

Net-Zero America - Rhode Island data

October 29, 2021 (updated November 17, 2023)

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

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Table 1: E+ scenario - IMPACTS - Health

Table 1: E+ scenario - IMPACTS - Health	2020	OUOE	2020	202E	207.0	20/E	2050
Item Premature deaths from air pollution -	2020	2025 11.1	2030 0.012	2035 0.012	2040 0.011	2045 0.007	2050
Fuel Comb - Electric Generation - Coal (deaths)		11.1	0.012	0.012	0.011	0.001	U
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural		6.43	3.18	2.2	2.68	1.66	0.983
Gas (deaths) Premature deaths from air pollution -		37.1	34.4	26	14.9	6.64	2.42
Mobile - On-Road (deaths) Premature deaths from air pollution - Gas		1.7	1.54	1.14	0.659	0.301	0.122
Stations (deaths) Premature deaths from air pollution -		7.64	6.58	4.66	2.66	1.29	0.502
Fuel Comb - Residential - Natural Gas (deaths)							
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		14.5	11.4	7.59	4.28	1.81	0.546
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		1.1	0.999	0.781	0.52	0.293	0.15
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.235	0.224	0.212	0.2	0.188	0.175
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		6.77	6	4.77	3.36	2.14	1.15
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		4.6	3.8	2.68	1.66	1.13	0.827
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.649	0.543	0.44	0.341	0.248	0.161
Premature deaths from air pollution - Industrial Processes - Coal Mining Ideaths)		0.093	0.048	0.048	0.047	0.047	0.046
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		6.32	5.75	4.99	3.86	2.73	1.62
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019)		98.3	0.103	0.103	0.098	0.06	0.003
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019)		57	28.2	19.5	23.7	14.7	8.71
Monetary damages from air pollution - Mobile - On-Road (million \$2019)		330	306	231	132	59.1	21.5
Monetary damages from air pollution - Gas Stations (million \$2019)		15	13.6	10.1	5.84	2.66	1.08
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019)		67.7	58.3	41.3	23.6	11.4	4.45
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019)		128	101	67.3	37.9	16.1	4.84
Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019)		9.75	8.86	6.92	4.61	2.6	1.33
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019)		2.08	1.98	1.88	1.77	1.66	1.55
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019)		59.9	53.1	42.2	29.8	19	10.2

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)		40.8	33.7	23.7	14.7	10	7.32
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019)		5.75	4.81	3.9	3.02	2.19	1.42
Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019)		0.82	0.426	0.421	0.413	0.416	0.41
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019)		56.1	51.1	44.3	34.3	24.2	14.4

Table 2: E+ scenario - IMPACTS - Jobs

Table 2: E+ Scenario - IMPACTS - Jobs							
Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		14.1	28.6	10.9	8.49	6.24	81.2
By economic sector - Construction (jobs)		1,137	1,293	1,151	1,546	1,440	1,891
By economic sector - Manufacturing		470	552	626	645	680	926
(jobs)							
By economic sector - Mining (jobs)		428	300	186	105	51.4	21.4
By economic sector - Other (jobs)		131	179	131	175	179	308
By economic sector - Pipeline (jobs)		101	85	65.4	46.5	28.2	27.1
By economic sector - Professional (jobs)		472	528	486	700	662	995
By economic sector - Trade (jobs)		437	435	360	446	415	595
By economic sector - Utilities (jobs)		799	774	1,073	1,922	1,731	1,974
By resource sector - Biomass (jobs)		60.5	79	31.2	25.6	22.8	347
By resource sector - CO2 (jobs)		0	0	0	0	0	84.7
By resource sector - Grid (jobs)		559	1,019	1,767	2,917	2,913	3,412
By resource sector - Natural Gas (jobs)		1,212	685	545	1,083	684	570
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		1,004	772	517	310	166	63.6
By resource sector - Solar (jobs)		1,044	1,342	739	790	893	1,587
By resource sector - Wind (jobs)		110	278	490	467	514	755
By education level - All sectors - High		1,684	1,795	1,748	2,359	2,198	2,902
school diploma or less (jobs)							
By education level - All sectors -		1,246	1,309	1,308	1,834	1,703	2,208
Associates degree or some college (jobs)							
By education level - All sectors -		834	841	813	1,095	1,010	1,330
Bachelors degree (jobs)							
By education level - All sectors - Masters		198	201	195	269	249	332
or professional degree (jobs)							
By education level - All sectors - Doctoral		28.4	29.4	26.2	35.1	32.4	46.5
degree (jobs)							
Related work experience - All sectors -		580	607	597	824	763	1,003
None (jobs)							
Related work experience - All sectors - Up		783	844	813	1,087	1,021	1,377
to 1 year (jobs)							
Related work experience - All sectors - 1		1,445	1,501	1,472	2,016	1,867	2,441
to 4 years (jobs)							
Related work experience - All sectors - 4		937	969	956	1,323	1,222	1,585
to 10 years (jobs)							
Related work experience - All sectors -	\neg	245	254	253	344	320	414
Over 10 years (jobs)							
On-the-Job Training - All sectors - None		221	231	217	288	268	360
(jobs)							
On-the-Job Training - All sectors - Up to 1	\Box	2,612	2,735	2,673	3,613	3,363	4,453
year (jobs)							
On-the-Job Training - All sectors - 1 to 4		844	881	877	1,231	1,138	1,462
years (jobs)							

Table 2. F+	scenario	- IMPACTS -	Inhe	(continued)
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Item	2020	2025	2030	2035	2040	2045	2050
On-the-Job Training - All sectors - 4 to 10 years (jobs)		274	287	283	411	376	480
On-the-Job Training - All sectors - Over 10 years (jobs)		39.7	41.9	39.3	50.9	47.5	62.8
On-Site or In-Plant Training - All sectors - None (jobs)		646	677	652	884	822	1,095
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		2,374	2,485	2,434	3,297	3,068	4,049
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		654	685	680	948	878	1,132
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		282	292	287	412	377	481
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		33.9	35.7	36.5	52.6	48.6	62.3
Wage income - All (million \$2019)		245	256	256	360	336	442

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

Item	2020	2025	2030	2035	2040	2045	2050
Oil consumption - Annual (million bbls)		22.6	18.9	13.7	8.88	5.07	2.07
Oil consumption - Cumulative (million							426
bbls)							
Oil production - Annual (million bbls)		0	0	0	0	0	0
Natural gas consumption - Annual (tcf)		78.8	66.4	53.3	40.1	25.2	17.5
Natural gas consumption - Cumulative							1,604
(tcf)							
Natural gas production - Annual (tcf)		0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	58.1	53.8	47.4	39.2	31.8	27.1	24.9
Final energy use - Residential (PJ)	45.6	42.8	39.4	34.2	28.6	24.4	21.9
Final energy use - Commercial (PJ)	37.9	36	34.2	31.9	29.5	27.8	26.7
Final energy use - Industry (PJ)	7.41	7.1	7.08	7.12	7.25	7.42	7.63

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

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -		0.337	0.347	1.19	1.3	1.08	1.15
Cumulative 5-yr (billion \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	5.42	76.6	148	397	646	845	1,044
Vehicle stocks - LDV - All others (1000	871	829	788	574	360	204	47.4
units)							
Light-duty vehicle capital costs vs. REF -		167	429	695	1,053	1,145	1,092
Cumulative 5-yr (million \$2018)							
Public EV charging plugs - DC Fast (1000	0.024		0.247		1.08		1.74
units)							
Public EV charging plugs - L2 (1000 units)	0.374		5.92		25.9		41.8

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 (%)	4.86	12.4	57.2	90.9	95.9	96.2	96.2

Table 7: E+ scenario - PILLAR 1: Efficiency/Electrification - Residential (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Electric	3.87	5.87	4.58	1.99	1.51	1.47	1.61
Resistance (%)							
Sales of space heating units - Gas (%)	54.1	35.8	25.3	4.26	0.506	0.272	0.257
Sales of space heating units - Fossil (%)	37.2	45.9	12.9	2.88	2.05	2.02	1.96
Sales of water heating units - Electric	0	1.46	13.8	34.6	38.2	38.4	38.4
Heat Pump (%)							
Sales of water heating units - Electric	22.1	39.5	47.7	59.4	61.4	61.5	61.5
Resistance (%)							
Sales of water heating units - Gas Furnace	65.5	51	36.9	5.9	0.348	0	0
(%)							
Sales of water heating units - Other (%)	12.4	7.96	1.57	0.146	0.084	0.085	0.085
Sales of cooking units - Electric	55.1	64.6	94	99.7	100	100	100
Resistance (%)							
Sales of cooking units - Gas (%)	44.9	35.4	6.05	0.305	0	0	0
Residential HVAC investment in 2020s vs.		0.886	0.975				
REF - Cumulative 5-yr (billion \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Electric	2.71	10.5	38.5	72.1	77.6	77.9	78
Heat Pump (%)							
Sales of space heating units - Electric	1.36	4.58	16.4	21.3	22	22.1	22
Resistance (%)							
Sales of space heating units - Gas (%)	68.5	55	39.3	6.28	0.373	0	0
Sales of space heating units - Fossil (%)	27.4	29.9	5.75	0.244	0	0	0
Sales of water heating units - Electric	1.43	3.46	15.8	41.2	45.7	46	46
Heat Pump (%)							
Sales of water heating units - Electric	7.28	12.2	23.8	48	52.2	52.5	52.5
Resistance (%)							
Sales of water heating units - Gas (%)	88.4	80.6	58.5	9.33	0.552	0	0
Sales of water heating units - Other (%)	2.9	3.75	1.86	1.55	1.53	1.53	1.55
Sales of cooking units - Electric	36.9	49.9	81.2	87.4	87.7	87.7	87.7
Resistance (%)							
Sales of cooking units - Gas (%)	63.1	50.1	18.8	12.6	12.3	12.3	12.3
Commercial HVAC investment in 2020s -		1,952	2,131				
Cumulative 5-yr (million \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Natural gas (MW)	1,997	625	804	804	3,235	3,816	3,816
Installed thermal - Nuclear (MW)	0	0	0	0	0	0	0
Installed renewables - Rooftop PV (MW)	152	264	310	362	422	489	563
Installed renewables - Solar - Base land use assumptions (MW)	105	105	652	652	652	652	652
Installed renewables - Wind - Base land use assumptions (MW)	91.4	91.4	91.4	91.4	91.4	91.4	91.4
Installed renewables - Offshore Wind - Base land use assumptions (MW)	0	0	268	681	906	906	906
Installed renewables - Solar - Constrained land use assumptions (MW)	11	11	1,010	1,010	1,010	1,010	1,010
Installed renewables - Wind - Constrained land use assumptions (MW)	91.4	91.4	91.4	91.4	91.4	91.4	91.4
Installed renewables - Offshore Wind - Constrained land use assumptions (MW)	73.2	617	793	793	793	793	793
Capital invested - Solar PV - Base (billion \$2018)		0	0.656	0	0	0	0
Capital invested - Wind - Base (billion \$2018)		0	0	0	0	0	0

Table 9: E+ scenario	DILLADO, Ologo	Flootnicity Conc	natina aanaaitu	(continued)
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Item	2020	2025	2030	2035	2040	2045	2050
Capital invested - Offshore Wind - Base (billion \$2018)		0	0.829	1.04	0.454	0	0
Capital invested - Solar PV - Constrained (billion \$2018)		0.137	0.725	0	0	0	0
Capital invested - Wind - Constrained (billion \$2018)		0	0	0	0	0	0
Capital invested - Offshore Wind - Constrained (billion \$2018)		2.08	0.546	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 10: E+ scenario - PILLAR 2: Clean Electricity - Generation

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	220	220	1,203	1,203	1,203	1,203	1,203
Wind - Base land use assumptions (GWh)	371	371	371	371	371	371	371
OffshoreWind - Base land use assumptions (GWh)	0	0	1,073	2,717	3,631	3,631	3,631
Solar - Constrained land use assumptions (GWh)	0	0	1,788	1,788	1,788	1,788	1,788
Wind - Constrained land use assumptions (GWh)	371	371	371	371	371	371	371
OffshoreWind - Constrained land use assumptions (GWh)	0	0	1,073	2,717	3,631	3,631	3,631
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	0	0	0	0	0	0	0
(quantity)							
Number of facilities - Allam power w ccu	0	0	0	0	0	0	0
(quantity)							
Number of facilities - Beccs hydrogen	0	0	0	0	0	0	1
(quantity)							
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	0	0	0	0	0	0	0
(quantity)							
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 -		0	0	0	0	0	1,155
Cumulative 5-yr (million \$2018)							
Biomass purchases (million \$2018/y)		0	0	0	0	0	46.4

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0	0	0	0	1.48
Annual - BECCS (MMT)		0	0	0	0	0	1.48
Annual - NGCC (MMT)		0	0	0	0	0	0
Annual - Cement and lime (MMT)		0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Cumulative - All (MMT)		0	0	0	0	0	1.48
Cumulative - BECCS (MMT)		0	0	0	0	0	1.48
Cumulative - NGCC (MMT)		0	0	0	0	0	0
Cumulative - Cement and lime (MMT)		0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Trunk (km)		0	0	0	0	0	0
Spur (km)		0	0	0	0	0	79.2
All (km)		0	0	0	0	0	79.2
Cumulative investment - Trunk (million		0	0	0	0	0	0
\$2018)							
Cumulative investment - Spur (million		0	0	0	0	0	59.3
\$2018)							
Cumulative investment - All (million		0	0	0	0	0	59.3
\$2018)							

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)							-4.07
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-27.6
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-94.6
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							0
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)							-18.3
Carbon sink potential - Low - Increase trees outside forests (1000 tC02e/y)							-9.99
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-3.81
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-21.5
Carbon sink potential - Low - All (not counting overlap) (1000 tC02e/y)							-180
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-6.1
Carbon sink potential - Mid - Avoid deforestation (1000 tC02e/y)							-96.5
Carbon sink potential - Mid - Extend rotation length (1000 tC02e/y)							-170
Carbon sink potential - Mid - Improve plantations (1000 tC02e/y)							0

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

lable 15: E+ scenario - PILLAR 6: Land sin	2020	2025	2030	2025	2040	207.5	2050
Item Carbon sink potential - Mid - Increase	2020	2025	2030	2035	2040	2045	2050 -36.6
retention of HWP (1000 tCO2e/y)							-30.0
Carbon sink potential - Mid - Increase		+		+			-19.3
trees outside forests (1000 tC02e/y)							-17.3
Carbon sink potential - Mid - Reforest							0
cropland (1000 tCO2e/y)							U
Carbon sink potential - Mid - Reforest							-27
·							-21
pasture (1000 tC02e/y)							/ 0.7
Carbon sink potential - Mid - Restore							-42.7
productivity (1000 tCO2e/y)							
Carbon sink potential - Mid - All (not							-399
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - High - Accelerate							-8.13
regeneration (1000 tCO2e/y)							
Carbon sink potential - High - Avoid							-165
deforestation (1000 tCO2e/y)							
Carbon sink potential - High - Extend							-246
rotation length (1000 tCO2e/y)							
Carbon sink potential - High - Improve							0
plantations (1000 tCO2e/y)							
Carbon sink potential - High - Increase							-54.9
retention of HWP (1000 tCO2e/y)							04.7
Carbon sink potential - High - Increase							-28.5
trees outside forests (1000 tC02e/y)							-20.5
` , , ,							0
Carbon sink potential - High - Reforest							0
cropland (1000 tC02e/y)							
Carbon sink potential - High - Reforest							-50.3
pasture (1000 tCO2e/y)							
Carbon sink potential - High - All (not							-617
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - High - Restore							-63.9
productivity (1000 tCO2e/y)							
Land impacted for carbon sink potential -							0.665
Low - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							21
Low - Avoid deforestation (over 30 years)							21
(1000 hectares)							
Land impacted for carbon sink potential -							48.1
							40.1
Low - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							0
Low - Improve plantations (1000							
hectares)							
Land impacted for carbon sink potential -							0
Low - Increase retention of HWP (1000							
hectares)							
Land impacted for carbon sink potential -							1.43
Low - Increase trees outside forests							
(1000 hectares)							
Land impacted for carbon sink potential -							0
Low - Reforest cropland (1000 hectares)							J
Land impacted for carbon sink potential -							0.247
Low - Reforest pasture (1000 hectares)							0.241
							10.0
Land impacted for carbon sink potential -							12.8
Low - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -							84.3
Low - Total impacted (over 30 years)							
(1000 hectares)	I .						

