	2,173	2,750	4,166
By economic sector - Mining (jobs)		1,116	820	603	445	286	150
By economic sector - Other (jobs)		1,613	1,865	2,308	2,763	3,368	6,132
By economic sector - Pipeline (jobs)		258	215	510	154	171	219
By economic sector - Professional (jobs)		5,174	6,883	8,459	10,325	13,272	20,177
By economic sector - Trade (jobs)		3,260	4,065	4,990	6,005	7,582	12,228
By economic sector - Utilities (jobs)		4,595	6,262	8,950	9,469	12,393	22,273
By resource sector - Biomass (jobs)		662	632	374	1,443	2,947	2,848
By resource sector - CO2 (jobs)		0	0	2,716	0	440	1,159
By resource sector - Coal (jobs)		86.9	0	0	0	0	0
By resource sector - Grid (jobs)		6,753	10,022	12,910	16,149	21,782	41,253
By resource sector - Natural Gas (jobs)		2,105	1,778	1,414	1,692	1,365	1,293
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		2,650	2,214	1,857	1,551	1,119	629
By resource sector - Solar (jobs)		10,898	10,299	11,488	12,655	13,864	25,915
By resource sector - Wind (jobs)		5,652	10,163	12,907	14,435	18,030	23,966
By education level - All sectors - High school diploma or less (jobs)		12,252	14,695	18,136	19,695	24,327	39,835
By education level - All sectors - Associates degree or some college (jobs)		9,103	11,165	14,087	15,318	19,002	31,322
By education level - All sectors - Bachelors degree (jobs)		5,743	7,096	8,778	9,849	12,348	19,771
By education level - All sectors - Masters or professional degree (jobs)		1,466	1,843	2,287	2,617	3,308	5,271
By education level - All sectors - Doctoral degree (jobs)		245	310	378	445	562	864
Related work experience - All sectors - None (jobs)		4,160	5,058	6,322	6,918	8,606	14,114
Related work experience - All sectors - Up to 1 year (jobs)		5,935	7,155	8,768	9,661	11,978	19,444
Related work experience - All sectors - 1 to 4 years (jobs)		10,286	12,570	15,650	17,219	21,419	34,923
Related work experience - All sectors - 4 to 10 years (jobs)		6,726	8,242	10,330	11,284	14,011	22,827
Related work experience - All sectors - Over 10 years (jobs)		1,701	2,086	2,597	2,842	3,532	5,755
On-the-Job Training - All sectors - None (jobs)		1,632	1,968	2,417	2,682	3,323	5,377
On-the-Job Training - All sectors - Up to 1 year (jobs)		18,576	22,665	28,004	30,996	38,654	62,761
On-the-Job Training - All sectors - 1 to 4 years (jobs)		6,156	7,514	9,480	10,229	12,641	20,814
On-the-Job Training - All sectors - 4 to 10 years (jobs)		2,151	2,616	3,339	3,565	4,381	7,229
On-the-Job Training - All sectors - Over 10 years (jobs)		293	347	426	452	547	882
On-Site or In-Plant Training - All sectors - None (jobs)		4,762	5,810	7,190	7,940	9,863	15,946
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		16,886	20,582	25,471	28,125	35,042	57,024
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		4,755	5,790	7,280	7,872	9,730	16,019
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		2,152	2,615	3,327	3,558	4,377	7,191
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		253	312	399	430	535	883
Wage income - All (million \$2019)		1,677	2,078	2,630	2,922	3,687	6,093

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	334	315	290	270	254	235	213
Final energy use - Residential (PJ)	151	140	128	117	105	92.8	81.8
Final energy use - Commercial (PJ)	93.8	95.2	96.6	96.8	95.9	94.4	93.4
Final energy use - Industry (PJ)	209	215	215	222	230	234	240

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)		1.88	1.92	2.22	2.29	3.56	3.78

