

# Net-Zero America - connecticut state report

2021-03-15

These data underlie graphs and tables presented in the Princeton Net-Zero America study:

E. Larson, C. Greig, J. Jenkins, E. Mayfield, A. Pascale, C. Zhang, J. Drossman, R. Williams, S. Pacala, R. Socolow, EJ Baik, R. Birdsey, R. Duke, R. Jones, B. Haley, E. Leslie, K. Paustian, and A. Swan, Net-Zero America: Potential Pathways, Infrastructure, and Impacts, interim report, Princeton University, Princeton, NJ, December 15, 2020. Report available at <a href="https://netzeroamerica.princeton.edu">https://netzeroamerica.princeton.edu</a>.

#### Notes

- These data are all data from the study available at <a href="https://netzeroamerica.prince-ton.edu">https://netzeroamerica.prince-ton.edu</a>.
- The Net-Zero America study describes five pathways to reach net-zero emissions and one "no new policies" reference scenario. In this document, state-level results are grouped by scenario. For some scenarios, the study generated national, but not statelevel results.
- Within results for a given scenario, data tables are organized into corresponding sections of the full net-zero study (e.g., Pillar 1, Pillar 2, etc.)
- For Pillar 6 (Land sinks), values shown are maximum carbon storage potentials.

# Data by category and subcategory

1	E+ scenario - PILLAR 1: Efficiency/Electrification - Commercial	. 1
2	E+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand	. 1
3	E+ scenario - PILLAR 1: Efficiency/Electrification - Overview	. 1
4	E+ scenario - PILLAR 1: Efficiency/Electrification - Residential	. 1
5	E+ scenario - PILLAR 1: Efficiency/Electrification - Transportation	. 2
6	E+ scenario - PILLAR 2: Clean Electricity - Generating capacity	. 2
7	E+ scenario - PILLAR 2: Clean Electricity - Generation	. 3
8	E+ scenario - PILLAR 3: Clean fuels - Bioenergy	. 3
9	E+ scenario - PILLAR 4: CCUS - CO2 capture	. 3
10	E+ scenario - PILLAR 4: CCUS - CO2 pipelines	. 3
11	E+ scenario - PILLAR 4: CCUS - CO2 storage	. 4
12	E+ scenario - PILLAR 6: Land sinks - Agriculture	. 4
13	E+ scenario - PILLAR 6: Land sinks - Forests	. 5
14	E+ scenario - IMPACTS - Fossil fuel industries	. 7
15	E+ scenario - IMPACTS - Health	. 7
16	E+ scenario - IMPACTS - Jobs	. 7
17	E- scenario - PILLAR 1: Efficiency/Electrification - Commercial	. 9
18	E- scenario - PILLAR 1: Efficiency/Electrification - Electricity demand	. 9
19	E- scenario - PILLAR 1: Efficiency/Electrification - Overview	. 9
20	E- scenario - PILLAR 1: Efficiency/Electrification - Residential	. 9
21	E- scenario - PILLAR 1: Efficiency/Electrification - Transportation	. 10
22	E- scenario - PILLAR 6: Land sinks - Agriculture	
23	E- scenario - PILLAR 6: Land sinks - Forests	
24	E- scenario - IMPACTS - Health	
25	E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Commercial	. 14
26	E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand .	
27	E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Overview	
28	E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Residential	
29	E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Transportation	
30	E+RE+ scenario - PILLAR 2: Clean Electricity - Generating capacity	. 15
31	E+RE+ scenario - PILLAR 2: Clean Electricity - Generation	
32	E+RE+ scenario - PILLAR 6: Land sinks - Agriculture	
33	E+RE+ scenario - PILLAR 6: Land sinks - Forests	
34	E+RE+ scenario - IMPACTS - Health	
35	E+RE- scenario - PILLAR 1: Efficiency/Electrification - Commercial	
36	E+RE- scenario - PILLAR 1: Efficiency/Electrification - Electricity demand	
37	E+RE- scenario - PILLAR 1: Efficiency/Electrification - Overview	
38	E+RE- scenario - PILLAR 1: Efficiency/Electrification - Residential	
39	E+RE- scenario - PILLAR 1: Efficiency/Electrification - Transportation	
40	E+RE- scenario - PILLAR 2: Clean Electricity - Generating capacity	
41	E+RE- scenario - PILLAR 2: Clean Electricity - Generation	
42	E+RE- scenario - PILLAR 6: Land sinks - Agriculture	
43	E+RE- scenario - PILLAR 6: Land sinks - Forests	. 22