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential -							0.997
Mid - Accelerate regeneration (1000							
hectares)							21.7
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years)							21.7
(1000 hectares)							
Land impacted for carbon sink potential -							86.8
Mid - Extend rotation length (1000							00.0
hectares)							
Land impacted for carbon sink potential -							0
Mid - Improve plantations (1000 hectares)							U
Land impacted for carbon sink potential -							0
Mid - Increase retention of HWP (1000							U
hectares)							
Land impacted for carbon sink potential -							2.07
Mid - Increase trees outside forests (1000							2.01
hectares)							
Land impacted for carbon sink potential -							0
Mid - Reforest cropland (1000 hectares)							Ü
Land impacted for carbon sink potential -							1.79
Mid - Reforest pasture (1000 hectares)							1.1 7
Land impacted for carbon sink potential -							25.8
Mid - Restore productivity (1000							20.0
hectares)							
Land impacted for carbon sink potential -							139
Mid - Total impacted (over 30 years) (1000							107
hectares)							
Land impacted for carbon sink potential -							1.33
High - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							22.4
High - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							126
High - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							0
High - Improve plantations (1000							
hectares)							
Land impacted for carbon sink potential -							0
High - Increase retention of HWP (1000							
hectares)							
Land impacted for carbon sink potential -							2.71
High - Increase trees outside forests							
(1000 hectares)							
Land impacted for carbon sink potential -							0
High - Reforest cropland (1000 hectares)							
Land impacted for carbon sink potential -							1.43
High - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							21.2
High - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -							175
High - Total impacted (over 30 years)							
(1000 hectares)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Moderate							0
deployment - Corn-ethanol to energy							
grasses (1000 tC02e/y)							
Carbon sink potential - Moderate							-5.39
deployment - Cropland measures (1000							
tCO2e/y)							
Carbon sink potential - Moderate							-0.164
deployment - Permanent conservation							
cover (1000 tC02e/y)							
Carbon sink potential - Moderate							-5.55
deployment - Total (1000 tC02e/y)							
Carbon sink potential - Aggressive							0
deployment - Corn-ethanol to energy							
grasses (1000 tCO2e/y)							
Carbon sink potential - Aggressive							-10.3
deployment - Cropland measures (1000							
tCO2e/y)							
Carbon sink potential - Aggressive							-0.327
deployment - Permanent conservation							
cover (1000 tCO2e/y)							
Carbon sink potential - Aggressive							-10.7
deployment - Total (1000 tCO2e/y)							
Land impacted for carbon sink - Moderate							0
deployment - Corn-ethanol to energy							
grasses (1000 hectares)							
Land impacted for carbon sink - Moderate							3.43
deployment - Cropland measures (1000							
hectares)							
Land impacted for carbon sink - Moderate							0.298
deployment - Permanent conservation							
cover (1000 hectares)							
Land impacted for carbon sink - Moderate							3.72
deployment - Total (1000 hectares)							
Land impacted for carbon sink -							0
Aggressive deployment - Corn-ethanol to							
energy grasses (1000 hectares)							
Land impacted for carbon sink -							6.55
Aggressive deployment - Cropland							
measures (1000 hectares)							
Land impacted for carbon sink -							0.595
Aggressive deployment - Permanent							
conservation cover (1000 hectares)							
Land impacted for carbon sink -							7.15
Aggressive deployment - Total (1000							
hectares)							

Table 17: E- scenario - IMPACTS - Health

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution -		11.1	0.012	0.012	0.011	0.007	0
Fuel Comb - Electric Generation - Coal							
(deaths)							
Premature deaths from air pollution -		6.32	2.49	0.933	0.388	0.119	0.245
Fuel Comb - Electric Generation - Natural							
Gas (deaths)							
Premature deaths from air pollution -		37.8	38	36.8	32.9	26	17.7
Mobile - On-Road (deaths)							
Premature deaths from air pollution - Gas		1.74	1.74	1.67	1.48	1.16	0.784
Stations (deaths)							

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

Item 2	020 2025	2030	2035	2040	2045	2050
Premature deaths from air pollution -	7.67	7.08	6.35	5.32	4.03	2.67
Fuel Comb - Residential - Natural Gas	1.01	1.00	0.00	0.02	4.00	2.01
(deaths)						
Premature deaths from air pollution -	14.7	13.9	13.1	11.2	8.15	4.96
Fuel Comb - Residential - Oil (deaths)						
Premature deaths from air pollution -	1.11	1.1	1.07	0.976	0.79	0.574
Fuel Comb - Residential - Other (deaths)						
Premature deaths from air pollution -	0.235	0.224	0.212	0.2	0.188	0.175
Fuel Comb - Comm/Institutional - Coal						
(deaths)	/ 70	/ 51	/ 10	F (0	/ 00	0.07
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural	6.78	6.51	6.18	5.63	4.82	3.86
Gas (deaths)						
Premature deaths from air pollution -	4.64	4.32	3.96	3.37	2.79	2.16
Fuel Comb - Comm/Institutional - Oil	7.04	7.02	3.70	0.01	2.17	2.10
(deaths)						
Premature deaths from air pollution -	0.649	0.582	0.516	0.451	0.388	0.327
Fuel Comb - Comm/Institutional - Other						
(deaths)						
Premature deaths from air pollution -	0.09	0.048	0.048	0.047	0.047	0.045
Industrial Processes - Coal Mining						
(deaths)						
Premature deaths from air pollution -	6.29	5.44	4.39	3.6	3.02	2.16
Industrial Processes - Oil & Gas						
Production (deaths)						
Monetary damages from air pollution -	98.3	0.103	0.103	0.098	0.06	0.003
Fuel Comb - Electric Generation - Coal						
(million \$2019)			0.07		101	0.17
Monetary damages from air pollution -	56	22	8.27	3.44	1.06	2.17
Fuel Comb - Electric Generation - Natural						
Gas (million \$2019) Monetary damages from air pollution -	336	338	327	292	231	157
Mobile - On-Road (million \$2019)	330	336	321	292	231	151
Monetary damages from air pollution -	15.4	15.4	14.8	13.1	10.3	6.94
Gas Stations (million \$2019)	13.4	13.4	14.0	13.1	10.5	0.74
Monetary damages from air pollution -	68	62.8	56.2	47.1	35.7	23.7
Fuel Comb - Residential - Natural Gas		02.0	30.2	71.1	33.1	20.1
(million \$2019)						
Monetary damages from air pollution -	131	123	116	99.6	72.2	44
Fuel Comb - Residential - Oil (million						
\$2019)						
Monetary damages from air pollution -	9.87	9.73	9.47	8.64	7	5.08
Fuel Comb - Residential - Other (million						
\$2019)						
Monetary damages from air pollution -	2.08	1.98	1.88	1.77	1.66	1.55
Fuel Comb - Comm/Institutional - Coal						
(million \$2019)				100		0/4
Monetary damages from air pollution -	60	57.6	54.7	49.9	42.7	34.1
Fuel Comb - Comm/Institutional - Natural						
Gas (million \$2019) Monetary damages from air pollution -	41.1	38.2	35.1	29.8	24.7	19.2
Fuel Comb - Comm/Institutional - Oil	41.1	30.2	33.1	29.0	24.1	17.2
(million \$2019)						
Monetary damages from air pollution -	5.75	5.15	4.57	3.99	3.43	2.9
Fuel Comb - Comm/Institutional - Other	0.10	0.10	7.01	0.77	010	۷./
(million \$2019)						
Monetary damages from air pollution -	0.796	0.427	0.424	0.419	0.417	0.398
Industrial Processes - Coal Mining		· ·	·			2.270
(million \$2019)						

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution -		55.9	48.3	39	31.9	26.9	19.2
Industrial Processes - Oil & Gas							
Production (million \$2019)							

Table 18: E- scenario - IMPACTS - Jobs

Table 18: E- scenario - IMPACTS - Jobs							
Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		17.2	22	8.4	5.41	4.89	81.2
By economic sector - Construction (jobs)		1,125	1,230	879	880	1,086	1,772
By economic sector - Manufacturing (jobs)		476	552	544	494	740	1,102
By economic sector - Mining (jobs)		433	314	227	158	104	53
By economic sector - Other (jobs)		130	180	111	123	151	298
By economic sector - Pipeline (jobs)		102	83.9	68.4	56.9	45.5	48.3
By economic sector - Professional (jobs)		468	502	377	404	520	961
By economic sector - Trade (jobs)		437	438	332	323	368	594
By economic sector - Utilities (jobs)		770	624	557	591	967	1,635
By resource sector - Biomass (jobs)		65.2	59.2	27.9	22.7	20.8	335
By resource sector - CO2 (jobs)		0	0	0	0	0	145
By resource sector - Grid (jobs)		497	641	817	940	1,665	2,770
By resource sector - Natural Gas (jobs)		1,212	723	400	324	362	456
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		1,017	839	695	542	393	211
By resource sector - Solar (jobs)		1,052	1,393	709	752	926	1,593
By resource sector - Wind (jobs)		114	289	454	454	621	1,035
By education level - All sectors - High		1,671	1,693	1,329	1,294	1,696	2,788
school diploma or less (jobs)		1,011	1,073	1,529	1,274	1,090	2,100
By education level - All sectors -		1,233	1,230	967	956	1,280	2,102
Associates degree or some college (jobs)		1,233	1,230	701	730	1,200	2,102
By education level - All sectors -		828	802	635	615	794	1,291
Bachelors degree (jobs)		020	802	033	013	174	1,271
By education level - All sectors - Masters		197	191	150	148	191	319
or professional degree (jobs)		197	191	150	146	191	319
By education level - All sectors - Doctoral		28.3	28.4	21.3	21.3	26.3	45.5
degree (jobs)		20.3	20.4	21.3	21.3	20.3	45.5
Related work experience - All sectors -		575	572	449	440	579	957
None (jobs)		5/5	512	449	440	519	951
Related work experience - All sectors - Up		778	800	624	610	800	1,333
to 1 year (jobs)		110	800	024	610	800	1,333
Related work experience - All sectors - 1		1,433	1 / 10	1 110	1,093	1 (20	2,340
to 4 years (jobs)		1,433	1,419	1,118	1,093	1,432	2,340
Related work experience - All sectors - 4		929	915	720	705	929	1,515
to 10 years (jobs)		929	915	720	705	929	ו,סוס
		0/0	240	192	187	248	400
Related work experience - All sectors - Over 10 years (jobs)		243	240	192	101	246	400
		220	221	170	1//	010	250
On-the-Job Training - All sectors - None		220	221	170	166	212	350
(jobs)		0.500	0.500	0.070	100/	0.710	/ 000
On-the-Job Training - All sectors - Up to 1		2,593	2,589	2,049	1,996	2,618	4,302
year (jobs) On-the-Job Training - All sectors - 1 to 4		005	007	(/0	(00	0/0	1.007
9		835	827	648	639	849	1,386
years (jobs)		071	0/0	007	201	0/0	//-
On-the-Job Training - All sectors - 4 to 10		271	268	204	204	269	445
years (jobs)		00.5		01.0	00.1	00.0	(0.0
On-the-Job Training - All sectors - Over 10		39.5	40.4	31.2	30.1	38.8	62.3
years (jobs)				501	/ 00	,,,	1010
On-Site or In-Plant Training - All sectors -		641	643	501	490	641	1,060
None (jobs)		0.057	0.050	10/0	1.010	0.070	0.000
On-Site or In-Plant Training - All sectors -		2,356	2,350	1,860	1,813	2,379	3,903
Up to 1 year (jobs)							

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

Item	2020	2025	2030	2035	2040	2045	2050
On-Site or In-Plant Training - All sectors -		648	644	506	497	659	1,076
1 to 4 years (jobs)							
On-Site or In-Plant Training - All sectors -		279	274	210	208	273	448
4 to 10 years (jobs)							
On-Site or In-Plant Training - All sectors -		33.4	33.2	26.2	26.2	35.4	58.5
Over 10 years (jobs)							
Wage income - All (million \$2019)		243	241	193	191	254	420

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	58.2	54.4	49.9	45.9	42.7	38.8	34.4
Final energy use - Residential (PJ)	45.6	43	41.1	39.3	36.3	32.3	28
Final energy use - Commercial (PJ)	37.9	36	35	34.2	33.1	31.9	30.6
Final energy use - Industry (PJ)	7.41	7.1	7.11	7.23	7.42	7.57	7.74

Table 20: E- scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested - Cumulative 5-yr (billion \$2018)		0.246	0.245	0.466	0.491	0.969	1.05

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	4.2	25.1	46	143	240	454	669
Vehicle stocks - LDV – All others (1000	874	874	874	829	784	604	425
units)							
Light-duty vehicle capital costs vs. REF -		0	27.1	56.8	192	604	880
Cumulative 5-yr (million \$2018)							
Public EV charging plugs - DC Fast (1000	0.024		0.077		0.4		1.12
units)							
Public EV charging plugs - L2 (1000 units)	0.374		1.84		9.6		26.8

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Electric	4.86	5.74	10.9	26.2	53.8	78.8	90.8
Heat Pump (%)							
Sales of space heating units - Electric	3.87	5.91	5.68	5.25	4.15	2.68	1.92
Resistance (%)							
Sales of space heating units - Gas (%)	54.1	36.3	34.9	31	21.7	10.2	3.52
Sales of space heating units - Fossil (%)	37.2	52.1	48.5	37.5	20.3	8.33	3.72
Sales of water heating units - Electric	0	0.513	1.93	6.5	16.6	28.5	35.2
Heat Pump (%)							
Sales of water heating units - Electric	22.1	38.7	39.7	42.7	48.9	55.9	59.7
Resistance (%)							
Sales of water heating units - Gas Furnace	65.5	51.6	49.9	44.4	31.3	14.6	4.75
(%)							
Sales of water heating units - Other (%)	12.4	9.19	8.47	6.4	3.18	1.08	0.344
Sales of cooking units - Electric	54.9	56.1	60.2	71.1	86.2	95.6	98.8
Resistance (%)							
Sales of cooking units - Gas (%)	45.1	43.9	39.8	28.9	13.8	4.45	1.2
Residential HVAC investment in 2020s vs.		0.888	1.03				
REF - Cumulative 5-yr (billion \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Electric	2.71	7.42	10.6	20.5	40.4	61.4	72.8
Heat Pump (%)							
Sales of space heating units - Electric	1.36	2.46	3.76	7.72	14.3	19.2	21.2
Resistance (%)							
Sales of space heating units - Gas (%)	68.5	55.5	53.2	47.3	33.4	15.6	5.09
Sales of space heating units - Fossil (%)	27.4	34.6	32.4	24.5	11.9	3.78	0.991
Sales of water heating units - Electric	1.43	2.87	4.27	8.98	20.1	34	42.1
Heat Pump (%)							
Sales of water heating units - Electric	7.28	11.6	12.8	17.4	28	41.1	48.8
Resistance (%)							
Sales of water heating units - Gas (%)	88.4	81.4	79.2	70.3	49.5	23.1	7.55
Sales of water heating units - Other (%)	2.9	4.09	3.79	3.25	2.39	1.79	1.62
Sales of cooking units - Electric	36.9	40.7	44.7	56.5	72.7	82.9	86.4
Resistance (%)							
Sales of cooking units - Gas (%)	63.1	59.3	55.3	43.5	27.3	17.1	13.6
Commercial HVAC investment in 2020s -		1,952	2,132				
Cumulative 5-yr (million \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Natural gas (MW)	1,997	625	29	29	29	557	1,664
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							-4.07
regeneration (1000 tCO2e/y)							
Carbon sink potential - Low - Avoid							-27.6
deforestation (1000 tCO2e/y)							
Carbon sink potential - Low - Extend							-94.6
rotation length (1000 tCO2e/y)							
Carbon sink potential - Low - Improve							0
plantations (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-18.3
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-9.99
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - Low - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - Low - Reforest							-3.81
pasture (1000 tCO2e/y)							
Carbon sink potential - Low - Restore							-21.5
productivity (1000 tCO2e/y)							
Carbon sink potential - Low - All (not							-180
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - Mid - Accelerate							-6.1
regeneration (1000 tCO2e/y)							
Carbon sink potential - Mid - Avoid							-96.5
deforestation (1000 tCO2e/y)							
Carbon sink potential - Mid - Extend							-170
rotation length (1000 tCO2e/y)							
Carbon sink potential - Mid - Improve							0
plantations (1000 tCO2e/y)							
Carbon sink potential - Mid - Increase							-36.6
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - Mid - Increase							-19.3
trees outside forests (1000 tCO2e/y)							

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

Item Corbon sink notantial Mid Referent	2020	2025	2030	2035	2040	2045	2050 0
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							U
							-27
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-21
Carbon sink potential - Mid - Restore							-42.7
productivity (1000 tCO2e/y)							-42.7
Carbon sink potential - Mid - All (not							-399
counting overlap) (1000 tCO2e/y)							-399
Carbon sink potential - High - Accelerate							-8.13
regeneration (1000 tCO2e/y)							-0.13
							1/5
Carbon sink potential - High - Avoid							-165
deforestation (1000 tC02e/y)							0//
Carbon sink potential - High - Extend							-246
rotation length (1000 tCO2e/y)							
Carbon sink potential - High - Improve							0
plantations (1000 tCO2e/y)							
Carbon sink potential - High - Increase							-54.9
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - High - Increase							-28.5
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - High - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - High - Reforest							-50.3
pasture (1000 tCO2e/y)							
Carbon sink potential - High - All (not							-617
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - High - Restore							-63.9
productivity (1000 tCO2e/y)							
Land impacted for carbon sink potential -							0.665
Low - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							21
Low - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							48.1
Low - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							0
Low - Improve plantations (1000							_
hectares)							
Land impacted for carbon sink potential -							0
Low - Increase retention of HWP (1000							
hectares)							
Land impacted for carbon sink potential -							1.43
Low - Increase trees outside forests							1.40
(1000 hectares)							
Land impacted for carbon sink potential -							0
Low - Reforest cropland (1000 hectares)							U
Land impacted for carbon sink potential -							0.247
Low - Reforest pasture (1000 hectares)							0.241
Land impacted for carbon sink potential -	+						12.8
Low - Restore productivity (1000							12.0
hectares)							
-							0/.0
Land impacted for carbon sink potential -							84.3
Low - Total impacted (over 30 years)							
(1000 hectares)							0.007
Land impacted for carbon sink potential -							0.997
Mid - Accelerate regeneration (1000 hectares)							
neciaresi							