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	105	197	289	715	1,140	2,082	3,023
Vehicle stocks - LDV – All others (1000 units)	3,952	3,952	3,952	3,749	3,545	2,732	1,919
Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018)		0	130	249	865	2,649	3,885
Public EV charging plugs - DC Fast (1000 units)	0.347		0.57		2.25		5.96
Public EV charging plugs - L2 (1000 units)	1.3		13.7		54.1		144

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 (%)	12.4	20.2	22.9	30.9	43.8	53.4	57.2
Sales of space heating units - Electric Resistance (%)	31	37.9	37.5	36.3	34.2	32.4	31.5
Sales of space heating units - Gas (%)	48.3	27.9	25.9	20.1	10.9	4.35	1.81
Sales of space heating units - Fossil (%)	8.35	14	13.7	12.7	11	9.88	9.53
Sales of water heating units - Electric Heat Pump (%)	0	1.35	5.19	16.3	33.7	45.7	50.1
Sales of water heating units - Electric Resistance (%)	40.2	56.7	55.5	52.2	47.4	44.4	43.4
Sales of water heating units - Gas Furnace (%)	53.4	36.6	34	26.2	13.7	4.82	1.35
Sales of water heating units - Other (%)	6.41	5.35	5.33	5.3	5.21	5.14	5.13
Sales of cooking units - Electric Resistance (%)	65.5	66.4	69.6	77.9	89.5	96.6	99.1
Sales of cooking units - Gas (%)	34.5	33.6	30.4	22.1	10.5	3.4	0.915
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018)		2.53	2.65				

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 (%)	2.5	12.5	15.3	23.6	37.7	49.3	54.5
Sales of space heating units - Electric Resistance (%)	16.7	13.9	16.1	22.4	32.2	39	41.6
Sales of space heating units - Gas Furnace (%)	80.8	73.6	68.6	54	30.1	11.7	3.87
Sales of space heating units - Fossil (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Heat Pump (%)	1	2.5	7.27	21.1	42.9	58.1	63.8
Sales of water heating units - Electric Resistance (%)	3.08	3.16	5.27	11.4	21.5	29	32.1

Table 55: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Commercial (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Sales of water heating units - Gas Furnace (%)	95.1	93.7	86.8	66.8	35	12.3	3.44
Sales of water heating units - Other (%)	0.791	0.625	0.628	0.63	0.63	0.629	0.629
Sales of cooking units - Electric Resistance (%)	27.5	31	36.1	49.7	68.6	80.2	84.3
Sales of cooking units - Gas (%)	72.5	69	63.9	50.3	31.4	19.8	15.7
Commercial HVAC investment in 2020s - Cumulative 5-yr (million \$2018)		13,324	14,288				

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	642	0	0	0	0	0	0
Installed thermal - Natural gas (MW)	2,857	2,832	2,320	2,898	4,031	4,285	6,097
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
Capital invested - Biomass w/ccu power plant (billion \$2018)	0	0	0	0	0	0	0

Table 57: E-B+ scenario - PILLAR 2: Clean Electricity - Generation

Item	2020	2025	2030	2035	2040	2045	2050
Biomass power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu allam power plant (GWh)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Number of facilities - Power (quantity)	0	0	0	0	0	0	0
Number of facilities - Power ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Allam power w ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Beccs hydrogen (quantity)	0	0	0	0	4	9	10
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	3,120	4,937	607
Biomass purchases (million \$2018/y)		0	0	0	234	604	650

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0	0	4.01	10.4	11.1
Annual - BECCS (MMT)		0	0	0	4.01	10.4	11.1
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	4.01	14.4	25.5
Cumulative - BECCS (MMT)		0	0	0	4.01	14.4	25.5
Cumulative - NGCC (MMT)		0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
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	497	497	497	497
Spur (km)		0	0	0	373	662	737
All (km)		0	0	497	871	1,159	1,234
Cumulative investment - Trunk (million \$2018)		0	0	1,561	1,561	1,561	1,561
Cumulative investment - Spur (million \$2018)		0	0	0	248	460	507
Cumulative investment - All (million \$2018)		0	0	1,561	1,809	2,020	2,068