44	E+RE- scenario - IMPACTS - Health	24
45	E-B+ scenario - PILLAR 1: Efficiency/Electrification - Commercial	25
46	E-B+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand	25
47	E-B+ scenario - PILLAR 1: Efficiency/Electrification - Overview	25
48	E-B+ scenario - PILLAR 1: Efficiency/Electrification - Residential	25
49	E-B+ scenario - PILLAR 1: Efficiency/Electrification - Transportation	26
50	E-B+ scenario - PILLAR 2: Clean Electricity - Generating capacity	26
51	E-B+ scenario - PILLAR 2: Clean Electricity - Generation	26
52	E-B+ scenario - PILLAR 3: Clean fuels - Bioenergy	26
53	E-B+ scenario - PILLAR 4: CCUS - CO2 capture	27
54	E-B+ scenario - PILLAR 4: CCUS - CO2 pipelines	27
55	E-B+ scenario - PILLAR 4: CCUS - CO2 storage	27
56	E-B+ scenario - PILLAR 6: Land sinks - Agriculture	27
57	E-B+ scenario - PILLAR 6: Land sinks - Forests	29
58	E-B+ scenario - IMPACTS - Health	31
59	REF scenario - PILLAR 1: Efficiency/Electrification - Commercial	31
60	REF scenario - PILLAR 1: Efficiency/Electrification - Electricity demand	32
61	REF scenario - PILLAR 1: Efficiency/Electrification - Overview	32
62	REF scenario - PILLAR 1: Efficiency/Electrification - Residential	32
63	REF scenario - PILLAR 1: Efficiency/Electrification - Transportation	32
64	REF scenario - PILLAR 6: Land sinks - Forests	33
65	REF scenario - PILLAR 6: Land sinks - Forests - REF only	35
66	REF scenario - IMPACTS - Health	35

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

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s -		7,080	7,732				
Cumulative 5-yr (million \$2018)							
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
Sales of space heating units - Electric	4.76	11	39.3	72.4	77.8	78.1	78.1
Heat Pump (%)							
Sales of space heating units - Electric	2.29	4.46	16.5	21.3	21.9	21.9	21.9
Resistance (%)							
Sales of space heating units - Fossil (%)	42.2	31.2	5.99	0.253	0	0	0
Sales of space heating units - Gas Furnace	50.7	53.4	38.2	6.11	0.363	0	0
(%)							
Sales of water heating units - Electric	2.81	3.52	15.9	41	45.5	45.9	45.9
Heat Pump (%)							
Sales of water heating units - Electric	13.8	12.6	24	48.1	52.3	52.5	52.5
Resistance (%)							
Sales of water heating units - Gas Furnace	78.2	80	58.2	9.28	0.549	0	0
(%)							
Sales of water heating units - Other (%)	5.24	3.95	1.94	1.61	1.6	1.59	1.61

Table 2: E+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -		1.3	1.34	3.78	4.11	3.37	3.57
Cumulative 5-yr (billion \$2018)							

Table 3: E+ scenario - PILLAR 1: Efficiency/Electrification - Overview

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	120	114	109	101	93.4	88.1	84.9
Final energy use - Industry (PJ)	64.9	63.4	62.5	61.2	61.1	61.8	62.1
Final energy use - Residential (PJ)	155	143	130	112	94.5	81.6	73.9
Final energy use - Transportation (PJ)	228	212	186	152	122	104	95.6

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

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs.		3.13	3.5				
REF - Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric	71.8	77.8	96.2	99.8	100	100	100
Resistance (%)							
Sales of cooking units - Gas (%)	28.2	22.2	3.79	0.191	0	0	0
Sales of space heating units - Electric	7.5	14.9	62.3	88.8	92.4	92.6	92.6
Heat Pump (%)							
Sales of space heating units - Electric	4.92	6.44	5.03	2.19	1.67	1.64	1.81
Resistance (%)							
Sales of space heating units - Fossil (%)	53.1	58.8	18.6	6.59	5.61	5.57	5.44
Sales of space heating units - Gas (%)	34.4	19.8	14	2.38	0.3	0.169	0.163
Sales of water heating units - Electric	0	1.56	13.2	30.7	33.7	33.9	33.9
Heat Pump (%)							
Sales of water heating units - Electric	35.5	54.6	60.4	65.2	66	66	66
Resistance (%)							
Sales of water heating units - Gas Furnace	46.8	33.5	24.3	3.88	0.229	0	0
(%)							
Sales of water heating units - Other (%)	17.6	10.3	2.05	0.206	0.126	0.127	0.126

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

Item 2020 2025 2030

Item	2020	2025	2030	2035	2040	2045	2050
Light-duty vehicle capital costs -		549	1,419	2,279	3,460	3,757	3,587
Cumulative 5-yr (million \$2018)							
Public EV charging plugs - DC Fast (1000	0.229		0.879		3.72		5.99
units)							
Public EV charging plugs - L2 (1000 units)	0.794		21.1		89.3		144
Vehicle sales - Heavy-duty - diesel (%)	97.2	92.1	67	23.3	4.22	0.628	0
Vehicle sales - Heavy-duty - EV (%)	0.588	3.81	19	45.6	57.4	59.6	60
Vehicle sales - Heavy-duty - gasoline (%)	0.227	0.227	0.176	0.066	0.013	0.002	0
Vehicle sales - Heavy-duty - hybrid (%)	0.082	0.09	0.077	0.031	0.007	0.001	0
Vehicle sales - Heavy-duty - hydrogen FC	0.392	2.54	12.7	30.4	38.2	39.7	40
(%)							
Vehicle sales - Heavy-duty - other (%)	1.5	1.23	1.07	0.568	0.163	0.038	0
Vehicle sales - Light-duty - diesel (%)	1.31	1.6	1.16	0.37	0.071	0.013	0
Vehicle sales - Light-duty - EV (%)	4.71	17.6	50.1	83.2	96.5	99.3	100
Vehicle sales - Light-duty - gasoline (%)	88.6	75.2	45.1	15.1	3.1	0.584	0
Vehicle sales - Light-duty - hybrid (%)	5.19	5.1	3.47	1.26	0.312	0.069	0
Vehicle sales - Light-duty - hydrogen FC	0.109	0.326	0.184	0.056	0.012	0.002	0
(%)							
Vehicle sales - Light-duty - other (%)	0.091	0.086	0.054	0.019	0.004	0.001	0
Vehicle sales - Medium-duty - diesel (%)	64.7	59.7	42.3	14.4	2.59	0.384	0
Vehicle sales - Medium-duty - EV (%)	0.784	5.07	25.3	60.8	76.5	79.5	80
Vehicle sales - Medium-duty - gasoline (%)	33.7	33.3	25.5	9.32	1.77	0.277	0
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.402	0.341	0.14	0.03	0.005	0
Vehicle sales - Medium-duty - hydrogen	0.196	1.27	6.33	15.2	19.1	19.9	20
FC (%)							
Vehicle sales - Medium-duty - other (%)	0.253	0.255	0.205	0.083	0.019	0.004	0