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

Table 25. E- Scellul 10 - PILLAR O. Luliu Silii		•	•				
Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential -							21.7
Mid - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							86.8
Mid - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							0
Mid - Improve plantations (1000 hectares)							
Land impacted for carbon sink potential -							0
Mid - Increase retention of HWP (1000							
hectares)							
Land impacted for carbon sink potential -							2.07
Mid - Increase trees outside forests (1000							
hectares)							
Land impacted for carbon sink potential -							0
Mid - Reforest cropland (1000 hectares)							
Land impacted for carbon sink potential -							1.79
Mid - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							25.8
Mid - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -							139
Mid - Total impacted (over 30 years) (1000							
hectares)							
Land impacted for carbon sink potential -							1.33
High - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							22.4
High - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							126
High - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							0
High - Improve plantations (1000							
hectares)							
Land impacted for carbon sink potential -							0
High - Increase retention of HWP (1000							
hectares)							
Land impacted for carbon sink potential -							2.71
High - Increase trees outside forests							
(1000 hectares)							
Land impacted for carbon sink potential -							0
High - Reforest cropland (1000 hectares)							_
Land impacted for carbon sink potential -							1.43
High - Reforest pasture (1000 hectares)							5
Land impacted for carbon sink potential -							21.2
High - Restore productivity (1000							21.2
hectares)							
Land impacted for carbon sink potential -							175
High - Total impacted (over 30 years)							11.0
(1000 hectares)							
(.555 1155641 55)		I					

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

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

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Moderate							-5.39
deployment - Cropland measures (1000							
tCO2e/y)							
Carbon sink potential - Moderate							-0.164
deployment - Permanent conservation							
cover (1000 tCO2e/y)							
Carbon sink potential - Moderate							-5.55
deployment - Total (1000 tCO2e/y)							
Carbon sink potential - Aggressive							0
deployment - Corn-ethanol to energy							
grasses (1000 tC02e/y)							
Carbon sink potential - Aggressive							-10.3
deployment - Cropland measures (1000							
tCO2e/y)							
Carbon sink potential - Aggressive							-0.327
deployment - Permanent conservation							0.02.
cover (1000 tCO2e/y)							
Carbon sink potential - Aggressive							-10.7
deployment - Total (1000 tC02e/y)							10.1
Land impacted for carbon sink - Moderate		+					0
deployment - Corn-ethanol to energy							U
grasses (1000 hectares)							
Land impacted for carbon sink - Moderate		+				+	3.43
deployment - Cropland measures (1000							3.43
hectares)							
Land impacted for carbon sink - Moderate						+	0.298
deployment - Permanent conservation							0.290
cover (1000 hectares)							
							3.72
Land impacted for carbon sink - Moderate							3.72
deployment - Total (1000 hectares)							
Land impacted for carbon sink -							0
Aggressive deployment - Corn-ethanol to							
energy grasses (1000 hectares)							
Land impacted for carbon sink -							6.55
Aggressive deployment - Cropland							
measures (1000 hectares)							
Land impacted for carbon sink -							0.595
Aggressive deployment - Permanent							
conservation cover (1000 hectares)							
Land impacted for carbon sink -							7.15
Aggressive deployment - Total (1000							
hectares)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution -		11.1	0.012	0.012	0.011	0.007	0
Fuel Comb - Electric Generation - Coal							
(deaths)							
Premature deaths from air pollution -		6.09	2.79	1.57	1.63	0.577	0.339
Fuel Comb - Electric Generation - Natural							
Gas (deaths)							
Premature deaths from air pollution -		37.1	34.4	26	14.9	6.64	2.42
Mobile - On-Road (deaths)							
Premature deaths from air pollution - Gas		1.7	1.54	1.14	0.659	0.301	0.122
Stations (deaths)							
Premature deaths from air pollution -		7.64	6.58	4.66	2.66	1.29	0.502
Fuel Comb - Residential - Natural Gas							
(deaths)							
Premature deaths from air pollution -		14.5	11.4	7.59	4.28	1.81	0.546
Fuel Comb - Residential - Oil (deaths)							

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

Table 27: E+RE+ scenario - IMPACTS - Heali		-	0000	0005	0070	00/5	0050
Item	2020	2025	2030 0.999	2035	2040	2045	2050
Premature deaths from air pollution -		1.1	0.999	0.781	0.52	0.293	0.15
Fuel Comb - Residential - Other (deaths)		0.005	0.007	0.010	0.0	0.100	0.175
Premature deaths from air pollution -		0.235	0.224	0.212	0.2	0.188	0.175
Fuel Comb - Comm/Institutional - Coal							
(deaths)				,	0.07	0.17	4.45
Premature deaths from air pollution -		6.77	6	4.77	3.36	2.14	1.15
Fuel Comb - Comm/Institutional - Natural							
Gas (deaths)							
Premature deaths from air pollution -		4.6	3.8	2.68	1.66	1.13	0.827
Fuel Comb - Comm/Institutional - Oil							
(deaths)							
Premature deaths from air pollution -		0.649	0.543	0.44	0.341	0.248	0.161
Fuel Comb - Comm/Institutional - Other							
(deaths)							
Premature deaths from air pollution -		0.1	0.048	0.048	0.047	0.047	0.043
Industrial Processes - Coal Mining		0	0.0.0	0.0.0	0.0	0.0	0.0.0
(deaths)							
Premature deaths from air pollution -		6.17	5.63	4.57	3.22	1.82	0.182
·		6.17	5.65	4.57	3.22	1.02	0.102
Industrial Processes - Oil & Gas							
Production (deaths)				2.122			
Monetary damages from air pollution -		98.3	0.103	0.103	0.098	0.06	0.003
Fuel Comb - Electric Generation - Coal							
(million \$2019)							
Monetary damages from air pollution -		53.9	24.7	13.9	14.4	5.11	3.01
Fuel Comb - Electric Generation - Natural							
Gas (million \$2019)							
Monetary damages from air pollution -		330	306	231	132	59.1	21.5
Mobile - On-Road (million \$2019)							_
Monetary damages from air pollution -		15	13.6	10.1	5.84	2.66	1.08
Gas Stations (million \$2019)			10.0	10.1	0.04	2.00	1.00
Monetary damages from air pollution -		67.7	58.3	41.3	23.6	11.4	4.45
Fuel Comb - Residential - Natural Gas		01.1	36.3	41.3	23.0	11.4	4.43
(million \$2019)		100	101	(7.0	070	1/1	
Monetary damages from air pollution -		128	101	67.3	37.9	16.1	4.84
Fuel Comb - Residential - Oil (million							
\$2019)							
Monetary damages from air pollution -		9.75	8.86	6.92	4.61	2.6	1.33
Fuel Comb - Residential - Other (million							
\$2019)							
Monetary damages from air pollution -		2.08	1.98	1.88	1.77	1.66	1.55
Fuel Comb - Comm/Institutional - Coal							
(million \$2019)							
Monetary damages from air pollution -		59.9	53.1	42.2	29.8	19	10.2
Fuel Comb - Comm/Institutional - Natural		37.7	33.1	72.2	27.0	"	10.2
Gas (million \$2019)							
		(0.0	00.7	00.7	14.7	10	700
Monetary damages from air pollution -		40.8	33.7	23.7	14.7	10	7.32
Fuel Comb - Comm/Institutional - Oil							
(million \$2019)							
Monetary damages from air pollution -		5.75	4.81	3.9	3.02	2.19	1.42
Fuel Comb - Comm/Institutional - Other							
(million \$2019)							
Monetary damages from air pollution -		0.884	0.426	0.42	0.412	0.416	0.383
Industrial Processes - Coal Mining							
(million \$2019)							
Monetary damages from air pollution -		54.8	50	40.6	28.6	16.1	1.62
Industrial Processes - Oil & Gas		04.0	55	-0.0	20.0	13.1	1.02
Production (million \$2019)							
רו טעעטנוטוו ןווווווטוו \$2017ן							