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual (MMT)		0	0	0	0	0	0
Injection wells (wells)		0	0	0	0	0	0
Resource characterization, appraisal, permitting costs (million \$2020)		0	0	0	0	0	0
Wells and facilities construction costs (million \$2020)		0	0	0	0	0	0

Table 62: E-B+ scenario - PILLAR 6: Land sinks - Forests

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-1,538
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-211
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-4,235
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							-2,923
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-6,699
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-231
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							-3,282
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-286
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-2,705
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-22,111
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-2,304
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-739
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-7,630
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-4,284
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO2e/y)							-13,398
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-446

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Mid - Reforest cropland (1000 tCO ₂ e/y)							-4,923
Carbon sink potential - Mid - Reforest pasture (1000 tCO ₂ e/y)							-2,033
Carbon sink potential - Mid - Restore productivity (1000 tCO ₂ e/y)							-5,365
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO ₂ e/y)							-41,121
Carbon sink potential - High - Accelerate regeneration (1000 tCO ₂ e/y)							-3,070
Carbon sink potential - High - Avoid deforestation (1000 tCO ₂ e/y)							-1,267
Carbon sink potential - High - Extend rotation length (1000 tCO ₂ e/y)							-11,025
Carbon sink potential - High - Improve plantations (1000 tCO ₂ e/y)							-5,746
Carbon sink potential - High - Increase retention of HWP (1000 tCO ₂ e/y)							-20,097
Carbon sink potential - High - Increase trees outside forests (1000 tCO ₂ e/y)							-660
Carbon sink potential - High - Reforest cropland (1000 tCO ₂ e/y)							-6,564
Carbon sink potential - High - Reforest pasture (1000 tCO ₂ e/y)							-3,779
Carbon sink potential - High - All (not counting overlap) (1000 tCO ₂ e/y)							-60,233
Carbon sink potential - High - Restore productivity (1000 tCO ₂ e/y)							-8,025
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							251
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							161
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							2,154
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							1,058
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)							33
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							217
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							18.6
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,609
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							5,503
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							377

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							166
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,888
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,593
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)							479
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							325
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							135
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							3,241
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							9,773
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							502
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							172
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							5,622
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							2,117
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)							62.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							434
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							107
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,660
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							11,677

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

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

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y)							-558
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y)							-37
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)							-595
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-1,084
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y)							-74.1
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)							-1,158
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)							926
Land impacted for carbon sink - Moderate deployment - Permanent conservation cover (1000 hectares)							62.8
Land impacted for carbon sink - Moderate deployment - Cropland to woody energy crops (1000 hectares)							0.006
Land impacted for carbon sink - Moderate deployment - Pasture to energy crops (1000 hectares)							4.06
Land impacted for carbon sink - Moderate deployment - Total (1000 hectares)							993
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)							4,416
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares)							126
Land impacted for carbon sink - Aggressive deployment - Cropland to woody energy crops (1000 hectares)							0.006

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink - Aggressive deployment - Pasture to energy crops (1000 hectares)							4.06
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)							4,546

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)		11.3	7.2	2.07	1.56	1.42	1.34
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		5.32	5.06	4.75	4	3.72	3.6
Premature deaths from air pollution - Mobile - On-Road (deaths)		47.3	48.5	49.6	50.9	52.2	53.6
Premature deaths from air pollution - Gas Stations (deaths)		3.31	3.36	3.4	3.47	3.52	3.57
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		4.98	4.36	3.84	3.49	3.3	3.16
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		0.795	0.66	0.509	0.382	0.288	0.229
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		0.444	0.432	0.434	0.442	0.45	0.457
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.065	0.065	0.064	0.064	0.063	0.062
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		3.99	4.07	3.99	3.98	4.16	4.46
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		0.749	0.72	0.707	0.697	0.69	0.684
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.306	0.308	0.312	0.314	0.316	0.317
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.18	0.116	0.087	0.081	0.075	0.068
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		10	10.5	10.7	10.1	9.99	9.28
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019)		100	63.8	18.3	13.8	12.6	11.8
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019)		47.2	44.8	42	35.4	32.9	31.9
Monetary damages from air pollution - Mobile - On-Road (million \$2019)		421	431	441	453	464	476
Monetary damages from air pollution - Gas Stations (million \$2019)		29.3	29.8	30.1	30.7	31.2	31.6
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019)		44.1	38.7	34	30.9	29.3	28
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019)		7.04	5.85	4.51	3.38	2.55	2.03