Table 6: E+ scenario - PILLAR 2: Clean Electricity - Generating capacity

Item	2020	2025	2030	2035	2040	2045	2050
Capital invested - Biomass power plant (billion \$2018)	0	0	0	0	0	0	0
Capital invested - Biomass w/ccu allam power plant (billion \$2018)	0	0	0	0	0	0	0
Capital invested - Biomass w/ccu power plant (billion \$2018)	0	0	0	0	0	0	0
Capital invested - Solar PV - Base (billion \$2018)		0	3.53	1.92	1.05	1.09	0
Capital invested - Solar PV - Constrained (billion \$2018)		0.09	2.85	0.72	0.909	1.6	0
Capital invested - Wind - Base (billion \$2018)		0	0.755	0.336	0.169	0	0.073
Capital invested - Wind - Constrained (billion \$2018)		0	0.822	0.087	0.108	0	0
Installed renewables - OffshoreWind - Base land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - OffshoreWind - Constrained land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - Rooftop PV (MW)	770	1,341	1,570	1,838	2,141	2,479	2,857
Installed renewables - Solar - Base land use assumptions (MW)	92.9	92.9	3,547	5,583	6,764	8,065	8,065
Installed renewables - Solar - Constrained land use assumptions (MW)	61.9	172	4,177	6,855	8,835	9,679	9,827
Installed renewables - Wind - Base land use assumptions (MW)	5.8	5.8	321	472	551	551	590
Installed renewables - Wind - Constrained land use assumptions (MW)	5.8	5.8	349	388	438	438	438

Table 7: E+ 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 allam power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu power plant (GWh)	0	0	0	0	0	0	0
OffshoreWind - Base land use	0	0	0	0	0	0	0
assumptions (GWh)							
OffshoreWind - Constrained land use	0	0	0	0	0	0	0
assumptions (GWh)							
Solar - Base land use assumptions (GWh)	169	169	5,420	8,477	10,241	12,184	12,184
Solar - Constrained land use assumptions	112	279	6,394	10,430	13,385	14,650	14,870
(GWh)							
Wind - Base land use assumptions (GWh)	24	24	1,153	1,676	1,955	1,955	2,088
Wind - Constrained land use assumptions	24	24	1,259	1,400	1,572	1,572	1,572
(GWh)							

Table 8: E+ scenario - PILLAR 3: Clean fuels - Bioenergy

		<u> </u>					
Item	2020	2025	2030	2035	2040	2045	2050
Biomass purchases (million \$2018/year)		0	0	0	0	0	55
Conversion capital investment -		0	0	0	0	0	1,600
Cumulative 5-yr (million \$2018)							
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	0
(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 - 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 - Pyrolysis (quantity)	0	0	0	0	0	0	1
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

Table 9: E+ scenario - PILLAR 4: CCUS - CO2 capture

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0	0	0	0	0.01
Annual - BECCS (MMT)		0	0	0	0	0	0
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Annual - NGCC (MMT)		0	0	0	0	0	0.01
Cumulative - All (MMT)		0	0	0	0	0	0.01
Cumulative - BECCS (MMT)		0	0	0	0	0	0
Cumulative - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - NGCC (MMT)		0	0	0	0	0	0.01

Table 10: E+ scenario - PILLAR 4: CCUS - CO2 pipelines

Item	2020	2025	2030	2035	2040	2045	2050
All (km)		0	146	146	146	146	146
Cumulative investment - All (million \$2018)		0	262	262	262	262	262
Cumulative investment - Spur (million \$2018)		0	0.702	0.702	0.702	0.702	0.703
Cumulative investment - Trunk (million \$2018)		0	262	262	262	262	262
Spur (km)		0	1.21	1.21	1.21	1.21	1.21
Trunk (km)		0	145	145	145	145	145

Table 11: E+ scenario - PILLAR 4: CCUS - CO2 storage

	•						
Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (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 12: E+ scenario - PILLAR 6: Land sinks - Agriculture