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

By economic sector - Agriculture (jobs) 14.2 29.5 10.9 6.93 5.59 81 1970 11.66 1.452 1.451 1.970 1.966 1.452 1.451 1.970 1.9	Table 28: E+RE+ scenario - IMPACTS - Jobs							
System Sector - Manufacturing A85 S83 S840 T15 S82 1,451 1,970 1,066 1,452 1,164 1,068 1,0		2020	2025	2030	2035			2050
Syeconomic sector - Manufacturing A85 583 840 715 842 1,104								
Fig. September	By economic sector - Construction (jobs)		1,134	1,270	1,166	1,452	1,451	1,970
By economic sector - Mining (jobs) 424 292 169 81.2 24.6 5.6 By economic sector - Pipeline (jobs) 131 180 136 174 189 329 By economic sector - Pipeline (jobs) 99 81.6 55.8 33.8 15.8 79 By economic sector - Professional (jobs) 426 430 367 431 433 644 By economic sector - Trade (jobs) 436 430 367 431 433 644 By economic sector - Trade (jobs) 436 430 367 431 433 644 By economic sector - Siemass (jobs) 55.2 831 29.3 22.6 20.8 356 By resource sector - Biomass (jobs) 55.2 831 29.3 22.6 20.8 356 By resource sector - Refuglis (jobs) 564 951 1,853 2,662 2,893 3,555 By resource sector - Natural Gas (jobs) 1,844 620 433 866 529 437 By resource sector - Natural Gas (jobs) 1,844 620 433 866 529 437 By resource sector - Nidicial (jobs) 1,844 620 443 866 529 437 By resource sector - Wind (jobs) 1,844 620 443 866 529 437 By resource sector - Wind (jobs) 1,844 620 443 866 529 437 By resource sector - Wind (jobs) 1,004 760 492 253 677 0.008 By resource sector - Wind (jobs) 1,004 760 492 253 677 0.008 By resource sector - Wind (jobs) 1,004 760 492 253 677 0.008 By resource sector - Wind (jobs) 1,255 1,284 1,335 1,734 1,754 2,347 Associates degree or some collège (jobs) By duduation level - All sectors - High 1,683 1,766 1,853 2,231 2,255 3,069 By duduation level - All sectors - Basa 828 862 1,043 1,049 1,438 Bachelors degree (jobs) 1,438 1,244 1,475 1,284 1,385 1,734 1,754 2,347 Associates degree or some collège (jobs) 1,448 1,445 1,445 1,445 1,445 1,446 1,445 1,446 1,4475 1,555 1,907 1,900 2,600 By duduation level - All sectors - Doctoral 28.3 291 273 341 34.6 52 Bachalors des reprience - All sectors - 4 10 2,610 2,640 2,847 3,434 3,480 4,762 By duduation level - All sectors - 10	,		485	583	840	715	842	1,104
Syeconomic sector - Other (jobs) 99 816 55.8 33.8 15.8 7.9			/12/1	292	169	81.2	2/1.6	5.6
Py economic sector - Pipeline (jobs) 99 81.6 55.8 33.8 15.8 7.9								
Sy economic sector - Professional (jobs)								
By economic sector - Irrade (jobs)								
Py economic sector - Utilities (jobs)								
By resource sector - Diomass (jobs) 55.2 83.1 29.3 22.6 20.8 356 By resource sector - Corid (jobs) 0 0 0 0 0 By resource sector - Corid (jobs) 564 951 1,853 2,662 2,893 3,555 By resource sector - Natural Gas (jobs) 1,184 620 433 866 529 437 By resource sector - Natural Gas (jobs) 0 0 0 0 0 0 By resource sector - Notic (jobs) 0 0 0 0 0 0 By resource sector - Notic (jobs) 0 0 0 0 0 0 0 By resource sector - Notic (jobs) 1,004 760 492 253 677 0.008 By resource sector - Solar (jobs) 1,006 1,398 845 873 998 1,583 By resource sector - Wind (jobs) 113 293 679 621 843 1,335 By reducation level - All sectors - High school diploma or less (jobs) 1,683 1,766 1,853 2,231 2,256 3,069 Sp ductation level - All sectors - High school diploma or less (jobs) 1,245 1,284 1,385 1,734 1,754 2,347 Associates degree or some college (jobs) 382 862 1,043 1,049 1,438 Bachelors degree (jobs) 383 828 862 1,043 1,049 1,438 Bachelors degree (jobs) 383 828 862 1,043 1,049 1,438 By ducation level - All sectors - Boctoral 28.3 29.1 27.3 34.1 34.6 52 degree (jobs) 384 385 361 3	,							
By resource sector - COZ (jobs)								
By resource sector - Airural Gas (jobs) 564 951 1,853 2,662 2,893 3,555 By resource sector - Nuclear (jobs) 0 0 0 0 0 0 0 By resource sector - Nuclear (jobs) 0 0 0 0 0 0 0 0 By resource sector - Oil (jobs) 1,004 760 492 253 677 0.008 By resource sector - Vind (jobs) 1,006 1,398 845 873 998 1,583 By resource sector - Wind (jobs) 113 293 679 621 843 1,335 By resource sector - Wind (jobs) 113 293 679 621 843 1,335 By resource sector - Wind (jobs) 1,663 1,766 1,853 2,231 2,256 3,069 She doucation level - All sectors - High 1,683 1,764 1,885 1,734 1,754 2,347 Associates degree or some college (jobs) 1,245 1,284 1,385 1,734 1,754 2,347 Associates degree or some college (jobs) 1,245 1,284 1,385 1,734 1,704 1,438 By education level - All sectors - 833 828 862 1,043 1,049 1,438 Bachelors degree (jobs) 198 198 205 256 258 361 By education level - All sectors - Masters or professional degree (jobs) 198 198 205 256 258 361 By education level - All sectors - Doctoral degree (jobs) 198 198 205 256 258 361 By education level - All sectors - Doctoral degree (jobs) 198 198 205 256 258 361 By elucation level - All sectors - Up 784 834 869 1,038 1,060 1,472 To I year (jobs) 1,472 1,444 1,475 1,555 1,907 1,920 2,600 To 4 years (jobs) 1,472 1,444 1,475 1,555 1,907 1,920 2,600 To 4 years (jobs) 1,472 1,444 1,475 1,555 1,907 1,920 2,600 To 4 years (jobs) 1,472 1,444 1,475 1,555 1,907 1,920 2,600 To 4 years (jobs) 1,472 1,444 1,475 1,555 1,907 1,920 2,600 To 4 years (jobs) 1,472 1,444 1,475 1,555 1,907 1,920 2,600 To 4 years (jobs) 1,474 1,475 1,555 1,907 1,920 2,600 To 4 years (jobs) 1,474 1,475 1,555 1,476 1,474 1,475 1,555 1,476 1,474 1,475 1,548 1,474 1,475								
By resource sector - Natural Gas (jobs)			- 1	II.	-	•	- 1	-
By resource sector - Nuclear (jobs)								
By resource sector - Oil (jobs) 1,004 760 492 253 677 0.008 By resource sector - Solar (jobs) 1,066 1,398 845 873 998 1,583 By resource sector - Wind (jobs) 113 293 679 621 643 1,335 By education level - All sectors - High 1,683 1,766 1,853 2,231 2,256 3,069 5								
By resource sector - Volar (jobs) 1,066 1,398 8.45 873 998 1,583 By resource sector - Wind (jobs) 113 398 3679 621 843 1,335 By education level - All sectors - High 1,683 1,766 1,853 2,231 2,256 3,069 School diploma or less (jobs) 1,245 1,284 1,385 1,734 1,754 2,347 3,485 3,649 3,485 3,445 3			- 1	- 1	-	-		_
By resource sector - Wind (jobs)								
By education level - All sectors - High school diploma or less (jobs) 1,683 1,766 1,853 2,231 2,256 3,069 School diploma or less (jobs) 1,245 1,284 1,385 1,734 1,754 2,347 Associates degree or some college (jobs) 89 education level - All sectors - 833 828 862 1,043 1,049 1,438 834 846 1,043 1,049 1,438 834 846 1,043 1,049 1,438 834 846 1,043 1,049 1,438 834 846 1,043 1,049 1,438 834 846 1,043 1,049 1,438 834 846 1,043 1,049 1,438 834 846 1,043 1,049 1,438 846 1,043 1,049 1,438 1,040 1,472 1,041 1,475 1,575 1,475 1,444 1,475 1,575 1,475 1,475 1,575 1,475 1,575 1,475 1,575 1,475 1,575 1,475 1,575 1,475 1,575 1,475 1,575 1,								
School diploma or less (jobs)								
By education level - All sectors - Associates degree or some college (jobs) Sy education level - All sectors - Same and the sectors -	,		1,003	1,700	1,000	2,231	2,230	3,009
Associates degree or some college (jobs) By education level - All sectors - 833 828 862 1,043 1,049 1,438 8achelors degree (jobs) By education level - All sectors - Masters 198 198 205 256 258 361			1 2/.5	1 20/.	1 205	172/.	175/	2 2/.7
By education level - All sectors - 833 828 862 1,043 1,049 1,438 828 834 834 846 1,043 1,049 1,438 834 846 1,043 1,049 1,438 834 846 1,043 1,049 1,438 846 846 1,043 1,049 1,438 846 846 1,043 1,049 1,438 1,040 1,472 1,041 1,475 1,555 1,977 1,472 1,061 1,472 1,444 1,475 1,555 1,907 1,920 2,600 1,472 1,444 1,475 1,555 1,907 1,920 2,600 1,472 1,444 1,475 1,555 1,907 1,920 2,600 1,049 1,444 1,475 1,555 1,907 1,920 2,600 1,049 1,250 1,258 1,689 1,044 1,445			1,240	1,204	1,365	1,134	1,134	2,341
Bachelors degree (jobs) Sy education level - All sectors - Masters or professional degree (jobs) Sy education level - All sectors - Doctoral degree (jobs) Sy education level - All sectors - Doctoral degree (jobs) Sy education level - All sectors - Doctoral degree (jobs) Sy education level - All sectors - Doctoral degree (jobs) Sy education level - All sectors - Doctoral degree (jobs) Sy education level - All sectors - Sy education level - All sectors - Up to 1 year (jobs) Sy education level - All sectors - Up to 1 year (jobs) Sy education level - All sectors - Up to 1 years (jobs) Sy education lever - Sy education lever - Sy education lever - Sy education lever - Sy education lever			833	828	862	1.0/.3	1 0/.9	1 / 38
By education level - All sectors - Masters or professional degree (jobs) Seducation level - All sectors - Doctoral degree (jobs) Seducation level - All sectors - Doctoral degree (jobs) Seducation level - All sectors - Doctoral degree (jobs) Seducation level - All sectors - Up to 10 (jobs) Seducation level - All sectors - Up to 1 (jobs) Seducation level - All sectors - Up to 1 (jobs) Seducation level - All sectors - Up to 1 (jobs) Seducation level - All sectors - Up to 1 (jobs) Seducation level - All sectors - Up to 1 (jobs) Seducation level - All sectors - Up to 1 (jobs) Seducation level - All sectors - Up to 1 (jobs) Seducation level - All sectors - Seducation level - All sectors - Up to 1 (jobs) Seducation level - Seducat			000	020	002	1,043	1,047	1,430
Description			108	198	205	256	258	361
By education level - All sectors - Doctoral degree [jobs] 28.3 29.1 27.3 34.1 34.6 52 52 579 596 629 777 781 1,061 781 1,061 784 784 784 784 785			170	170	203	230	230	301
Degree (jobs) Related work experience - All sectors - 579 596 629 777 781 1,06			28.3	291	27.3	34.1	34.6	52
Related work experience - All sectors - None (jobs)			20.5	27.1	21.0	34.1	34.0	32
None (jobs) Related work experience - All sectors - Up to 1 year (jobs) Related work experience - All sectors - 1 to 4 years (jobs) Related work experience - All sectors - 1 to 4 years (jobs) Related work experience - All sectors - 4 to 10 years (jobs) Related work experience - All sectors - 4 to 10 years (jobs) Related work experience - All sectors - 245			579	596	629	777	781	1 061
Related work experience - All sectors - Up to 1 year (jobs) Related work experience - All sectors - 1 to 1 year (jobs) Related work experience - All sectors - 1 to 4 years (jobs) Related work experience - All sectors - 4 to 10 years (jobs) Related work experience - All sectors - 4 to 10 years (jobs) Related work experience - All sectors - 245 Over 10 years (jobs) On-the-Job Training - All sectors - None (jobs) On-the-Job Training - All sectors - Up to 1 years (jobs) On-the-Job Training - All sectors - 1 to 4 years (jobs) On-the-Job Training - All sectors - 4 to 10 years (jobs) On-the-Job Training - All sectors - Over 10 years (jobs) On-the-Job Training - All sectors - 4 to 10 years (jobs) On-the-Job Training - All sectors - Over 10 years (jobs) On-the-Job Training - All sectors - Over 10 years (jobs) On-the-Job Training - All sectors - Over 10 years (jobs) On-Site or In-Plant Training - All sectors - 2,373 Up to 1 year (jobs) On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) On-Site or In-Plant Training - All sectors - 2,373 Up to 1 year (jobs) On-Site or In-Plant Training - All sectors - 2,373 Up to 1 year (jobs) On-Site or In-Plant Training - All sectors - 2,373 Up to 1 year (jobs) On-Site or In-Plant Training - All sectors - 2,373 Up to 1 year (jobs) On-Site or In-Plant Training - All sectors - 2,373 Up to 1 year (jobs) On-Site or In-Plant Training - All sectors - 2,373 Up to 1 year (jobs) On-Site or In-Plant Training - All sectors - 2,373 Up to 1 years (jobs) On-Site or In-Plant Training - All sectors - 2,373 Up to 1 years (jobs) On-Site or In-Plant Training - All sectors - 2,373 Up to 1 years (jobs)			017	0,0	027			1,001
To 1 year (jobs) Related work experience - All sectors - 1 1,444 1,475 1,555 1,907 1,920 2,600 10 4 years (jobs) Related work experience - All sectors - 4 936 951 1,009 1,250 1,258 1,689 10 years (jobs) Related work experience - All sectors - 4 936 951 1,009 1,250 1,258 1,689 10 years (jobs) 245 250 270 327 332 444 2,694 2,847 3,434 3,480 4,762 2,848 3,130 3,165 4,762 2,848 3,130 3,165 3,148 3			784	834	869	1.038	1,060	1 472
Related work experience - All sectors - 1 to 4 years (jobs) Related work experience - All sectors - 4 to 10 years (jobs) On-the-Job Training - All sectors - 1 to 4 years (jobs) On-the-Job Training - All sectors - 4 to 10 years (jobs) On-the-Job Training - All sectors - 4 to 10 years (jobs) On-the-Job Training - All sectors - 1 to 4 years (jobs) On-the-Job Training - All sectors - 1 to 4 years (jobs) On-the-Job Training - All sectors - 1 to 4 years (jobs) On-the-Job Training - All sectors - 2 to 10 years (jobs) On-the-Job Training - All sectors - 4 to 10 years (jobs) On-the-Job Training - All sectors - 4 to 10 years (jobs) On-Site or In-Plant Training - All sectors - 2 to 10 years (jobs) On-Site or In-Plant Training - All sectors - 2 to 2						.,000	.,000	.,
Related work experience - All sectors - 4 to 10 years (jobs) On-the-Job Training - All sectors - 1 to 4 years (jobs) On-the-Job Training - All sectors - 1 to 4 years (jobs) On-the-Job Training - All sectors - 1 to 4 years (jobs) On-the-Job Training - All sectors - 1 to 4 years (jobs) On-the-Job Training - All sectors - 1 to 4 years (jobs) On-the-Job Training - All sectors - 1 to 4 years (jobs) On-the-Job Training - All sectors - 1 to 4 years (jobs) On-the-Job Training - All sectors - 1 to 4 years (jobs) On-the-Job Training - All sectors - 2 to 10 years (jobs) On-the-Job Training - All sectors - 4 to 10 years (jobs) On-Site or In-Plant Training - All sectors - 2 (373) On-Site or In-Plant Training - All sectors - 2 (373) On-Site or In-Plant Training - All sectors - 2 (373) On-Site or In-Plant Training - All sectors - 2 (373) On-Site or In-Plant Training - All sectors - 2 (373) On-Site or In-Plant Training - All sectors - 2 (373) On-Site or In-Plant Training - All sectors - 2 (373) On-Site or In-Plant Training - All sectors - 2 (373) On-Site or In-Plant Training - All sectors - 2 (373) On-Site or In-Plant Training - All sectors - 2 (373) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Training - All sectors - 3 (38) On-Site or In-Plant Trai			1.444	1.475	1.555	1.907	1.920	2.600
Related work experience - All sectors - 4 to 10 years (jobs) 936 951 1,009 1,250 1,258 1,689 to 10 years (jobs) Related work experience - All sectors - Over 10 years (jobs) 245 250 270 327 332 444 On-the Job Training - All sectors - None (jobs) 221 228 229 275 278 386 (jobs) 0n-the Job Training - All sectors - Up to 1 year (jobs) 2,694 2,847 3,434 3,480 4,762 years (jobs) 0n-the Job Training - All sectors - 1 to 4 years (jobs) 842 863 922 1,159 1,165 1,548 On-the Job Training - All sectors - 4 to 10 years (jobs) 273 279 290 382 379 502 On-Site or In-Plant Training - All sectors - Over 10 years (jobs) 39.7 41.5 42.5 49.1 50 67.7 None (jobs) 0n-Site or In-Plant Training - All sectors - 2,373 2,447 2,588 3,130 3,168 4,323 Up to 1 years (jobs) 0n-Site or In-Plant Training - All sectors - 4, to 10 years (jobs) 281 285 295			,,	.,	,,,,,,	1,101	,,,	_,,,,,
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Related work experience - All sectors - Over 10 years (jobs) 245 250 270 327 332 444 Over 10 years (jobs) 0n-the-Job Training - All sectors - None (jobs) 221 228 229 275 278 386 On-the-Job Training - All sectors - Up to 1 year (jobs) 2,611 2,694 2,847 3,434 3,480 4,762 On-the-Job Training - All sectors - 1 to 4 years (jobs) 842 863 922 1,159 1,165 1,548 years (jobs) 273 279 290 382 379 502 on-the-Job Training - All sectors - Over 10 years (jobs) 39.7 41.5 42.5 49.1 50 67.7 years (jobs) 39.7 41.5 42.5 49.1 50 67.7 years (jobs) 39.7 41.5 42.5 49.1 50 67.7 years (jobs) 30.8 39.7 2,447 2,588 3,130 3,168 4,323 On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) 281 285 295					,		,	•
Over 10 years (jobs) 221 228 229 275 278 386 (jobs) On-the-Job Training - All sectors - Up to 1 year (jobs) 2,611 2,694 2,847 3,434 3,480 4,762 year (jobs) On-the-Job Training - All sectors - 1 to 4 years (jobs) 842 863 922 1,159 1,165 1,548 years (jobs) On-the-Job Training - All sectors - 4 to 10 years (jobs) 273 279 290 382 379 502 years (jobs) On-the-Job Training - All sectors - 0ver 10 years (jobs) 39.7 41.5 42.5 49.1 50 67.7 years (jobs) On-Site or In-Plant Training - All sectors - None (jobs) 646 668 694 843 855 1,176 years (jobs) On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) 2,373 2,447 2,588 3,130 3,168 4,323 years (jobs) On-Site or In-Plant Training - All sectors - 2 years (jobs) 281 285 295 384 380 503 years (jobs) On-Site or In-Plant Training - All sectors - 3 years (jobs) 33.8 34.8 38.2 49.3	Related work experience - All sectors -		245	250	270	327	332	444
Company Comp								
On-the-Job Training - All sectors - Up to 1 year (jobs) 2,611 2,694 2,847 3,434 3,480 4,762 year (jobs) On-the-Job Training - All sectors - 1 to 4 years (jobs) 842 863 922 1,159 1,165 1,548 years (jobs) On-the-Job Training - All sectors - 4 to 10 years (jobs) 273 279 290 382 379 502 years (jobs) On-the-Job Training - All sectors - Over 10 years (jobs) 39.7 41.5 42.5 49.1 50 67.7 years (jobs) 646 668 694 843 855 1,176 None (jobs) 0n-Site or In-Plant Training - All sectors - Up to 1 year (jobs) 2,373 2,447 2,588 3,130 3,168 4,323 Up to 1 year (jobs) 0n-Site or In-Plant Training - All sectors - 4 years (jobs) 654 672 717 893 899 1,199 On-Site or In-Plant Training - All sectors - 281 285 295 384 380 503 4 to 10 years (jobs) 0n-Site or In-Plant Training - All sectors - 33.8 34.8 38.2 49.3 49.6	On-the-Job Training - All sectors - None		221	228	229	275	278	386
year (jobs) 842 863 922 1,159 1,165 1,548 years (jobs) 273 279 290 382 379 502 years (jobs) 39.7 41.5 42.5 49.1 50 67.7 years (jobs) 0n-site or In-Plant Training - All sectors - Ver 10 39.7 41.5 42.5 49.1 50 67.7 years (jobs) 0n-Site or In-Plant Training - All sectors - Ver 10 646 668 694 843 855 1,176 None (jobs) 0n-Site or In-Plant Training - All sectors - Ver 10 2,373 2,447 2,588 3,130 3,168 4,323 Up to 1 year (jobs) 0n-Site or In-Plant Training - All sectors - Ver 10 654 672 717 893 899 1,199 0n-Site or In-Plant Training - All sectors - Ver 10 years (jobs) 281 285 295 384 380 503 0n-Site or In-Plant Training - All sectors - Ver 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7	(jobs)							
On-the-Job Training - All sectors - 1 to 4 years (jobs) 842 863 922 1,159 1,165 1,548 years (jobs) On-the-Job Training - All sectors - 4 to 10 years (jobs) 273 279 290 382 379 502 years (jobs) On-the-Job Training - All sectors - Over 10 years (jobs) 39.7 41.5 42.5 49.1 50 67.7 years (jobs) On-Site or In-Plant Training - All sectors - None (jobs) 646 668 694 843 855 1,176 years (jobs) On-Site or In-Plant Training - All sectors - 10 years (jobs) 2,373 2,447 2,588 3,130 3,168 4,323 years (jobs) On-Site or In-Plant Training - All sectors - 200 654 672 717 893 899 1,199 1 to 4 years (jobs) 281 285 295 384 380 503 4 to 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7 Over 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7	On-the-Job Training - All sectors - Up to 1		2,611	2,694	2,847	3,434	3,480	4,762
years (jobs) 273 279 290 382 379 502 years (jobs) 39.7 41.5 42.5 49.1 50 67.7 years (jobs) 0n-Site or In-Plant Training - All sectors - None (jobs) 646 668 694 843 855 1,176 None (jobs) 0n-Site or In-Plant Training - All sectors - Up to 1 year (jobs) 2,373 2,447 2,588 3,130 3,168 4,323 Up to 1 year (jobs) 0n-Site or In-Plant Training - All sectors - 10 years (jobs) 654 672 717 893 899 1,199 1 to 4 years (jobs) 281 285 295 384 380 503 4 to 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7 Over 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7	year (jobs)							
On-the-Job Training - All sectors - 4 to 10 years (jobs) 273 279 290 382 379 502 On-the-Job Training - All sectors - Over 10 years (jobs) 39.7 41.5 42.5 49.1 50 67.7 Vears (jobs) 0n-Site or In-Plant Training - All sectors - None (jobs) 646 668 694 843 855 1,176 On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) 2,373 2,447 2,588 3,130 3,168 4,323 On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) 654 672 717 893 899 1,199 On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) 281 285 295 384 380 503 Over 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7	On-the-Job Training - All sectors - 1 to 4		842	863	922	1,159	1,165	1,548
years (jobs) 39.7 41.5 42.5 49.1 50 67.7 years (jobs) On-Site or In-Plant Training - All sectors - None (jobs) 646 668 694 843 855 1,176 On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) 2,373 2,447 2,588 3,130 3,168 4,323 On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) 654 672 717 893 899 1,199 On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) 281 285 295 384 380 503 Over 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7								
On-the-Job Training - All sectors - Over 10 years (jobs) 39.7 41.5 42.5 49.1 50 67.7 On-Site or In-Plant Training - All sectors - None (jobs) 646 668 694 843 855 1,176 On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) 2,373 2,447 2,588 3,130 3,168 4,323 On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) 654 672 717 893 899 1,199 On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) 281 285 295 384 380 503 Over 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7	On-the-Job Training - All sectors - 4 to 10		273	279	290	382	379	502
years (jobs) 646 668 694 843 855 1,176 None (jobs) 0n-Site or In-Plant Training - All sectors - Up to 1 year (jobs) 2,373 2,447 2,588 3,130 3,168 4,323 Up to 1 year (jobs) 0n-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) 654 672 717 893 899 1,199 On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) 281 285 295 384 380 503 On-Site or In-Plant Training - All sectors - Over 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7								
On-Site or In-Plant Training - All sectors - None (jobs) 646 668 694 843 855 1,176 On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) 2,373 2,447 2,588 3,130 3,168 4,323 On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) 654 672 717 893 899 1,199 On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) 281 285 295 384 380 503 Over 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7	9		39.7	41.5	42.5	49.1	50	67.7
None (jobs) 2,373 2,447 2,588 3,130 3,168 4,323 Up to 1 year (jobs) 0n-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) 654 672 717 893 899 1,199 On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) 281 285 295 384 380 503 On-Site or In-Plant Training - All sectors - Over 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7								
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs) 2,373 2,447 2,588 3,130 3,168 4,323 On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) 654 672 717 893 899 1,199 On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) 281 285 295 384 380 503 On-Site or In-Plant Training - All sectors - Over 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7	•		646	668	694	843	855	1,176
Up to 1 year (jobs) 654 672 717 893 899 1,199 1 to 4 years (jobs) 281 285 295 384 380 503 4 to 10 years (jobs) 281 285 295 384 380 503 On-Site or In-Plant Training - All sectors - Over 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7								
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs) 654 672 717 893 899 1,199 On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) 281 285 295 384 380 503 On-Site or In-Plant Training - All sectors - Over 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7	=		2,373	2,447	2,588	3,130	3,168	4,323
1 to 4 years (jobs) 281 285 295 384 380 503 4 to 10 years (jobs) 281 285 295 384 380 503 On-Site or In-Plant Training - All sectors - Over 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7								
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs) 281 285 295 384 380 503 On-Site or In-Plant Training - All sectors - Over 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7			654	672	717	893	899	1,199
4 to 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7 Over 10 years (jobs) 33.8 34.8 38.2 49.3 49.6 65.7								
On-Site or In-Plant Training - All sectors - 33.8 34.8 38.2 49.3 49.6 65.7 Over 10 years (jobs)			281	285	295	384	380	503
Over 10 years (jobs)								
			33.8	34.8	38.2	49.3	49.6	65.7
wage income - All [million \$2019] 245 251 269 339 344 469			2:-		0.10	000	27.1	
	vvage income - All [million \$2019]		245	251	269	339	344	469