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019)		3.93	3.83	3.84	3.92	3.98	4.05
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019)		0.575	0.573	0.57	0.564	0.556	0.547
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019)		35.3	36	35.3	35.2	36.8	39.5
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019)		6.63	6.38	6.26	6.17	6.11	6.05
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019)		2.71	2.73	2.76	2.78	2.8	2.81
Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019)		1.59	1.02	0.771	0.711	0.665	0.603
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019)		89.1	93.2	94.6	90	88.7	82.4

Table 65: REF scenario - IMPACTS - Jobs

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		190	177	176	157	157	164
By economic sector - Construction (jobs)		3,653	9,212	9,926	11,165	11,967	17,580
By economic sector - Manufacturing (jobs)		1,080	1,290	1,488	1,583	1,497	1,748
By economic sector - Mining (jobs)		1,135	918	749	611	520	442
By economic sector - Other (jobs)		218	1,510	1,814	2,203	2,573	4,755
By economic sector - Pipeline (jobs)		265	273	276	262	265	264
By economic sector - Professional (jobs)		2,184	4,226	4,768	5,834	6,634	9,909
By economic sector - Trade (jobs)		1,459	2,803	3,161	3,835	4,422	7,024
By economic sector - Utilities (jobs)		3,656	4,153	4,618	5,520	6,160	7,612
By resource sector - Biomass (jobs)		623	589	555	509	514	517
By resource sector - CO2 (jobs)		0	0	0	0	0	0
By resource sector - Coal (jobs)		86.9	0	0	0	0	0
By resource sector - Grid (jobs)		5,456	6,153	6,815	8,642	10,107	12,690
By resource sector - Natural Gas (jobs)		2,177	2,288	2,517	2,351	2,167	2,288
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		2,675	2,278	2,005	1,860	1,779	1,724
By resource sector - Solar (jobs)			9,934	11,294	12,507	13,647	25,620
By resource sector - Wind (jobs)		2,821	3,320	3,788	5,301	5,984	6,660
By education level - All sectors - High school diploma or less (jobs)		5,736	10,477	11,447	13,089	14,261	20,607
By education level - All sectors - Associates degree or some college (jobs)		4,301	7,785	8,600	9,981	10,975	15,954
By education level - All sectors - Bachelors degree (jobs)		2,952	4,861	5,336	6,220	6,865	9,885
By education level - All sectors - Masters or professional degree (jobs)		741	1,237	1,367	1,613	1,797	2,611
By education level - All sectors - Doctoral degree (jobs)		110	203	224	267	298	442
Related work experience - All sectors - None (jobs)		2,001	3,571	3,929	4,539	4,986	7,250
Related work experience - All sectors - Up to 1 year (jobs)		2,693	5,049	5,533	6,354	6,943	10,136
Related work experience - All sectors - 1 to 4 years (jobs)		5,031	8,779	9,645	11,166	12,273	17,747