Table 12: E+ Scenario - PILLAR 6: Land Sini			0000	0005	0040	00/5	0050
Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive							0
deployment - Corn-ethanol to energy							
grasses (1000 tC02e/y)							70
Carbon sink potential - Aggressive							-79
deployment - Cropland measures (1000							
tCO2e/y)							
Carbon sink potential - Aggressive							-3.14
deployment - Permanent conservation							
cover (1000 tCO2e/y)							
Carbon sink potential - Aggressive							-82.1
deployment - Total (1000 tC02e/y)							
Carbon sink potential - Moderate							0
deployment - Corn-ethanol to energy							
grasses (1000 tCO2e/y)							
Carbon sink potential - Moderate							-41.5
deployment - Cropland measures (1000							
tCO2e/y)							
Carbon sink potential - Moderate							-1.57
deployment - Permanent conservation							
cover (1000 tCO2e/y)							
Carbon sink potential - Moderate							-43.1
deployment - Total (1000 tC02e/y)							
Land impacted for carbon sink -							0
Aggressive deployment - Corn-ethanol to							
energy grasses (1000 hectares)							
Land impacted for carbon sink -							54.5
Aggressive deployment - Cropland							
measures (1000 hectares)							
Land impacted for carbon sink -							5.72
Aggressive deployment - Permanent							J
conservation cover (1000 hectares)							
Land impacted for carbon sink -							60.2
Aggressive deployment - Total (1000							00.2
hectares)							
Land impacted for carbon sink - Moderate							0
deployment - Corn-ethanol to energy							U
grasses (1000 hectares)							
Land impacted for carbon sink - Moderate							28.7
deployment - Cropland measures (1000							20.1
hectares)							0.07
Land impacted for carbon sink - Moderate							2.86
deployment - Permanent conservation							
cover (1000 hectares)							04.5
Land impacted for carbon sink - Moderate							31.5
deployment - Total (1000 hectares)							

Table 13: E+ scenario - PILLAR 6: Land sinks - Forests

Table 13: E+ scenario - PILLAR 6: Land sin	ks - Forests						
Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Accelerate							-54.6
regeneration (1000 tCO2e/y)							
Carbon sink potential - High - All (not							-3,043
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - High - Avoid							-768
deforestation (1000 tCO2e/y)							
Carbon sink potential - High - Extend							-1,158
rotation length (1000 tCO2e/y)							,
Carbon sink potential - High - Improve							-10.4
plantations (1000 tCO2e/y)							10.1
Carbon sink potential - High - Increase							-360
retention of HWP (1000 tCO2e/y)							-300
Carbon sink potential - High - Increase							-143
trees outside forests (1000 tC02e/y)							-143
* **							0
Carbon sink potential - High - Reforest							U
cropland (1000 tC02e/y)							
Carbon sink potential - High - Reforest							-224
pasture (1000 tCO2e/y)							
Carbon sink potential - High - Restore							-325
productivity (1000 tCO2e/y)							
Carbon sink potential - Low - Accelerate							-27.4
regeneration (1000 tCO2e/y)							
Carbon sink potential - Low - All (not							-902
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - Low - Avoid							-128
deforestation (1000 tCO2e/y)							
Carbon sink potential - Low - Extend							-445
rotation length (1000 tC02e/y)							
Carbon sink potential - Low - Improve							-5.3
plantations (1000 tCO2e/y)							0.0
Carbon sink potential - Low - Increase							-120
retention of HWP (1000 tCO2e/y)							-120
							-50.1
Carbon sink potential - Low - Increase							-50.1
trees outside forests (1000 tC02e/y)							
Carbon sink potential - Low - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - Low - Reforest							-17
pasture (1000 tCO2e/y)							
Carbon sink potential - Low - Restore							-109
productivity (1000 tCO2e/y)							
Carbon sink potential - Mid - Accelerate							-41
regeneration (1000 tCO2e/y)							
Carbon sink potential - Mid - All (not							-1,973
counting overlap) (1000 tCO2e/y)							•
Carbon sink potential - Mid - Avoid							-448
deforestation (1000 tCO2e/y)							
Carbon sink potential - Mid - Extend							-801
rotation length (1000 tC02e/y)							001
Carbon sink potential - Mid - Improve							-7.77
plantations (1000 tCO2e/y)							-1.11
Carbon sink potential - Mid - Increase							-240
							-240
retention of HWP (1000 tC02e/y)							0.7
Carbon sink potential - Mid - Increase							-96.7
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - Mid - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - Mid - Reforest							-121
pasture (1000 tCO2e/y)							
Carbon sink potential - Mid - Restore							-217
productivity (1000 tCO2e/y)							
						ll_	

Table 13: E+ scenario - PILLAR 6: Land sinks - Forests (continued)

Table 13: E+ scenario - PILLAR 6: Land sink		·					
Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential -							8.94
High - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							104
High - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							591
High - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							3.84
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 -							13.6
High - Increase trees outside forests							
(1000 hectares)							
Land impacted for carbon sink potential -							0
High - Reforest cropland (1000 hectares)							U
Land impacted for carbon sink potential -							/ 27
·							6.37
High - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							108
High - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -							835
High - Total impacted (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							4.47
Low - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							97.6
Low - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							226
Low - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							1.92
Low - Improve plantations (1000							1.72
hectares)							
Land impacted for carbon sink potential -							0
Low - Increase retention of HWP (1000							U
-							
hectares)							71/
Land impacted for carbon sink potential -							7.16
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 -							1.1
Low - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							65.1
Low - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -							404
Low - Total impacted (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							6.7
Mid - Accelerate regeneration (1000							0.1
hectares)							
Hootal Goj		1				I	