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	58.1	53.8	47.4	39.2	31.8	27.1	24.9
Final energy use - Residential (PJ)	45.6	42.8	39.4	34.2	28.6	24.4	21.9
Final energy use - Commercial (PJ)	37.9	36	34.2	31.9	29.5	27.8	26.7
Final energy use - Industry (PJ)	7.41	7.1	7.08	7.12	7.25	7.42	7.63

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

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -		0.337	0.347	1.19	1.3	1.08	1.15
Cumulative 5-yr (billion \$2018)							

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

2020	2025	2030	2035	2040	2045	2050
5.42	76.6	148	397	646	845	1,044
871	829	788	574	360	204	47.4
	167	429	695	1,053	1,145	1,092
0.024		0.247		1.08		1.74
0.374		5.92		25.9		41.8
	5.42 871	5.42 76.6 871 829 167	5.42 76.6 148 871 829 788 167 429 0.024 0.247	5.42 76.6 148 397 871 829 788 574 167 429 695 0.024 0.247	5.42 76.6 148 397 646 871 829 788 574 360 167 429 695 1,053 0.024 0.247 1.08	5.42 76.6 148 397 646 845 871 829 788 574 360 204 167 429 695 1,053 1,145 0.024 0.247 1.08

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Electric	4.86	12.4	57.2	90.9	95.9	96.2	96.2
Heat Pump (%)							
Sales of space heating units - Electric	3.87	5.87	4.58	1.99	1.51	1.47	1.61
Resistance (%)							
Sales of space heating units - Gas (%)	54.1	35.8	25.3	4.26	0.506	0.272	0.257
Sales of space heating units - Fossil (%)	37.2	45.9	12.9	2.88	2.05	2.02	1.96
Sales of water heating units - Electric	0	1.46	13.8	34.6	38.2	38.4	38.4
Heat Pump (%)							
Sales of water heating units - Electric	22.1	39.5	47.7	59.4	61.4	61.5	61.5
Resistance (%)							
Sales of water heating units - Gas Furnace	65.5	51	36.9	5.9	0.348	0	0
(%)							
Sales of water heating units - Other (%)	12.4	7.96	1.57	0.146	0.084	0.085	0.085
Sales of cooking units - Electric	55.1	64.6	94	99.7	100	100	100
Resistance (%)							
Sales of cooking units - Gas (%)	44.9	35.4	6.05	0.305	0	0	0
Residential HVAC investment in 2020s vs.		0.886	0.975				
REF - Cumulative 5-yr (billion \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Electric	2.71	10.5	38.5	72.1	77.6	77.9	78
Heat Pump (%)							
Sales of space heating units - Electric	1.36	4.58	16.4	21.3	22	22.1	22
Resistance (%)							
Sales of space heating units - Gas (%)	68.5	55	39.3	6.28	0.373	0	0
Sales of space heating units - Fossil (%)	27.4	29.9	5.75	0.244	0	0	0
Sales of water heating units - Electric	1.43	3.46	15.8	41.2	45.7	46	46
Heat Pump (%)							
Sales of water heating units - Electric	7.28	12.2	23.8	48	52.2	52.5	52.5
Resistance (%)							
Sales of water heating units - Gas (%)	88.4	80.6	58.5	9.33	0.552	0	0
Sales of water heating units - Other (%)	2.9	3.75	1.86	1.55	1.53	1.53	1.55

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of cooking units - Electric	36.9	49.9	81.2	87.4	87.7	87.7	87.7
Resistance (%)							
Sales of cooking units - Gas (%)	63.1	50.1	18.8	12.6	12.3	12.3	12.3
Commercial HVAC investment in 2020s -		1,952	2,131				
Cumulative 5-yr (million \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Natural gas (MW)	1,997	625	625	625	2,554	3,139	3,136
Installed thermal - Nuclear (MW)	0	0	0	0	0	0	0
Installed renewables - Rooftop PV (MW)	152	264	310	362	422	489	563
Installed renewables - Solar - Base land	105	105	652	652	652	652	652
use assumptions (MW)							
Installed renewables - Wind - Base land	91.4	91.4	91.4	91.4	91.4	91.4	91.4
use assumptions (MW)							
Installed renewables - Offshore Wind -	0	0	268	906	906	906	906
Base land use assumptions (MW)							
Installed renewables - Solar -	105	105	884	884	884	884	884
Constrained land use assumptions (MW)							
Installed renewables - Wind - Constrained	102	102	102	102	102	102	102
land use assumptions (MW)							
Installed renewables - Offshore Wind -	73.2	556	793	793	793	793	793
Constrained land use assumptions (MW)							
Capital invested - Solar PV - Base (billion		0	0.656	0	0	0	0
\$2018)							
Capital invested - Offshore Wind - Base		0	0.829	1.6	0	0	0
(billion \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	220	220	1,207	1,207	1,207	1,207	1,207
Wind - Base land use assumptions (GWh)	371	371	371	371	371	371	371
OffshoreWind - Base land use assumptions (GWh)	0	0	1,073	3,631	3,631	3,631	3,631
Solar - Constrained land use assumptions (GWh)	440	440	3,237	3,237	3,237	3,237	3,237
Wind - Constrained land use assumptions (GWh)	742	742	742	742	742	742	742
OffshoreWind - Constrained land use assumptions (GWh)	593	4,469	6,342	6,342	6,342	6,342	6,342

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Accelerate							-4.07
regeneration (1000 tCO2e/y)							
Carbon sink potential - Low - Avoid							-27.6
deforestation (1000 tCO2e/y)							
Carbon sink potential - Low - Extend							-94.6
rotation length (1000 tCO2e/y)							
Carbon sink potential - Low - Improve							0
plantations (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-18.3
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-9.99
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - Low - Reforest							0
cropland (1000 tCO2e/y)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-3.81
Carbon sink potential - Low - Restore							-21.5
productivity (1000 tC02e/y)							21.0
Carbon sink potential - Low - All (not							-180
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - Mid - Accelerate							-6.1
regeneration (1000 tCO2e/y)							
Carbon sink potential - Mid - Avoid							-96.5
deforestation (1000 tCO2e/y)							
Carbon sink potential - Mid - Extend							-170
rotation length (1000 tCO2e/y)							
Carbon sink potential - Mid - Improve							0
plantations (1000 tC02e/y) Carbon sink potential - Mid - Increase							-36.6
retention of HWP (1000 tC02e/y)							-30.0
Carbon sink potential - Mid - Increase							-19.3
trees outside forests (1000 tC02e/y)							17.0
Carbon sink potential - Mid - Reforest							0
cropland (1000 tCO2e/y)							_
Carbon sink potential - Mid - Reforest							-27
pasture (1000 tC02e/y)							
Carbon sink potential - Mid - Restore							-42.7
productivity (1000 tCO2e/y)							
Carbon sink potential - Mid - All (not							-399
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - High - Accelerate							-8.13
regeneration (1000 tC02e/y)							4/5
Carbon sink potential - High - Avoid							-165
deforestation (1000 tC02e/y) Carbon sink potential - High - Extend							-246
rotation length (1000 tC02e/y)							-240
Carbon sink potential - High - Improve							0
plantations (1000 tCO2e/y)							
Carbon sink potential - High - Increase							-54.9
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - High - Increase							-28.5
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - High - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - High - Reforest							-50.3
pasture (1000 tC02e/y)							
Carbon sink potential - High - All (not							-617
counting overlap) (1000 tC02e/y)							(1)
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-63.9
Land impacted for carbon sink potential -							0.665
Low - Accelerate regeneration (1000							0.000
hectares)							
Land impacted for carbon sink potential -							21
Low - Avoid deforestation (over 30 years)							_
(1000 hectares)							
Land impacted for carbon sink potential -							48.
Low - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							C
Low - Improve plantations (1000							
hectares)							
Land impacted for carbon sink potential -							0
Low - Increase retention of HWP (1000							

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

Item Item	2020	2025 2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential -	2020	2020	2000	2000	20.0	20.10	1.43
Low - Increase trees outside forests							
(1000 hectares)							
Land impacted for carbon sink potential -							0
Low - Reforest cropland (1000 hectares)							
Land impacted for carbon sink potential -							0.247
Low - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							12.8
Low - Restore productivity (1000							
hectares)							0/ 0
Land impacted for carbon sink potential -							84.3
Low - Total impacted (over 30 years) (1000 hectares)							
Land impacted for carbon sink potential -							0.997
Mid - Accelerate regeneration (1000							0.997
hectares)							
Land impacted for carbon sink potential -							21.7
Mid - Avoid deforestation (over 30 years)							21.1
(1000 hectares)							
Land impacted for carbon sink potential -							86.8
Mid - Extend rotation length (1000							00.0
hectares)							
Land impacted for carbon sink potential -							0
Mid - Improve plantations (1000 hectares)							Ü
Land impacted for carbon sink potential -							0
Mid - Increase retention of HWP (1000							_
hectares)							
Land impacted for carbon sink potential -							2.07
Mid - Increase trees outside forests (1000							
hectares)							
Land impacted for carbon sink potential -							0
Mid - Reforest cropland (1000 hectares)							
Land impacted for carbon sink potential -							1.79
Mid - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							25.8
Mid - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -							139
Mid - Total impacted (over 30 years) (1000							
hectares)							
Land impacted for carbon sink potential -							1.33
High - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							22.4
High - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							126
High - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							0
High - Improve plantations (1000							
hectares)							
Land impacted for carbon sink potential -							0
High - Increase retention of HWP (1000							
hectares)							~ =-
Land impacted for carbon sink potential -							2.71
High - Increase trees outside forests							
(1000 hectares)							
Land impacted for carbon sink potential -							0
High - Reforest cropland (1000 hectares)							

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 -							1.43
High - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							21.2
High - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -							175
High - Total impacted (over 30 years)							
(1000 hectares)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Moderate	2020	2020	2000	2000	2040	2040	0
deployment - Corn-ethanol to energy							Ū
grasses (1000 tC02e/y)							
Carbon sink potential - Moderate							-5.39
deployment - Cropland measures (1000							0.07
tCO2e/y)							
Carbon sink potential - Moderate							-0.164
deployment - Permanent conservation							0.10-
cover (1000 tC02e/y)							
Carbon sink potential - Moderate							-5.55
deployment - Total (1000 tC02e/y)							0.00
Carbon sink potential - Aggressive							0
deployment - Corn-ethanol to energy							J
grasses (1000 tC02e/y)							
Carbon sink potential - Aggressive							-10.3
deployment - Cropland measures (1000							-10.0
tCO2e/y)							
Carbon sink potential - Aggressive							-0.327
deployment - Permanent conservation							-0.021
cover (1000 tC02e/y)							
Carbon sink potential - Aggressive							-10.7
deployment - Total (1000 tC02e/y)							10.1
Land impacted for carbon sink - Moderate							0
deployment - Corn-ethanol to energy							J
grasses (1000 hectares)							
Land impacted for carbon sink - Moderate							3.43
deployment - Cropland measures (1000							0.40
hectares)							
Land impacted for carbon sink - Moderate							0.298
deployment - Permanent conservation							0.270
cover (1000 hectares)							
Land impacted for carbon sink - Moderate							3.72
deployment - Total (1000 hectares)							0.12
Land impacted for carbon sink -							0
Aggressive deployment - Corn-ethanol to							U
energy grasses (1000 hectares)							
Land impacted for carbon sink -							6.55
Aggressive deployment - Cropland							0.00
measures (1000 hectares)							
Land impacted for carbon sink -							0.595
Aggressive deployment - Permanent							0.070
conservation cover (1000 hectares)							
Land impacted for carbon sink -							7.15
Aggressive deployment - Total (1000							1.13
hectares)							
nootai ooj							

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

Table 38: E+RE- scenario - IMPACTS - Healt		0005	0000	0005	0010	00/5	0050
Item Drometure deaths from air pollution	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Electric Generation - Coal		11.1	0.012	0.012	0.011	0.007	0
(deaths)							
Premature deaths from air pollution -		6.37	3.65	3.85	2.93	1.56	0.38
Fuel Comb - Electric Generation - Natural		0.31	3.03	3.63	2.73	1.56	0.36
Gas (deaths)							
Premature deaths from air pollution -		37.1	34.4	26	14.9	6.64	2.42
Mobile - On-Road (deaths)		01.1	54.4	20	14.7	0.04	2.72
Premature deaths from air pollution - Gas		1.7	1.54	1.14	0.659	0.301	0.122
Stations (deaths)							•
Premature deaths from air pollution -		7.64	6.58	4.66	2.66	1.29	0.502
Fuel Comb - Residential - Natural Gas							
(deaths)							
Premature deaths from air pollution -		14.5	11.4	7.59	4.28	1.81	0.546
Fuel Comb - Residential - Oil (deaths)							
Premature deaths from air pollution -		1.1	0.999	0.781	0.52	0.293	0.15
Fuel Comb - Residential - Other (deaths)							
Premature deaths from air pollution -		0.235	0.224	0.212	0.2	0.188	0.175
Fuel Comb - Comm/Institutional - Coal							
(deaths)							
Premature deaths from air pollution -		6.77	6	4.77	3.36	2.14	1.15
Fuel Comb - Comm/Institutional - Natural							
Gas (deaths)							
Premature deaths from air pollution -		4.6	3.8	2.68	1.66	1.13	0.827
Fuel Comb - Comm/Institutional - Oil							
(deaths)		0.770	0.5/0	0.77	0.071	0.04.0	0.1/1
Premature deaths from air pollution -		0.649	0.543	0.44	0.341	0.248	0.161
Fuel Comb - Comm/Institutional - Other (deaths)							
Premature deaths from air pollution -		0.086	0.048	0.048	0.047	0.047	0.043
Industrial Processes - Coal Mining		0.086	0.046	0.046	0.041	0.041	0.043
(deaths)							
Premature deaths from air pollution -		6.42	6.1	5.91	5.13	4.29	3.2
Industrial Processes - Oil & Gas		0.42	0.1	5.71	0.10	7.27	0.2
Production (deaths)							
Monetary damages from air pollution -		98.3	0.103	0.103	0.098	0.06	0.003
Fuel Comb - Electric Generation - Coal		70.0	000	000	0.070	0.00	0.000
(million \$2019)							
Monetary damages from air pollution -		56.5	32.3	34.1	25.9	13.8	3.37
Fuel Comb - Electric Generation - Natural							
Gas (million \$2019)							
Monetary damages from air pollution -		330	306	231	132	59.1	21.5
Mobile - On-Road (million \$2019)							
Monetary damages from air pollution -		15	13.6	10.1	5.84	2.66	1.08
Gas Stations (million \$2019)							
Monetary damages from air pollution -		67.7	58.3	41.3	23.6	11.4	4.45
Fuel Comb - Residential - Natural Gas							
(million \$2019)							
Monetary damages from air pollution -		128	101	67.3	37.9	16.1	4.84
Fuel Comb - Residential - Oil (million							
\$2019)							
Monetary damages from air pollution -		9.75	8.86	6.92	4.61	2.6	1.33
Fuel Comb - Residential - Other (million							
\$2019)		0.00	100	100	4 77	1//	1
Monetary damages from air pollution -		2.08	1.98	1.88	1.77	1.66	1.55
Fuel Comb - Comm/Institutional - Coal (million \$2019)							
Monetary damages from air pollution -		59.9	53.1	42.2	29.8	19	10.2
Fuel Comb - Comm/Institutional - Natural		77.7	33.1	42.2	27.0	17	10.2
Gas (million \$2019)							
αασ (ΠΠΠΟΠ ΨΖΟΤ/)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution -		40.8	33.7	23.7	14.7	10	7.32
Fuel Comb - Comm/Institutional - Oil							
(million \$2019)							
Monetary damages from air pollution -		5.75	4.81	3.9	3.02	2.19	1.42
Fuel Comb - Comm/Institutional - Other							
(million \$2019)							
Monetary damages from air pollution -		0.757	0.425	0.421	0.412	0.416	0.383
Industrial Processes - Coal Mining							
(million \$2019)							
Monetary damages from air pollution -		57	54.1	52.4	45.5	38.1	28.4
Industrial Processes - Oil & Gas							
Production (million \$2019)							