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

Item	2020	2025	2030	2035	2040	2045	2050
Related work experience - All sectors - 4 to 10 years (jobs)		3,267	5,719	6,283	7,278	7,989	11,499
Related work experience - All sectors - Over 10 years (jobs)		847	1,445	1,585	1,833	2,006	2,867
On-the-Job Training - All sectors - None (jobs)		747	1,388	1,523	1,760	1,935	2,859
On-the-Job Training - All sectors - Up to 1 year (jobs)		9,081	15,844	17,398	20,107	22,070	31,937
On-the-Job Training - All sectors - 1 to 4 years (jobs)		2,922	5,252	5,772	6,671	7,311	10,533
On-the-Job Training - All sectors - 4 to 10 years (jobs)		964	1,833	2,013	2,328	2,553	3,695
On-the-Job Training - All sectors - Over 10 years (jobs)		125	246	268	304	328	476
On-Site or In-Plant Training - All sectors - None (jobs)		2,221	4,040	4,444	5,143	5,645	8,240
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		8,248	14,413	15,822	18,280	20,062	29,021
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		2,260	4,060	4,460	5,150	5,642	8,138
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		989	1,833	2,009	2,320	2,542	3,661
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		121	217	239	278	306	439
Wage income - All (million \$2019)		833	1,446	1,605	1,881	2,094	3,043

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	334	316	295	284	286	295	308
Final energy use - Residential (PJ)	151	140	129	121	115	111	107
Final energy use - Commercial (PJ)	93.8	96.3	99.1	101	104	110	118
Final energy use - Industry (PJ)	209	222	230	240	253	268	285

Table 67: REF scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested - Cumulative 5-yr (billion \$2018)		2.31	2.4	2.04	2.08	2.23	2.28

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 (%)	10.6	29.2	30	31.3	32.8	34.9	37.8
Sales of space heating units - Electric Resistance (%)	31.7	33	32.6	31.9	30.8	28.9	25.7
Sales of space heating units - Gas (%)	49.2	24.7	25.6	25.8	25.6	25.6	25.6
Sales of space heating units - Fossil (%)	8.51	13	11.8	11	10.8	10.7	10.8
Sales of water heating units - Electric Heat Pump (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Resistance (%)	40.2	57.1	57	57	56.9	56.9	56.9
Sales of water heating units - Gas Furnace (%)	53.4	37.5	37.6	37.6	37.6	37.7	37.7
Sales of water heating units - Other (%)	6.41	5.36	5.36	5.41	5.42	5.43	5.44
Sales of cooking units - Electric Resistance (%)	65.2	65.2	65.2	65.2	65.2	65.2	65.2
Sales of cooking units - Gas (%)	34.8	34.8	34.8	34.8	34.8	34.8	34.8

Table 68: REF scenario - PILLAR 1: Efficiency/Electrification - Residential (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018)		2.54	2.44				

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 (%)	2.5	22.4	55	63.9	64.6	64.7	64.7
Sales of space heating units - Electric Resistance (%)	16.7	16.3	26	31	34.1	34.6	34.6
Sales of space heating units - Gas Furnace (%)	80.8	61.3	19	5.16	1.26	0.741	0.694
Sales of space heating units - Fossil (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Heat Pump (%)	1	0.818	0.818	0.822	0.828	0.831	0.832
Sales of water heating units - Electric Resistance (%)	3.08	2.41	2.42	2.43	2.43	2.43	2.43
Sales of water heating units - Gas Furnace (%)	95.1	96.1	96.1	96.1	96.1	96.1	96.1
Sales of water heating units - Other (%)	0.791	0.625	0.628	0.63	0.63	0.629	0.629
Sales of cooking units - Electric Resistance (%)	27.5	29	29	29	29	28.9	28.9
Sales of cooking units - Gas (%)	72.5	71	71	71	71	71.1	71.1
Commercial HVAC investment in 2020s - Cumulative 5-yr (million \$2018)		13,236	13,602				

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Coal (MW)	642	0	0	0	0	0	0
Installed thermal - Natural gas (MW)	2,857	2,832	2,832	2,830	2,249	1,596	3,623
Installed thermal - Nuclear (MW)	0	0	0	0	0	0	0
Installed renewables - Rooftop PV (MW)	2,443	3,766	5,029	6,555	8,366	10,477	12,977
Installed renewables - Solar - Base land use assumptions (MW)	703	703	703	703	703	703	703
Installed renewables - Wind - Base land use assumptions (MW)	4,154	4,154	4,154	4,154	5,001	5,440	5,440
Installed renewables - Offshore Wind - Base land use assumptions (MW)	0	109	109	109	109	197	352
Installed renewables - Solar - Constrained land use assumptions (MW)	133	133	133	133	133	133	133