Table 13: E+ scenario - PILLAR 6: Land sinks - I	Forests (continued)	1

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential -							101
Mid - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							408
Mid - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							2.89
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 -							10.4
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 -							7.98
Mid - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							131
Mid - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -							668
Mid - Total impacted (over 30 years) (1000							
hectares)							

# Table 14: E+ scenario - IMPACTS - Fossil fuel industries

Item	2020	2025	2030	2035	2040	2045	2050
Natural gas consumption - Annual (tcf)		215	181	145	109	68.9	47.8
Natural gas consumption - Cumulative							4,381
(tcf)							
Natural gas production - Annual (tcf)		0	0	0	0	0	0
Oil consumption - Annual (million bbls)		52.3	44.4	33	22.4	14.2	7.82
Oil consumption - Cumulative (million							1,024
bbls)							
Oil production - Annual (million bbls)		0	0	0	0	0	0

#### Table 15: E+ scenario - IMPACTS - Health

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019\$)	2020	361	0.581	0.58	0.562	0.335	0.01
Monetary damages from air pollution - Natural Gas (million 2019\$)		224	119	82.9	82.1	54.6	23.3
Monetary damages from air pollution - Transportation (million 2019\$)		995	923	697	399	179	67.5
Premature deaths from air pollution - Coal (deaths)		40.8	0.066	0.065	0.063	0.038	0.001
Premature deaths from air pollution - Natural Gas (deaths)		25.2	13.4	9.36	9.27	6.16	2.63
Premature deaths from air pollution - Transportation (deaths)		112	104	78.3	44.9	20.2	7.59

# Table 16: E+ scenario - IMPACTS - Jobs

2020	2025	2030	2035	2040	2045	2050
	79.2	161	61.4	47.7	35	122
	4,586	5,887	5,803	5,929	5,614	7,066
	2,163	3,528	3,391	3,758	4,876	7,051
	1,037	732	463	271	142	70.8
	2020	79.2 4,586 2,163	79.2 161 4,586 5,887 2,163 3,528	79.2 161 61.4 4,586 5,887 5,803 2,163 3,528 3,391	79.2         161         61.4         47.7           4,586         5,887         5,803         5,929           2,163         3,528         3,391         3,758	79.2     161     61.4     47.7     35       4,586     5,887     5,803     5,929     5,614       2,163     3,528     3,391     3,758     4,876

Table 16: E+ scenario - IMPACTS - Jobs (continued)