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

0000	0005	0000	0005	00/0	00/5	0050
2020						2050
						81.4
						1,566
	553	409	4/3	459	327	566
	432	306	201	122	71	41.9
	129	81.5	101	132	132	254
	104	89.7	78.1	64.4	49.2	57.8
	464	366	482	804	539	824
	433	329	336	434	331	486
	798	762	1,495	3,195	1,768	1,928
	56.5	59.2	26.5	23.8	23	338
	0	0	0	0	0	164
	539	729	1,541	2,480	2,235	2,459
	1,240	964	682	864	669	586
	0	0	649	2,166	540	532
	1,003	772	517	310	178	101
	1,006	482	515	534	547	1,390
	218	220	274	198	197	235
	1,718	1,366	1,566	2,031	1,677	2,298
	1,269	1,011	1,187	1,602	1,303	1,742
	847	669	754	1,012	778	1,055
	200	159	183	257	195	266
	28.3	21.9	25.4	37.3	26.2	38.4
	589	471	541	718	586	797
	800	628	727	952	773	1,089
	1.150		1010	1.500	110=	
	1,470	1,171	1,343	1,789	1,435	1,934
	0.50	750	075	4.477	010	4.057
	953	758	875	1,177	942	1,256
	050	100	000	201	0/0	007
	250	199	230	304	242	324
	007	17/	107	050	007	287
	224	174	197	258	206	287
	0.777	0.115	0.400	2.100	0.5/1	3,516
	2,004	۷,۱۱۵	2,423	3,170	۷,561	3,310
	957	685	700	1.077	979	1,159
	001	000	177	1,011	010	1,107
	2020	16.1 1,132 553 432 129 104 464 433 798 56.5 0 539 1,240 0 1,003 1,006 218 1,718	16.1 23.1 1,132 861 553 409 432 306 129 81.5 104 89.7 464 366 433 329 798 762 56.5 59.2 0 0 539 729 1,240 964 0 0 1,003 772 1,006 482 218 220 1,718 1,366 1,269 1,011 847 669 200 159 28.3 21.9 589 471 800 628 1,470 1,171 953 758 250 199 224 174 2,664 2,115	16.1 23.1 7.73 1,132 861 1,030 553 409 473 432 306 201 129 81.5 101 104 89.7 78.1 464 366 482 433 329 336 798 762 1,495 56.5 59.2 26.5 0 0 0 539 729 1,541 1,240 964 682 0 0 649 1,003 772 517 1,006 482 515 218 220 274 1,718 1,366 1,566 1,269 1,011 1,187 847 669 754 200 159 183 28.3 21.9 25.4 589 471 541 800 628 727 1,470 1,17	16.1 23.1 7.73 6.37 1,132 861 1,030 1,358 553 409 473 459 432 306 201 122 129 81.5 101 132 104 89.7 78.1 64.4 464 366 482 804 433 329 336 434 798 762 1,495 3,195 56.5 59.2 26.5 23.8 0 0 0 0 539 729 1,541 2,480 1,240 964 682 864 0 0 649 2,166 1,003 772 517 310 1,006 482 515 534 218 220 274 198 1,718 1,366 1,566 2,031 1,269 1,011 1,187 1,602 847 669 <td>16.1 23.1 7.73 6.37 5.87 1,132 861 1,030 1,358 1,167 553 409 473 459 327 432 306 201 122 71 129 81.5 101 132 132 104 89.7 78.1 64.4 49.2 464 366 482 804 539 433 329 336 434 331 798 762 1,495 3,195 1,768 56.5 59.2 26.5 23.8 23 0 0 0 0 0 0 539 729 1,541 2,480 2,235 1,240 964 682 864 669 0 0 649 2,166 540 1,003 772 517 310 178 1,006 482 515 534 547</td>	16.1 23.1 7.73 6.37 5.87 1,132 861 1,030 1,358 1,167 553 409 473 459 327 432 306 201 122 71 129 81.5 101 132 132 104 89.7 78.1 64.4 49.2 464 366 482 804 539 433 329 336 434 331 798 762 1,495 3,195 1,768 56.5 59.2 26.5 23.8 23 0 0 0 0 0 0 539 729 1,541 2,480 2,235 1,240 964 682 864 669 0 0 649 2,166 540 1,003 772 517 310 178 1,006 482 515 534 547

Table 30.	F+RF- scenai	rio - IMPACTS -	Inhe	(continued)
Table 39.	E+KE-SCEIIUI	10 - IMPAGIS -	JUUSI	COMUNICIENT

Item	2020	2025	2030	2035	2040	2045	2050
On-the-Job Training - All sectors - 4 to 10 years (jobs)		275	221	262	362	299	389
On-the-Job Training - All sectors - Over 10 years (jobs)		40.8	31.1	35	44.3	35.5	49.4
On-Site or In-Plant Training - All sectors - None (jobs)		658	517	592	789	627	868
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		2,420	1,923	2,206	2,912	2,340	3,197
On-Site or In-Plant Training - All sectors - 1 to 4 years (jobs)		666	531	618	828	676	896
On-Site or In-Plant Training - All sectors - 4 to 10 years (jobs)		284	228	266	364	299	389
On-Site or In-Plant Training - All sectors - Over 10 years (jobs)		34.4	27.9	33.3	45.8	37.7	49.5
Wage income - All (million \$2019)		249	202	236	321	261	351

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	58.1	53.8	47.4	39.2	31.8	27.1	24.9
Final energy use - Residential (PJ)	45.6	42.8	39.4	34.2	28.6	24.4	21.9
Final energy use - Commercial (PJ)	37.9	36	34.2	31.9	29.5	27.8	26.7
Final energy use - Industry (PJ)	7.41	7.1	7.08	7.12	7.25	7.42	7.63

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

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -		0.337	0.347	1.19	1.3	1.08	1.15
Cumulative 5-yr (billion \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	5.42	76.6	148	397	646	845	1,044
Vehicle stocks - LDV – All others (1000 units)	871	829	788	574	360	204	47.4
Light-duty vehicle capital costs vs. REF - Cumulative 5-yr (million \$2018)		167	429	695	1,053	1,145	1,092
Public EV charging plugs - DC Fast (1000 units)	0.024		0.247		1.08		1.74
Public EV charging plugs - L2 (1000 units)	0.374		5.92		25.9		41.8

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Electric	4.86	12.4	57.2	90.9	95.9	96.2	96.2
Heat Pump (%)							
Sales of space heating units - Electric	3.87	5.87	4.58	1.99	1.51	1.47	1.61
Resistance (%)							
Sales of space heating units - Gas (%)	54.1	35.8	25.3	4.26	0.506	0.272	0.257
Sales of space heating units - Fossil (%)	37.2	45.9	12.9	2.88	2.05	2.02	1.96
Sales of water heating units - Electric	0	1.46	13.8	34.6	38.2	38.4	38.4
Heat Pump (%)							
Sales of water heating units - Electric	22.1	39.5	47.7	59.4	61.4	61.5	61.5
Resistance (%)							
Sales of water heating units - Gas Furnace	65.5	51	36.9	5.9	0.348	0	0
(%)							
Sales of water heating units - Other (%)	12.4	7.96	1.57	0.146	0.084	0.085	0.085
Sales of cooking units - Electric	55.1	64.6	94	99.7	100	100	100
Resistance (%)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of cooking units - Gas (%)	44.9	35.4	6.05	0.305	0	0	0
Residential HVAC investment in 2020s vs.		0.886	0.975				
REF - Cumulative 5-yr (billion \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Electric	2.71	10.5	38.5	72.1	77.6	77.9	78
Heat Pump (%)							
Sales of space heating units - Electric	1.36	4.58	16.4	21.3	22	22.1	22
Resistance (%)							
Sales of space heating units - Gas (%)	68.5	55	39.3	6.28	0.373	0	0
Sales of space heating units - Fossil (%)	27.4	29.9	5.75	0.244	0	0	0
Sales of water heating units - Electric	1.43	3.46	15.8	41.2	45.7	46	46
Heat Pump (%)							
Sales of water heating units - Electric	7.28	12.2	23.8	48	52.2	52.5	52.5
Resistance (%)							
Sales of water heating units - Gas (%)	88.4	80.6	58.5	9.33	0.552	0	0
Sales of water heating units - Other (%)	2.9	3.75	1.86	1.55	1.53	1.53	1.55
Sales of cooking units - Electric	36.9	49.9	81.2	87.4	87.7	87.7	87.7
Resistance (%)							
Sales of cooking units - Gas (%)	63.1	50.1	18.8	12.6	12.3	12.3	12.3
Commercial HVAC investment in 2020s -		1,952	2,131				
Cumulative 5-yr (million \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Natural gas (MW)	1,997	625	822	822	2,199	2,184	2,170
Installed thermal - Nuclear (MW)	0	0	0	272	1,141	1,141	1,141
Installed renewables - Rooftop PV (MW)	152	264	310	362	422	489	563
Installed renewables - Solar - Base land	105	105	105	105	105	105	105
use assumptions (MW)							
Installed renewables - Wind - Base land	91.4	91.4	91.4	91.4	91.4	91.4	91.4
use assumptions (MW)							
Installed renewables - Offshore Wind -	0	0	393	683	683	683	888
Base land use assumptions (MW)							
Installed renewables - Solar -	307	307	307	307	307	307	307
Constrained land use assumptions (MW)							
Installed renewables - Wind - Constrained	91.4	91.4	91.4	91.4	91.4	91.4	91.4
land use assumptions (MW)							
Installed renewables - Offshore Wind -	73.2	793	793	793	793	793	793
Constrained land use assumptions (MW)							
Capital invested - Solar PV - Base (billion		0	0	0	0	0	0
\$2018)							
Capital invested - Wind - Base (billion		0	0	0	0	0	0
\$2018)							
Capital invested - Offshore Wind - Base		0	1.22	0.529	0	0	0.271
(billion \$2018)							
Capital invested - Solar PV - Constrained		0	0	0	0	0	0
(billion \$2018)							
Capital invested - Wind - Constrained		0	0	0	0	0	0
(billion \$2018)							
Capital invested - Offshore Wind -		2.75	0	0	0	0	0
Constrained (billion \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	220	220	220	220	220	220	220

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

Item	2020	2025	2030	2035	2040	2045	2050
Wind - Base land use assumptions (GWh)	371	371	371	371	371	371	371
OffshoreWind - Base land use	0	0	1,567	2,404	2,404	2,404	3,237
assumptions (GWh)							
Solar - Constrained land use assumptions	583	583	583	583	583	583	583
(GWh)							
Wind - Constrained land use assumptions	371	371	371	371	371	371	371
(GWh)							
OffshoreWind - Constrained land use	297	3,171	3,171	3,171	3,171	3,171	3,171
assumptions (GWh)							

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)							-4.07
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)							-27.6
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-94.6
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)							0
Carbon sink potential - Low - Increase retention of HWP (1000 tC02e/y)							-18.3
Carbon sink potential - Low - Increase trees outside forests (1000 tC02e/y)							-9.99
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							0
Carbon sink potential - Low - Reforest pasture (1000 tC02e/y)							-3.81
Carbon sink potential - Low - Restore							-21.5
productivity (1000 tCO2e/y) Carbon sink potential - Low - All (not							-180
counting overlap) (1000 tC02e/y) Carbon sink potential - Mid - Accelerate							-6.1
regeneration (1000 tCO2e/y) Carbon sink potential - Mid - Avoid							-96.5
deforestation (1000 tCO2e/y) Carbon sink potential - Mid - Extend							-170
rotation length (1000 tC02e/y) Carbon sink potential - Mid - Improve							0
plantations (1000 tCO2e/y) Carbon sink potential - Mid - Increase							-36.6
retention of HWP (1000 tCO2e/y) Carbon sink potential - Mid - Increase							-19.3
trees outside forests (1000 tC02e/y) Carbon sink potential - Mid - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-27
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-42.7
Carbon sink potential - Mid - All (not counting overlap) (1000 tC02e/y)							-399
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)							-8.13
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)							-165
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)							-246
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)							0

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

Item Carbon sink potential - High - Increase	2020	2025	2030	2035	2040	2045	2050 -54.9
retention of HWP (1000 tCO2e/y)							-54.9
Carbon sink potential - High - Increase							-28.5
trees outside forests (1000 tC02e/y)							-26.5
Carbon sink potential - High - Reforest							0
cropland (1000 tCO2e/y)							U
Carbon sink potential - High - Reforest							-50.3
pasture (1000 tC02e/y)							-30.3
Carbon sink potential - High - All (not							-617
counting overlap) (1000 tCO2e/y)							-011
Carbon sink potential - High - Restore							-63.9
productivity (1000 tCO2e/y)							-03.7
Land impacted for carbon sink potential -							0.665
Low - Accelerate regeneration (1000							0.000
hectares)							
Land impacted for carbon sink potential -							21
Low - Avoid deforestation (over 30 years)							۷.
(1000 hectares)							
Land impacted for carbon sink potential -							48.1
Low - Extend rotation length (1000							70.1
hectares)							
Land impacted for carbon sink potential -							0
Low - Improve plantations (1000							Ŭ
hectares)							
Land impacted for carbon sink potential -							0
Low - Increase retention of HWP (1000							U
hectares)							
Land impacted for carbon sink potential -							1.43
Low - Increase trees outside forests							1.40
(1000 hectares)							
Land impacted for carbon sink potential -							0
Low - Reforest cropland (1000 hectares)							Ū
Land impacted for carbon sink potential -							0.247
Low - Reforest pasture (1000 hectares)							0.2
Land impacted for carbon sink potential -							12.8
Low - Restore productivity (1000							0
hectares)							
Land impacted for carbon sink potential -							84.3
Low - Total impacted (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							0.997
Mid - Accelerate regeneration (1000							•
hectares)							
Land impacted for carbon sink potential -							21.7
Mid - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							86.8
Mid - Extend rotation length (1000							00.0
hectares)							
Land impacted for carbon sink potential -							0
Mid - Improve plantations (1000 hectares)							Ū
Land impacted for carbon sink potential -							0
Mid - Increase retention of HWP (1000							Ū
hectares)							
Land impacted for carbon sink potential -		-					2.07
Mid - Increase trees outside forests (1000							2.01
hectares)							
Land impacted for carbon sink potential -							0
Mid - Reforest cropland (1000 hectares)							J
							1.79
Land impacted for carbon sink potential -							