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	2,011	2,011	2,011	2,011	2,011	2,011	2,011
Wind - Base land use assumptions (GWh)	14,129	14,129	14,129	14,129	17,259	18,842	18,842
Offshore Wind - 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)	-34.3		-7.18				-5.98
Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y)	-5.47		-9.18				-9.66
Business-as-usual carbon sink - Total (Mt CO2e/y)	-39.7		-16.4				-15.6

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Accelerate regeneration (1000 tCO ₂ e/y)							-1,538
Carbon sink potential - Low - Avoid deforestation (1000 tCO ₂ e/y)							-211
Carbon sink potential - Low - Extend rotation length (1000 tCO ₂ e/y)							-4,235
Carbon sink potential - Low - Improve plantations (1000 tCO ₂ e/y)							-2,923
Carbon sink potential - Low - Increase retention of HWP (1000 tCO ₂ e/y)							-6,699
Carbon sink potential - Low - Increase trees outside forests (1000 tCO ₂ e/y)							-231
Carbon sink potential - Low - Reforest cropland (1000 tCO ₂ e/y)							-3,282
Carbon sink potential - Low - Reforest pasture (1000 tCO ₂ e/y)							-286
Carbon sink potential - Low - Restore productivity (1000 tCO ₂ e/y)							-2,705
Carbon sink potential - Low - All (not counting overlap) (1000 tCO ₂ e/y)							-22,111
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO ₂ e/y)							-2,304
Carbon sink potential - Mid - Avoid deforestation (1000 tCO ₂ e/y)							-739
Carbon sink potential - Mid - Extend rotation length (1000 tCO ₂ e/y)							-7,630
Carbon sink potential - Mid - Improve plantations (1000 tCO ₂ e/y)							-4,284
Carbon sink potential - Mid - Increase retention of HWP (1000 tCO ₂ e/y)							-13,398
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO ₂ e/y)							-446
Carbon sink potential - Mid - Reforest cropland (1000 tCO ₂ e/y)							-4,923
Carbon sink potential - Mid - Reforest pasture (1000 tCO ₂ e/y)							-2,033
Carbon sink potential - Mid - Restore productivity (1000 tCO ₂ e/y)							-5,365
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO ₂ e/y)							-41,121
Carbon sink potential - High - Accelerate regeneration (1000 tCO ₂ e/y)							-3,070
Carbon sink potential - High - Avoid deforestation (1000 tCO ₂ e/y)							-1,267
Carbon sink potential - High - Extend rotation length (1000 tCO ₂ e/y)							-11,025
Carbon sink potential - High - Improve plantations (1000 tCO ₂ e/y)							-5,746
Carbon sink potential - High - Increase retention of HWP (1000 tCO ₂ e/y)							-20,097
Carbon sink potential - High - Increase trees outside forests (1000 tCO ₂ e/y)							-660
Carbon sink potential - High - Reforest cropland (1000 tCO ₂ e/y)							-6,564
Carbon sink potential - High - Reforest pasture (1000 tCO ₂ e/y)							-3,779
Carbon sink potential - High - All (not counting overlap) (1000 tCO ₂ e/y)							-60,233

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-8,025
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares)							251
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)							161
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)							2,154
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)							1,058
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)							33
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							217
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)							18.6
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)							1,609
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							5,503
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							377
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							166
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							3,888
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							1,593
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)							47.9
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							325
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							135
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							3,241
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							9,773
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)							502

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares)							172
Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares)							5,622
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares)							2,117
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)							62.7
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)							434
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							107
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares)							2,660
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares)							11,677