By economic sector - Define (jobs)   663   907   885   922   987   1,477   950.3   89   89   89   89   89   89   89   8	Table 16: E+ Scenurio - IMPACTS - Jobs (Co							
By economic sector - Professional (jobs)   262   252   171   124   779   50.3   By economic sector - Trade (jobs)   1,973   2,470   2,382   2,473   2,388   3,228   By economic sector - Trade (jobs)   1,461   1,702   1,677   1,647   1,646   2,201   By economic sector - Utilities (jobs)   3,810   4,406   5,113   5,821   5,367   6,156   By education level - All sectors - 4,997   6,340   6,404   6,638   6,872   8,885   Associates degree or some college (jobs)   89 education level - All sectors - 10,800   116   137   126   127   123   163   163   169   164   164   175   175   17		2020	2025	2030	2035	2040	2045	2050
By economic sector - Professional (jobs)   1973   2,470   2,382   2,473   2,388   3,228   By economic sector - Trade (jobs)   1,461   1,702   1,627   1,647   1,616   2,201   1,616   2,001   1,616								
By economic sector - Trade (jobs)	,							
By economic sector - Utilities (jobs)   3,810   4,406   5,113   5,821   5,367   6,156   By education level - All sectors - 4,997   6,340   6,404   6,838   6,872   8,885   Associates degree or some college (jobs)   3,309   3,996   3,879   4,039   4,054   5,278   3,278   3,278   3,279   4,039   4,054   5,278   3,278   3,279   4,039   4,054   5,278   3,278   3,279   4,039   4,054   5,278   3,278   3,279   4,039   4,054   5,278   3,278   3,279   4,039   4,054   5,278   3,278   3,279   4,039   4,054   5,278   3,279   4,039   4,054   5,278   3,278   3,279   4,039   4,054   5,278   3,278   3,279   4,039   4,054   5,278   3,278   3,279   4,039   4,054   5,278   3,278   3,279   4,039   4,054   5,278   3,279   4,039   4,054   5,278   3,279   4,039   4,054   5,278   3,279   4,039   4,054   5,278   3,279   4,039   4,054   5,278   3,279   4,039   4,054   5,278   3,279   4,039   4,054   5,278   3,279   4,039   4,054   5,278   4,039   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,054   4,039   4,039   4,054   4,039								
By education level - All sectors - Associates degree or some college (jobs)	,							
Associates degree or some college (jobs) By education level - All sectors - Bachelors degree (jobs) By education level - All sectors - Doctoral degree (jobs) By education level - All sectors - Doctoral degree (jobs) By education level - All sectors - High Sy esource sector - Biomass (jobs) Sy esource sector - Biomass (jobs) Sy resource sector - Biomass (jobs) Sy resource sector - Coal (jobs) Sy resource sector - Coal (jobs) Sy resource sector - Natural Gas (jobs) Sy resource sector - Natural Gas (jobs) Sy resource sector - Nuclear (	*							
By education level - All sectors -   3,309   3,996   3,879   4,039   4,054   5,278   Bachelors degree (jobs)     116   137   126   127   123   163			4,997	6,340	6,404	6,838	6,872	8,885
Bachelors degree (jobs)   16   137   126   127   123   163   163   169   120   127   123   163   169   120   127   123   163   169   120   127   123   163   169   120   127   123   163   169   120   127   128   163   128   128   120   128			3 300	2 004	2 070	/ <sub>1</sub> 030	/. 05/.	5 270
By education level - All sectors - Doctoral degree (jobs)   By education level - All sectors - High school diploma or less (jobs)   By education level - All sectors - High school diploma or less (jobs)   By education level - All sectors - Masters   800   958   932   969   957   1,245   By education level - All sectors - Masters   800   958   932   969   957   1,245   By education level - All sectors - Masters   800   958   932   969   957   1,245   By resource sector - CO2 (jobs)   340   443   175   143   128   520   By resource sector - CO2 (jobs)   0   258   0,7   1,78   1,77   1,31   By resource sector - CO3 (jobs)   54.1   0   0   0   0   0   0   By resource sector - Natural Gas (jobs)   2,665   2,096   1,726   2,137   1,462   950   By resource sector - Natural Gas (jobs)   2,665   2,096   1,726   2,137   1,462   950   By resource sector - Natural Gas (jobs)   2,327   1,811   1,242   785   463   240   By resource sector - Oil (jobs)   5,521   7,776   6,104   6,253   7,768   10,627   By resource sector - Solar (jobs)   5,521   7,776   6,104   6,253   7,768   10,627   By resource sector - Wind (jobs)   111   1,200   1,735   1,597   1,519   3,191   Median wages - Annual - All (\$2019 per   69,495   69,357   70,702   71,735   71,921   72,238   job)   0n-Site or In-Plant Training - Total jobs - 1   2,614   3,286   3,307   3,513   3,505   4,507   to 4 years (jobs)   0n-Site or In-Plant Training - Total jobs - 2,611   3,278   3,205   3,361   3,399   4,455   None (jobs)   0n-Site or In-Plant Training - Total jobs - 3,400   1,764   1,764   1,764   1,764   1,765   1,765   Dn-Site or In-Plant Training - Total jobs - 3,500   3,369   4,229   4,263   4,533   4,510   5,780   years (jobs)   0n-Site or In-Plant Training - Total jobs - 3,500   3,369   4,229   4,263   4,533   4,510   5,780   years (jobs)   0n-Site or In-Plant Training - Total jobs - 3,500   3,369   4,229   4,263   4,533   4,510   5,780   years (jobs)   0n-Site or In-Plant Training - Total jobs - 3,500   3,369   3,369   3,360   3,369   3,360   3,369   3,360			3,309	3,990	3,019	4,039	4,054	5,216
degree [jobs]   Py education level - All sectors - High school diploma or less (jobs)   Sy education level - All sectors - Masters or professional degree [jobs]   Sy education level - All sectors - Masters or professional degree [jobs]   Sy resource sector - Giorass (jobs)   Sy resource sector - Giorass (jobs)   Sy resource sector - Coal (jobs)   Sy resource sector - Giorass (jobs)   Sy resource sector - Coal (jobs)   Sy resource sector - Nuclear (jobs)   Sy resource sector - Wind (jobs)   Sy resource sector - Solar (jobs)   Sy resource sector - Wind (jobs			116	137	126	127	123	163