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 -							25.8
Mid - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -							139
Mid - Total impacted (over 30 years) (1000							
hectares)							
Land impacted for carbon sink potential -							1.33
High - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							22.4
High - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							126
High - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							0
High - Improve plantations (1000							
hectares)							
Land impacted for carbon sink potential -							0
High - Increase retention of HWP (1000							
hectares)							
Land impacted for carbon sink potential -							2.71
High - Increase trees outside forests							
(1000 hectares)							
Land impacted for carbon sink potential -							0
High - Reforest cropland (1000 hectares)							
Land impacted for carbon sink potential -							1.43
High - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							21.2
High - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -	+						175
High - Total impacted (over 30 years)							0
(1000 hectares)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Moderate							0
deployment - Corn-ethanol to energy							
grasses (1000 tCO2e/y)							
Carbon sink potential - Moderate							-5.39
deployment - Cropland measures (1000							
tCO2e/y)							
Carbon sink potential - Moderate							-0.164
deployment - Permanent conservation							
cover (1000 tCO2e/y)							
Carbon sink potential - Moderate							-5.55
deployment - Total (1000 tCO2e/y)							
Carbon sink potential - Aggressive							0
deployment - Corn-ethanol to energy							
grasses (1000 tCO2e/y)							
Carbon sink potential - Aggressive							-10.3
deployment - Cropland measures (1000							
tCO2e/y)							
Carbon sink potential - Aggressive							-0.327
deployment - Permanent conservation							
cover (1000 tCO2e/y)							
Carbon sink potential - Aggressive							-10.7
deployment - Total (1000 tCO2e/y)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink - Moderate							0
deployment - Corn-ethanol to energy							
grasses (1000 hectares)							
Land impacted for carbon sink - Moderate							3.43
deployment - Cropland measures (1000							
hectares)							
Land impacted for carbon sink - Moderate							0.298
deployment - Permanent conservation							
cover (1000 hectares)							
Land impacted for carbon sink - Moderate							3.72
deployment - Total (1000 hectares)							
Land impacted for carbon sink -							0
Aggressive deployment - Corn-ethanol to							
energy grasses (1000 hectares)							
Land impacted for carbon sink -							6.55
Aggressive deployment - Cropland							
measures (1000 hectares)							
Land impacted for carbon sink -							0.595
Aggressive deployment - Permanent							
conservation cover (1000 hectares)							
Land impacted for carbon sink -							7.15
Aggressive deployment - Total (1000							
hectares)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution -		11.1	0.012	0.012	0.011	0.007	0
Fuel Comb - Electric Generation - Coal							
(deaths)							
Premature deaths from air pollution -		6.34	2.35	1.09	0.887	0.557	0.347
Fuel Comb - Electric Generation - Natural							
Gas (deaths)							
Premature deaths from air pollution -		37.8	38	36.8	32.9	26	17.7
Mobile - On-Road (deaths)							
Premature deaths from air pollution - Gas		1.74	1.74	1.67	1.48	1.16	0.784
Stations (deaths)							
Premature deaths from air pollution -		7.67	7.08	6.35	5.32	4.03	2.67
Fuel Comb - Residential - Natural Gas							
(deaths)							
Premature deaths from air pollution -		14.7	13.9	13.1	11.2	8.15	4.96
Fuel Comb - Residential - Oil (deaths)							
Premature deaths from air pollution -		1.11	1.1	1.07	0.976	0.79	0.574
Fuel Comb - Residential - Other (deaths)							
Premature deaths from air pollution -		0.235	0.224	0.212	0.2	0.188	0.175
Fuel Comb - Comm/Institutional - Coal							
(deaths)							
Premature deaths from air pollution -		6.78	6.51	6.18	5.63	4.82	3.86
Fuel Comb - Comm/Institutional - Natural							
Gas (deaths)							
Premature deaths from air pollution -		4.64	4.32	3.96	3.37	2.79	2.16
Fuel Comb - Comm/Institutional - Oil							
(deaths)							
Premature deaths from air pollution -		0.649	0.582	0.516	0.451	0.388	0.327
Fuel Comb - Comm/Institutional - Other							
(deaths)							
Premature deaths from air pollution -		0.093	0.048	0.048	0.048	0.048	0.047
Industrial Processes - Coal Mining							
(deaths)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		6.29	5.44	4.39	3.6	3.02	2.16
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019)		98.3	0.103	0.103	0.098	0.06	0.003
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019)		56.2	20.8	9.63	7.86	4.93	3.07
Monetary damages from air pollution - Mobile - On-Road (million \$2019)		336	338	327	292	231	157
Monetary damages from air pollution - Gas Stations (million \$2019)		15.4	15.4	14.8	13.1	10.3	6.94
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019)		68	62.8	56.2	47.1	35.7	23.7
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019)		131	123	116	99.6	72.2	44
Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019)		9.87	9.73	9.47	8.64	7	5.08
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019)		2.08	1.98	1.88	1.77	1.66	1.55
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019)		60	57.6	54.7	49.9	42.7	34.1
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019)		41.1	38.2	35.1	29.8	24.7	19.2
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019)		5.75	5.15	4.57	3.99	3.43	2.9
Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019)		0.817	0.426	0.424	0.419	0.422	0.413
Monetary damages from air pollution - Industrial Processes - Oil & Gas Production (million \$2019)		55.9	48.3	39	31.9	26.9	19.2

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

Table col E B: coolidito Il Il 71010 cobe							
Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		15.7	22	8.23	6.09	5.05	103
By economic sector - Construction (jobs)		1,122	1,225	861	888	1,128	1,669
By economic sector - Manufacturing		474	554	501	398	569	930
(jobs)							
By economic sector - Mining (jobs)		431	314	228	166	103	48.8
By economic sector - Other (jobs)		130	178	108	119	147	284
By economic sector - Pipeline (jobs)		101	83.7	69.3	58.9	44.5	46.6
By economic sector - Professional (jobs)		467	502	367	399	518	940
By economic sector - Trade (jobs)		437	437	326	324	366	564
By economic sector - Utilities (jobs)		766	623	542	658	1,145	1,541
By resource sector - Biomass (jobs)		62.5	59.2	27.9	25.5	23.4	486
By resource sector - CO2 (jobs)		0	0	0	0	0	149
By resource sector - Grid (jobs)		498	641	780	995	1,894	2,625
By resource sector - Natural Gas (jobs)		1,202	721	410	412	503	412
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		1,017	839	695	573	396	192
By resource sector - Solar (jobs)		1,050	1,380	685	691	784	1,555

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

Item	2020	2025	2030	2035	2040	2045	2050
By resource sector - Wind (jobs)		117	298	413	320	425	708
By education level - All sectors - High		1,666	1,690	1,289	1,285	1,710	2,616
school diploma or less (jobs)							
By education level - All sectors -		1,229	1,228	938	952	1,300	1,955
Associates degree or some college (jobs)							
By education level - All sectors -		826	801	617	611	796	1,210
Bachelors degree (jobs)							
By education level - All sectors - Masters		196	191	146	148	194	302
or professional degree (jobs)							
By education level - All sectors - Doctoral		28.2	28.3	20.8	21.2	26.2	43.8
degree (jobs)							
Related work experience - All sectors -		573	571	436	439	589	899
None (jobs)							
Related work experience - All sectors - Up		776	798	605	601	797	1,255
to 1 year (jobs)							
Related work experience - All sectors - 1		1,429	1,416	1,086	1,089	1,449	2,189
to 4 years (jobs)							
Related work experience - All sectors - 4		926	913	699	704	943	1,414
to 10 years (jobs)							
Related work experience - All sectors -		242	239	186	184	248	371
Over 10 years (jobs)							
On-the-Job Training - All sectors - None		219	220	166	164	212	329
(jobs)							
On-the-Job Training - All sectors - Up to 1		2,585	2,585	1,987	1,976	2,624	4,033
year (jobs)							
On-the-Job Training - All sectors - 1 to 4		832	826	629	639	869	1,290
years (jobs)							
On-the-Job Training - All sectors - 4 to 10		270	267	199	208	284	418
years (jobs)							
On-the-Job Training - All sectors - Over 10		39.4	40.3	30.2	29.2	37.8	57.4
years (jobs)							
On-Site or In-Plant Training - All sectors -		640	642	486	484	640	992
None (jobs)							
On-Site or In-Plant Training - All sectors -		2,349	2,347	1,804	1,797	2,390	3,658
Up to 1 year (jobs)							
On-Site or In-Plant Training - All sectors -		646	643	491	497	672	1,001
1 to 4 years (jobs)							
On-Site or In-Plant Training - All sectors -		278	273	205	212	286	420
4 to 10 years (jobs)							
On-Site or In-Plant Training - All sectors -		33.3	33.2	25.4	26.3	36.6	54.7
Over 10 years (jobs)							
Wage income - All (million \$2019)		242	240	187	191	260	394

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	58.2	54.4	49.9	45.9	42.7	38.8	34.4
Final energy use - Residential (PJ)	45.6	43	41.1	39.3	36.3	32.3	28
Final energy use - Commercial (PJ)	37.9	36	35	34.2	33.1	31.9	30.6
Final energy use - Industry (PJ)	7.41	7.1	7.11	7.23	7.42	7.57	7.74

Table 52: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

	•	•	•				
Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -		0.246	0.245	0.466	0.491	0.969	1.05
Cumulative 5-yr (billion \$2018)							

Table 53: E-B+ scenar	rio - PILLAR 1: Efficiency	v/Electrification -	Transportation

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle stocks - LDV – EV (1000 units)	4.2	25.1	46	143	240	454	669
Vehicle stocks - LDV – All others (1000	874	874	874	829	784	604	425
units)							
Light-duty vehicle capital costs vs. REF -		0	27.1	56.8	192	604	880
Cumulative 5-yr (million \$2018)							
Public EV charging plugs - DC Fast (1000	0.024		0.077		0.4		1.12
units)							
Public EV charging plugs - L2 (1000 units)	0.374		1.84		9.6		26.8

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Electric	4.86	5.74	10.9	26.2	53.8	78.8	90.8
Heat Pump (%)							
Sales of space heating units - Electric	3.87	5.91	5.68	5.25	4.15	2.68	1.92
Resistance (%)							
Sales of space heating units - Gas (%)	54.1	36.3	34.9	31	21.7	10.2	3.52
Sales of space heating units - Fossil (%)	37.2	52.1	48.5	37.5	20.3	8.33	3.72
Sales of water heating units - Electric	0	0.513	1.93	6.5	16.6	28.5	35.2
Heat Pump (%)							
Sales of water heating units - Electric	22.1	38.7	39.7	42.7	48.9	55.9	59.7
Resistance (%)							
Sales of water heating units - Gas Furnace	65.5	51.6	49.9	44.4	31.3	14.6	4.75
(%)							
Sales of water heating units - Other (%)	12.4	9.19	8.47	6.4	3.18	1.08	0.344
Sales of cooking units - Electric	54.9	56.1	60.2	71.1	86.2	95.6	98.8
Resistance (%)							
Sales of cooking units - Gas (%)	45.1	43.9	39.8	28.9	13.8	4.45	1.2
Residential HVAC investment in 2020s vs.		0.888	1.03				
REF - Cumulative 5-yr (billion \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Electric	2.71	7.42	10.6	20.5	40.4	61.4	72.8
Heat Pump (%)							
Sales of space heating units - Electric	1.36	2.46	3.76	7.72	14.3	19.2	21.2
Resistance (%)							
Sales of space heating units - Gas (%)	68.5	55.5	53.2	47.3	33.4	15.6	5.09
Sales of space heating units - Fossil (%)	27.4	34.6	32.4	24.5	11.9	3.78	0.991
Sales of water heating units - Electric	1.43	2.87	4.27	8.98	20.1	34	42.1
Heat Pump (%)							
Sales of water heating units - Electric	7.28	11.6	12.8	17.4	28	41.1	48.8
Resistance (%)							
Sales of water heating units - Gas (%)	88.4	81.4	79.2	70.3	49.5	23.1	7.55
Sales of water heating units - Other (%)	2.9	4.09	3.79	3.25	2.39	1.79	1.62
Sales of cooking units - Electric	36.9	40.7	44.7	56.5	72.7	82.9	86.4
Resistance (%)							
Sales of cooking units - Gas (%)	63.1	59.3	55.3	43.5	27.3	17.1	13.6
Commercial HVAC investment in 2020s -		1,952	2,132				
Cumulative 5-yr (million \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Natural gas (MW)	1,997	625	29	29	481	1,571	1,843
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

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

Item	2020	2025	2030	2035	2040	2045	2050
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

Table 30. L-D+ Scellul 10 - FILLAN 3. Cleuil	•						
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	0	0	0	0	0	0	0
(quantity)							
Number of facilities - Allam power w ccu	0	0	0	0	0	0	0
(quantity)							
Number of facilities - Beccs hydrogen	0	0	0	0	0	0	1
(quantity)							
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	0	0	0	0	0	0	0
(quantity)							
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 -		0	0	0	0	0	1,510
Cumulative 5-yr (million \$2018)							
Biomass purchases (million \$2018/y)		0	0	0	0	0	114

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0	0	0	0	1.94
Annual - BECCS (MMT)		0	0	0	0	0	1.94
Annual - NGCC (MMT)		0	0	0	0	0	0
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - All (MMT)		0	0	0	0	0	1.94
Cumulative - BECCS (MMT)		0	0	0	0	0	1.94
Cumulative - NGCC (MMT)		0	0	0	0	0	0
Cumulative - Cement and lime (MMT)		0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Trunk (km)		0	0	0	0	0	0
Spur (km)		0	0	0	0	0	79.2
All (km)		0	0	0	0	0	79.2
Cumulative investment - Trunk (million \$2018)		0	0	0	0	0	0
Cumulative investment - Spur (million \$2018)		0	0	0	0	0	65.6
Cumulative investment - All (million \$2018)		0	0	0	0	0	65.6

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							-4.07
regeneration (1000 tCO2e/y)							
Carbon sink potential - Low - Avoid							-27.6
deforestation (1000 tCO2e/y)							
Carbon sink potential - Low - Extend							-94.6
rotation length (1000 tCO2e/y)							
Carbon sink potential - Low - Improve							0
plantations (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-18.3
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-9.99
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - Low - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - Low - Reforest							-3.81
pasture (1000 tCO2e/y)							
Carbon sink potential - Low - Restore							-21.5
productivity (1000 tCO2e/y)							
Carbon sink potential - Low - All (not							-180
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - Mid - Accelerate							-6.1
regeneration (1000 tCO2e/y)							
Carbon sink potential - Mid - Avoid							-96.5
deforestation (1000 tCO2e/y)							
Carbon sink potential - Mid - Extend							-170
rotation length (1000 tCO2e/y)							
Carbon sink potential - Mid - Improve							0
plantations (1000 tCO2e/y)							
Carbon sink potential - Mid - Increase							-36.6
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - Mid - Increase							-19.3
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - Mid - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - Mid - Reforest							-27
pasture (1000 tCO2e/y)							
Carbon sink potential - Mid - Restore							-42.7
productivity (1000 tCO2e/y)							
Carbon sink potential - Mid - All (not							-399
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - High - Accelerate							-8.13
regeneration (1000 tCO2e/y)							
Carbon sink potential - High - Avoid							-165
deforestation (1000 tCO2e/y)							
Carbon sink potential - High - Extend							-246
rotation length (1000 tCO2e/y)							
Carbon sink potential - High - Improve							0
plantations (1000 tCO2e/y)							
Carbon sink potential - High - Increase							-54.9
retention of HWP (1000 tCO2e/y)							

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

Table 62: E-B+ scenario - PILLAR 6: Land s		•		0005	00/0	00/5	0050
Item Corbon sink notantial High Increase	2020	2025	2030	2035	2040	2045	2050 -28.5
Carbon sink potential - High - Increase trees outside forests (1000 tC02e/y)							-26.5
7							0
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							U
Carbon sink potential - High - Reforest							-50.3
pasture (1000 tC02e/y)							-50.3
Carbon sink potential - High - All (not							-617
counting overlap) (1000 tCO2e/y)							-017
Carbon sink potential - High - Restore							-63.9
productivity (1000 tC02e/y)							-03.9
Land impacted for carbon sink potential -							0.665
Low - Accelerate regeneration (1000							0.000
hectares)							
Land impacted for carbon sink potential -							21
Low - Avoid deforestation (over 30 years)							21
(1000 hectares)							
Land impacted for carbon sink potential -							48.1
Low - Extend rotation length (1000							70.1
hectares)							
Land impacted for carbon sink potential -							0
Low - Improve plantations (1000							Ū
hectares)							
Land impacted for carbon sink potential -							0
Low - Increase retention of HWP (1000							J
hectares)							
Land impacted for carbon sink potential -							1.43
Low - Increase trees outside forests							
(1000 hectares)							
Land impacted for carbon sink potential -							0
Low - Reforest cropland (1000 hectares)							
Land impacted for carbon sink potential -							0.247
Low - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							12.8
Low - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -							84.3
Low - Total impacted (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							0.997
Mid - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							21.7
Mid - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							86.8
Mid - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							0
Mid - Improve plantations (1000 hectares)							
Land impacted for carbon sink potential -							0
Mid - Increase retention of HWP (1000							
hectares)							0.07
Land impacted for carbon sink potential -							2.07
Mid - Increase trees outside forests (1000							
hectares)							
Land impacted for carbon sink potential -							0
Mid - Reforest cropland (1000 hectares)							170
Land impacted for carbon sink potential -							1.79
Mid - Reforest pasture (1000 hectares)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Mid - Restore productivity (1000							25.8
hectares)							
Land impacted for carbon sink potential -							139
Mid - Total impacted (over 30 years) (1000							
hectares)							
Land impacted for carbon sink potential -							1.33
High - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							22.4
High - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							126
High - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							0
High - Improve plantations (1000							
hectares)							
Land impacted for carbon sink potential -							0
High - Increase retention of HWP (1000							
hectares)							
Land impacted for carbon sink potential -							2.71
High - Increase trees outside forests							
(1000 hectares)							
Land impacted for carbon sink potential -							0
High - Reforest cropland (1000 hectares)							
Land impacted for carbon sink potential -							1.43
High - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							21.2
High - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -							175
High - Total impacted (over 30 years)							
(1000 hectares)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Moderate							0
deployment - Corn-ethanol to energy							
grasses (1000 tCO2e/y)							
Carbon sink potential - Moderate							-5.39
deployment - Cropland measures (1000							
tCO2e/y)							
Carbon sink potential - Moderate							-0.164
deployment - Permanent conservation							
cover (1000 tCO2e/y)							
Carbon sink potential - Moderate							0
deployment - Cropland to woody energy							
crops (1000 tCO2e/y)							
Carbon sink potential - Moderate							0
deployment - Pasture to energy crops							
(1000 tCO2e/y)							
Carbon sink potential - Moderate							-5.55
deployment - Total (1000 tCO2e/y)							
Carbon sink potential - Aggressive							0
deployment - Corn-ethanol to energy							
grasses (1000 tCO2e/y)							
Carbon sink potential - Aggressive							-10.3
deployment - Cropland measures (1000							
tCO2e/y)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive							-0.327
deployment - Permanent conservation							
cover (1000 tCO2e/y)							
Carbon sink potential - Aggressive							0
deployment - Cropland to woody energy							
crops (1000 tCO2e/y)							
Carbon sink potential - Aggressive							0
deployment - Pasture to energy crops							
(1000 tCO2e/y)							
Carbon sink potential - Aggressive							-10.7
deployment - Total (1000 tCO2e/y)							
Land impacted for carbon sink - Moderate							0
deployment - Corn-ethanol to energy							
grasses (1000 hectares)							
Land impacted for carbon sink - Moderate							3.43
deployment - Cropland measures (1000							
hectares)							
Land impacted for carbon sink - Moderate							0.298
deployment - Permanent conservation							
cover (1000 hectares)							
Land impacted for carbon sink - Moderate							0
deployment - Cropland to woody energy							
crops (1000 hectares)							
Land impacted for carbon sink - Moderate							0.047
deployment - Pasture to energy crops							
(1000 hectares)							
Land impacted for carbon sink - Moderate							3.77
deployment - Total (1000 hectares)							
Land impacted for carbon sink -							0
Aggressive deployment - Corn-ethanol to							
energy grasses (1000 hectares)							4.0
Land impacted for carbon sink -							16.2
Aggressive deployment - Cropland							
measures (1000 hectares)							0.505
Land impacted for carbon sink -							0.595
Aggressive deployment - Permanent							
conservation cover (1000 hectares)							
Land impacted for carbon sink -							0
Aggressive deployment - Cropland to							
woody energy crops (1000 hectares)							0.017
Land impacted for carbon sink -							0.047
Aggressive deployment - Pasture to							
energy crops (1000 hectares) Land impacted for carbon sink -							1/ 0
•							16.8
Aggressive deployment - Total (1000 hectares)							
iiculai esj							

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)		30.7	19.2	17.8	17.4	17	15.2
Premature deaths from air pollution - Fuel Comb - Electric Generation - Natural Gas (deaths)		5.02	3.28	4.37	6.14	5.69	5.17
Premature deaths from air pollution - Mobile - On-Road (deaths)		37.7	38.5	39.1	39.9	40.7	41.5
Premature deaths from air pollution - Gas Stations (deaths)		1.73	1.75	1.77	1.8	1.83	1.85

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

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution - Fuel Comb - Residential - Natural Gas (deaths)		7.66	7.44	7.55	7.7	7.77	7.67
Premature deaths from air pollution - Fuel Comb - Residential - Oil (deaths)		14.3	11.6	7.87	4.88	2.91	1.87
Premature deaths from air pollution - Fuel Comb - Residential - Other (deaths)		1.1	1.08	1.06	1.05	1.04	1.03
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Coal (deaths)		0.246	0.245	0.244	0.242	0.239	0.235
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (deaths)		6.92	7.03	6.92	6.8	6.88	7.15
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Oil (deaths)		4.65	4.19	3.48	2.57	1.99	1.6
Premature deaths from air pollution - Fuel Comb - Comm/Institutional - Other (deaths)		0.678	0.691	0.702	0.71	0.717	0.721
Premature deaths from air pollution - Industrial Processes - Coal Mining (deaths)		0.176	0.127	0.107	0.102	0.099	0.094
Premature deaths from air pollution - Industrial Processes - Oil & Gas Production (deaths)		6.34	6.78	7	6.66	6.66	6.36
Monetary damages from air pollution - Fuel Comb - Electric Generation - Coal (million \$2019)		272	170	158	154	151	135
Monetary damages from air pollution - Fuel Comb - Electric Generation - Natural Gas (million \$2019)		44.5	29	38.7	54.4	50.4	45.8
Monetary damages from air pollution - Mobile - On-Road (million \$2019)		335	342	348	355	362	369
Monetary damages from air pollution - Gas Stations (million \$2019)		15.3	15.5	15.7	16	16.2	16.4
Monetary damages from air pollution - Fuel Comb - Residential - Natural Gas (million \$2019)		67.9	65.9	66.9	68.3	68.8	67.9
Monetary damages from air pollution - Fuel Comb - Residential - Oil (million \$2019)		127	103	69.8	43.2	25.8	16.5
Monetary damages from air pollution - Fuel Comb - Residential - Other (million \$2019)		9.75	9.59	9.41	9.31	9.21	9.12
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Coal (million \$2019)		2.17	2.17	2.16	2.14	2.12	2.08
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Natural Gas (million \$2019)		61.3	62.2	61.3	60.2	60.9	63.3
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Oil (million \$2019)		41.1	37.1	30.8	22.7	17.6	14.3
Monetary damages from air pollution - Fuel Comb - Comm/Institutional - Other (million \$2019)		6	6.11	6.21	6.29	6.35	6.39
Monetary damages from air pollution - Industrial Processes - Coal Mining (million \$2019)		1.55	1.12	0.943	0.899	0.875	0.825

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution -		56.3	60.2	62.1	59.1	59.1	56.5
Industrial Processes - Oil & Gas							
Production (million \$2019)							

Table 65: REF scenario - IMPACTS - Jobs

Table 65: REF SCENATIO - IMPACTS - JODS							
Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)		14.9	13.4	13.2	10.8	10.7	11.6
By economic sector - Construction (jobs)		599	766	954	1,117	1,264	1,717
By economic sector - Manufacturing		323	328	488	381	413	616
(jobs)							
By economic sector - Mining (jobs)		438	351	284	231	196	166
By economic sector - Other (jobs)		20.9	67.6	88.3	110	125	252
By economic sector - Pipeline (jobs)		104	107	107	102	103	102
By economic sector - Professional (jobs)		283	291	364	454	504	716
By economic sector - Trade (jobs)		317	307	325	364	389	543
By economic sector - Utilities (jobs)		732	546	863	1,193	1,407	1,664
By resource sector - Biomass (jobs)		57.5	53.9	50	44.7	45.7	46.5
By resource sector - CO2 (jobs)		0	0	0	0	0	0
By resource sector - Grid (jobs)		438	463	1,059	1,424	1,903	2,436
By resource sector - Natural Gas (jobs)		1,230	849	911	1,179	1,153	1,136
By resource sector - Nuclear (jobs)		0	0	0	0	0	0
By resource sector - Oil (jobs)		1,024	859	748	690	658	637
By resource sector - Solar (jobs)			452	489	512	527	1,249
By resource sector - Wind (jobs)		80.2	99	232	112	126	284
By education level - All sectors - High		1,168	1,181	1,491	1,678	1,878	2,470
school diploma or less (jobs)							
By education level - All sectors -		872	856	1,101	1,273	1,425	1,875
Associates degree or some college (jobs)							
By education level - All sectors - Bachelors degree (jobs)		624	584	708	794	871	1,130
By education level - All sectors - Masters or professional degree (jobs)		146	137	167	192	211	276
By education level - All sectors - Doctoral degree (jobs)		19.4	19	22.1	25.5	27.6	37.3
Related work experience - All sectors - None (jobs)		412	404	510	585	653	856
Related work experience - All sectors - Up to 1 year (jobs)		528	541	682	762	851	1,139
Related work experience - All sectors - 1 to 4 years (jobs)		1,041	1,010	1,263	1,436	1,598	2,087
Related work experience - All sectors - 4 to 10 years (jobs)		673	650	818	937	1,042	1,357
Related work experience - All sectors - Over 10 years (jobs)		177	171	215	242	269	351
On-the-Job Training - All sectors - None (jobs)		153	153	186	208	229	306
On-the-Job Training - All sectors - Up to 1 year (jobs)		1,868	1,825	2,283	2,565	2,852	3,748
On-the-Job Training - All sectors - 1 to 4 years (jobs)		595	584	745	863	966	1,259
On-the-Job Training - All sectors - 4 to 10 years (jobs)		188	188	241	289	325	423
On-the-Job Training - All sectors - Over 10 years (jobs)		26.2	27.1	33.6	36.6	40.2	53.8
On-Site or In-Plant Training - All sectors - None (jobs)		450	444	553	624	691	917
On-Site or In-Plant Training - All sectors - Up to 1 year (jobs)		1,698	1,660	2,079	2,341	2,606	3,420

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

Item	2020	2025	2030	2035	2040	2045	2050
On-Site or In-Plant Training - All sectors -		462	454	579	666	746	974
1 to 4 years (jobs)							
On-Site or In-Plant Training - All sectors -		197	195	247	294	329	425
4 to 10 years (jobs)							
On-Site or In-Plant Training - All sectors -		23.8	23.3	30.6	36.3	40.9	53.3
Over 10 years (jobs)							
Wage income - All (million \$2019)		179	174	221	257	290	380

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Transportation (PJ)	58.1	54.5	50.5	48.1	48.2	49.7	51.5
Final energy use - Residential (PJ)	45.6	43.2	42	41.3	40.8	40.5	40.2
Final energy use - Commercial (PJ)	37.8	36.8	37.1	37.1	37.2	38.2	39.8
Final energy use - Industry (PJ)	7.42	7.31	7.55	7.93	8.42	8.89	9.39

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

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -		0.245	0.243	0.8	0.865	0.782	0.829
Cumulative 5-yr (billion \$2018)							

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 (%)	4.66	8.08	8.4	8.88	9.08	9.28	9.55
Sales of space heating units - Electric Resistance (%)	3.9	5.72	5.6	5.54	5.52	5.25	5.08
Sales of space heating units - Gas (%)	54.2	41.1	62.8	77.8	78.6	78.8	78.7
Sales of space heating units - Fossil (%)	37.3	45.1	23.2	7.8	6.77	6.71	6.7
Sales of water heating units - Electric Heat Pump (%)	0	0	0	0	0	0	0
Sales of water heating units - Electric Resistance (%)	22.1	38.4	38.4	38.4	38.4	38.4	38.4
Sales of water heating units - Gas Furnace (%)	65.5	52.1	52.2	52.1	52.1	52.1	52.1
Sales of water heating units - Other (%)	12.4	9.45	9.45	9.48	9.5	9.51	9.52
Sales of cooking units - Electric Resistance (%)	54.5	54.5	54.5	54.5	54.5	54.5	54.5
Sales of cooking units - Gas (%)	45.5	45.5	45.5	45.5	45.5	45.5	45.5
Residential HVAC investment in 2020s vs. REF - Cumulative 5-yr (billion \$2018)		0.864	0.9				

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Electric	2.71	12.7	40.8	63.9	67.6	67.9	68
Heat Pump (%)							
Sales of space heating units - Electric	1.36	2.89	7.67	20	30.2	31.9	32
Resistance (%)							
Sales of space heating units - Gas (%)	68.5	51	27.9	6.76	0.86	0.048	0
Sales of space heating units - Fossil (%)	27.4	33.4	23.6	9.33	1.34	0.106	0
Sales of water heating units - Electric	1.43	2.35	2.32	2.33	2.32	2.34	2.33
Heat Pump (%)							
Sales of water heating units - Electric	7.28	11.1	10.9	11.1	11.1	11	11
Resistance (%)							
Sales of water heating units - Gas (%)	88.4	82.4	82.7	82.5	82.5	82.7	82.6
Sales of water heating units - Other (%)	2.9	4.16	4.07	4.09	4.16	4	4.05

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

Item	2020	2025	2030	2035	2040	2045	2050
Sales of cooking units - Electric	36.9	39	38.6	38.5	38.3	38.5	38.4
Resistance (%)							
Sales of cooking units - Gas (%)	63.1	61	61.4	61.5	61.7	61.5	61.6
Commercial HVAC investment in 2020s -		1,928	1,983				
Cumulative 5-yr (million \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Installed thermal - Natural gas (MW)	1,997	625	625	898	1,679	3,041	3,637
Installed thermal - Nuclear (MW)	0	0	0	0	0	0	0
Installed renewables - Rooftop PV (MW)	152	264	310	362	422	489	563
Installed renewables - Solar - Base land use assumptions (MW)	69.2	69.2	69.2	69.2	69.2	69.2	69.2
Installed renewables - Wind - Base land use assumptions (MW)	88.4	88.4	88.4	88.4	88.4	88.4	88.4
Installed renewables - Offshore Wind - Base land use assumptions (MW)	0	0	0	0	0	0	1,173
Installed renewables - Solar - Constrained land use assumptions (MW)	35.7	35.7	35.7	35.7	35.7	35.7	35.7
Installed renewables - Wind - Constrained land use assumptions (MW)	3	3	3	3	3	3	3

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	220	220	220	220	220	220	220
Wind - Base land use assumptions (GWh)	371	371	371	371	371	371	371
OffshoreWind - Base land use	0	0	0	0	0	0	0
assumptions (GWh)							

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)	-1.01		-0.322				-0.288
Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y)	-0.015		-0.027				-0.028
Business-as-usual carbon sink - Total (Mt CO2e/y)	-1.02		-0.349				-0.316

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

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Accelerate							-4.07
regeneration (1000 tCO2e/y)							
Carbon sink potential - Low - Avoid							-27.6
deforestation (1000 tCO2e/y)							
Carbon sink potential - Low - Extend							-94.6
rotation length (1000 tCO2e/y)							
Carbon sink potential - Low - Improve							0
plantations (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-18.3
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-9.99
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - Low - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - Low - Reforest							-3.81
pasture (1000 tCO2e/y)							

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

Table 73: REF scenario - PILLAR 6: Land si	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Restore	2020	2023	2030	2033	2040	2043	-21.5
productivity (1000 tCO2e/y)							-21.0
Carbon sink potential - Low - All (not							-180
counting overlap) (1000 tC02e/y)							-100
Carbon sink potential - Mid - Accelerate							-6.1
regeneration (1000 tC02e/y)							-0.1
							0/ 5
Carbon sink potential - Mid - Avoid							-96.5
deforestation (1000 tC02e/y)							
Carbon sink potential - Mid - Extend							-170
rotation length (1000 tCO2e/y)							
Carbon sink potential - Mid - Improve							0
plantations (1000 tCO2e/y)							
Carbon sink potential - Mid - Increase							-36.6
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - Mid - Increase							-19.3
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - Mid - Reforest							0
cropland (1000 tCO2e/y)							·
Carbon sink potential - Mid - Reforest							-27
pasture (1000 tC02e/y)							-21
Carbon sink potential - Mid - Restore							-42.7
							-42.7
productivity (1000 tC02e/y)							200
Carbon sink potential - Mid - All (not							-399
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - High - Accelerate							-8.13
regeneration (1000 tCO2e/y)							
Carbon sink potential - High - Avoid							-165
deforestation (1000 tCO2e/y)							
Carbon sink potential - High - Extend							-246
rotation length (1000 tCO2e/y)							
Carbon sink potential - High - Improve							0
plantations (1000 tCO2e/y)							_
Carbon sink potential - High - Increase							-54.9
retention of HWP (1000 tCO2e/y)							04.7
Carbon sink potential - High - Increase	+						-28.5
							-26.5
trees outside forests (1000 tC02e/y)							
Carbon sink potential - High - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - High - Reforest							-50.3
pasture (1000 tCO2e/y)							
Carbon sink potential - High - All (not							-617
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - High - Restore							-63.9
productivity (1000 tCO2e/y)							
Land impacted for carbon sink potential -							0.665
Low - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							21
Low - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -	+						48.1
							40.1
Low - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							0
Low - Improve plantations (1000							
hectares)							
Land impacted for carbon sink potential -							0
Low - Increase retention of HWP (1000							
hectares)			1			1	

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

lable 73: REF scenario - PILLAR 6: Land si		•	•		2010		
Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Low - Increase trees outside forests							1.43
(1000 hectares)							
Land impacted for carbon sink potential -							0
Low - Reforest cropland (1000 hectares)							U
Land impacted for carbon sink potential -							0.247
Low - Reforest pasture (1000 hectares)							0.241
Land impacted for carbon sink potential -							12.8
Low - Restore productivity (1000							12.0
hectares)							
Land impacted for carbon sink potential -							84.3
Low - Total impacted (over 30 years)							0
(1000 hectares)							
Land impacted for carbon sink potential -							0.997
Mid - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							21.7
Mid - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							86.8
Mid - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							0
Mid - Improve plantations (1000 hectares)							
Land impacted for carbon sink potential -							0
Mid - Increase retention of HWP (1000							
hectares)							
Land impacted for carbon sink potential -							2.07
Mid - Increase trees outside forests (1000							
hectares)							
Land impacted for carbon sink potential -							0
Mid - Reforest cropland (1000 hectares)							170
Land impacted for carbon sink potential -							1.79
Mid - Reforest pasture (1000 hectares)							05.0
Land impacted for carbon sink potential -							25.8
Mid - Restore productivity (1000 hectares)							
Land impacted for carbon sink potential -							139
Mid - Total impacted (over 30 years) (1000							137
hectares)							
Land impacted for carbon sink potential -							1.33
High - Accelerate regeneration (1000							1.00
hectares)							
Land impacted for carbon sink potential -							22.4
High - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							126
High - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							0
High - Improve plantations (1000							
hectares)							
Land impacted for carbon sink potential -							0
High - Increase retention of HWP (1000							
hectares)							
Land impacted for carbon sink potential -							2.71
High - Increase trees outside forests							
(1000 hectares)							
Land impacted for carbon sink potential -							0
High - Reforest cropland (1000 hectares)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential -							1.43
High - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							21.2
High - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -							175
High - Total impacted (over 30 years)							
(1000 hectares)							