By education level - All sectors - High school diploma or less (jobs)   Sy education level - All sectors - Masters or professional degree (jobs)   Sy education level - All sectors - Masters or professional degree (jobs)   Sy resource sector - Biomass (jobs)   340	•		110	101	120	121	125	100
School diploma or less (jobs)   Sy education level - All sectors - Masters or professional degree (jobs)   Sy resource sector - Col (jobs)   O			6.761	8.613	8.557	9.022	9.096	11.851
By education level - All sectors - Masters or professional degree (jobs)   Sy resource sector - Biomass (jobs)   340   443   175   143   128   520   By resource sector - Giomass (jobs)   0   258   0.7   1.78   1.77   1.31   By resource sector - CO2 (jobs)   0   258   0.7   1.78   1.77   1.31   By resource sector - CO2 (jobs)   0   0   0   0   0   0   By resource sector - Grid (jobs)   3,873   5,650   8,553   10,078   9,742   11,892   By resource sector - Nuclear (jobs)   1,092   889   361   0   0   0   0   By resource sector - Nuclear (jobs)   1,092   889   361   0   0   0   0   By resource sector - Nuclear (jobs)   2,237   1,811   1,242   785   463   240   By resource sector - Vind (jobs)   5,521   7,776   6,104   6,253   7,768   10,627   By resource sector - Wind (jobs)   111   1,120   1,735   1,597   1,519   3,191   Median wages - Annual - All (\$2019 per   69,495   69,357   70,702   71,735   71,921   72,238   job)   0n-Site or In-Plant Training - Total jobs - 1   2,614   3,286   3,307   3,513   3,505   4,507   0n-Site or In-Plant Training - Total jobs - 4   1,100   1,358   1,377   1,462   1,406   1,764   to 10 years (jobs)   134   171   176   191   189   240   0n-Site or In-Plant Training - Total jobs - 4   1,100   1,358   1,377   1,462   1,406   1,764   to 10 years (jobs)   1,402   1,406   1,764   0n-Site or In-Plant Training - Total jobs - 4   1,100   1,358   1,377   1,462   1,406   1,764   to 10 years (jobs)   1,402   1,406   1,764   0n-Site or In-Plant Training - Total jobs - 4   1,406   1,764   to 10 years (jobs)   1,402   1,406   1,406   0n-Site or In-Plant Training - Total jobs - 4   1,406   1,764   to 10 years (jobs)   1,402   1,406   1,406   0n-Site or In-Plant Training - Total jobs - 4   1,406   1,406   1,406   0n-Site or In-Plant Training - Total jobs - 4   1,406   1,406   0n-Site or In-Plant Training - Total jobs - 4   1,406   1,406   0n-Site or In-Plant Training - Total jobs - 4   1,406   1,406   0n-Site or In-Plant Training - Total jobs - 4   1,406   1,406   0n-Site or In-Plant Training - Tot	,		5,.5.	3,5.5	3,33	7,022	7,070	,00.
Dry professional degree (jobs)   340			800	958	932	969	957	1.245
By resource sector - Biomass (jobs)   340   443   175   143   128   520   By resource sector - CO2 (jobs)   0   258   0.7   1.78   1.77   1.31   By resource sector - CO2 (jobs)   54.1   0   0   0   0   0   0   By resource sector - Goid (jobs)   3,873   5,650   8,553   10,078   9,742   11,892   By resource sector - Natural Gas (jobs)   2,665   2,096   1,726   2,137   1,482   950   By resource sector - Nuclear (jobs)   1,092   889   361   0   0   0   0   By resource sector - Nuclear (jobs)   2,327   1,811   1,242   785   463   240   By resource sector - Oil (jobs)   2,327   1,811   1,242   785   463   240   By resource sector - Wind (jobs)   111   1,120   1,735   1,597   1,519   3,191   Median wages - Annual - All (\$2019 per   69,495   69,357   70,702   71,735   71,921   72,238   job)   0n-Site or In-Plant Training - Total jobs - 1   2,614   3,286   3,307   3,513   3,505   4,507   to 4 years (jobs)   0n-Site or In-Plant Training - Total jobs - 4   1,100   1,358   1,377   1,462   1,406   1,764   to 10 years (jobs)   0n-Site or In-Plant Training - Total jobs - 2,611   3,278   3,205   3,361   3,399   4,455   None (jobs)   0n-Site or In-Plant Training - Total jobs - 2,611   3,278   3,205   3,361   3,399   4,455   None (jobs)   0n-Site or In-Plant Training - Total jobs - 2,611   3,278   3,205   3,361   3,399   4,455   None (jobs)   0n-Site or In-Plant Training - Total jobs - 2,611   3,278   3,205   3,361   3,399   4,455   None (jobs)   0n-Site or In-Plant Training - Total jobs - 2,611   3,278   3,205   3,361   3,399   4,455   None (jobs)   0n-Site or In-Plant Training - Total jobs - 2,611   3,278   3,205   3,361   3,399   4,455   None (jobs)   0n-Site or In-Plant Training - Total jobs - 2,611   3,278   3,205   3,361   3,399   4,455   None (jobs)   0n-Site or In-Plant Training - Total jobs - 2,611   3,278   3,205   3,361   3,399   4,455   None (jobs)   0n-Site or In-Plant Training - Total jobs - 2,611   3,399   3,307   3,505   3,505   3,505   3,505   3,505   3,505   3,505   3,505   3,505   3,505   3,505   3,505   3,5								.,
By resource sector - CO2 (jobs)   0   258   0.7   1.78   1.77   1.31			340	443	175	143	128	520
By resource sector - Grid (jobs)   3,873   5,650   8,553   10,078   9,742   11,892   By resource sector - Natural Gas (jobs)   2,665   2,096   1,726   2,137   1,482   950   By resource sector - Nuclear (jobs)   1,092   889   3,61   0   0   0   0   0   By resource sector - Oil (jobs)   2,327   1,811   1,242   785   463   240   240   By resource sector - Solar (jobs)   5,521   7,776   6,104   6,253   7,768   10,627   By resource sector - Solar (jobs)   111   1,120   1,735   1,597   1,519   3,191   Median wages - Annual - All (\$2019 per   69,495   69,357   70,702   71,735   71,921   72,238   job)   0n-Site or In-Plant Training - Total jobs - 1   2,614   3,286   3,307   3,513   3,505   4,507   to 4 years (jobs)   0n-Site or In-Plant Training - Total jobs - 4   1,100   1,358   1,377   1,462   1,406   1,764   to 10 years (jobs)   0n-Site or In-Plant Training - Total jobs - None (jobs)   0n-Site or In-Plant Training - Total jobs - 1   3,278   3,205   3,361   3,399   4,455   0,507   0,508   0,508   0,508   0,509			0	258	0.7	1.78	1.77	1.31
By resource sector - Natural Gas (jobs)   2,665   2,096   1,726   2,137   1,482   950	By resource sector - Coal (jobs)		54.1	0	0	0	0	0
By resource sector - Nuclear (jobs)   1,092   889   361   0   0   0   0	By resource sector - Grid (jobs)		3,873	5,650	8,553	10,078	9,742	11,892
By resource sector - Oil (jobs)   2,327   1,811   1,242   785   463   240	By resource sector - Natural Gas (jobs)		2,665	2,096	1,726	2,137	1,482	950
By resource sector - Solar (jobs)   5,521   7,776   6,104   6,253   7,768   10,627	By resource sector - Nuclear (jobs)		1,092	889	361	0	0	0
By resource sector - Wind (jobs)	By resource sector - Oil (jobs)		2,327	1,811	1,242	785	463	240
Median wages - Annual - All [\$2019 per job]   169,495   69,357   70,702   71,735   71,921   72,238   job   1	By resource sector - Solar (jobs)		5,521				7,768	10,627
Dot-  Site or In-Plant Training - Total jobs - 1	By resource sector - Wind (jobs)		111	1,120	1,735	1,597	1,519	3,191
On-Site or In-Plant Training - Total jobs - 1 to 4 years (jobs)         2,614         3,286         3,307         3,513         3,505         4,507 to 4 years (jobs)           On-Site or In-Plant Training - Total jobs - 4 to 10 years (jobs)         1,100         1,358         1,377         1,462         1,406         1,764 to 10 years (jobs)           On-Site or In-Plant Training - Total jobs - None (jobs)         2,611         3,278         3,205         3,361         3,399         4,455           On-Site or In-Plant Training - Total jobs - Over 10 years (jobs)         134         171         176         191         189         240           On-Site or In-Plant Training - Total jobs - Over 10 years (jobs)         9,524         11,950         11,832         12,469         12,603         16,456           Up to 1 year (jobs)         0n-the-Job Training - All sectors - 1 to 4         3,369         4,229         4,263         4,533         4,510         5,780           On-the-Job Training - All sectors - 4 to 10 years (jobs)         1,076         1,339         1,368         1,458         1,400         1,755           On-the-Job Training - All sectors - None (jobs)         162         206         197         204         210         277           Vears (jobs)         10,485         13,168         13,004         13,696	Median wages - Annual - All (\$2019 per		69,495	69,357	70,702	71,735	71,921	72,238
to 4 years (jobs)         1,100         1,358         1,377         1,462         1,406         1,764           to 10 years (jobs)         2,611         3,278         3,205         3,361         3,399         4,455           None (jobs)         3,321         3,278         3,205         3,361         3,399         4,455           None (jobs)         0n-Site or In-Plant Training - Total jobs - Over 10 years (jobs)         134         171         176         191         189         240           Over 10 years (jobs)         0n-Site or In-Plant Training - Total jobs - Over 10 years (jobs)         134         171         176         191         189         240           On-site or In-Plant Training - Total jobs - Over 10 years (jobs)         9,524         11,950         11,832         12,469         12,603         16,456           Up to 1 years (jobs)         0n-the-Job Training - All sectors - 1 to 4         3,369         4,229         4,263         4,533         4,510         5,780           years (jobs)         0n-the-Job Training - All sectors - 4 to 10         1,076         1,339         1,368         1,458         1,400         1,755           years (jobs)         0n-the-Job Training - All sectors - Over 10         162         206         197         204         210								
On-Site or In-Plant Training - Total jobs - 4 to 10 years (jobs)         1,100         1,358         1,377         1,462         1,406         1,764 to 10 years (jobs)           On-Site or In-Plant Training - Total jobs - None (jobs)         2,611         3,278         3,205         3,361         3,399         4,455           On-Site or In-Plant Training - Total jobs - Over 10 years (jobs)         134         171         176         191         189         240           On-Site or In-Plant Training - Total jobs - Over 10 years (jobs)         9,524         11,950         11,832         12,469         12,603         16,456           On-the-Job Training - All sectors - 1 to 4 years (jobs)         3,369         4,229         4,263         4,533         4,510         5,780           On-the-Job Training - All sectors - 4 to 10 years (jobs)         1,076         1,339         1,368         1,458         1,400         1,755           On-the-Job Training - All sectors - None (jobs)         891         1,101         1,066         1,104         1,112         1,463           On-the-Job Training - All sectors - Over 10 years (jobs)         10,485         13,168         13,004         13,696         13,870         18,147           Related work experience - All sectors - 1 to 4 years (jobs)         5,753         7,164         7,115	= = =		2,614	3,286	3,307	3,513	3,505	4,507
to 10 years (jobs) On-Site or In-Plant Training - Total jobs - None (jobs) On-Site or In-Plant Training - Total jobs - Over 10 years (jobs) On-Site or In-Plant Training - Total jobs - Over 10 years (jobs) On-Site or In-Plant Training - Total jobs - Over 10 years (jobs) On-Site or In-Plant Training - Total jobs - Up to 1 year (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 - None (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 - Up to 1 years (jobs) On-the-Job Training - All sectors - Up to 1 years (jobs) On-the-Job Training - All sectors - Up to 1 years (jobs) On-the-Job Training - All sectors - Up to 1 years (jobs) On-the-Job Training - All sectors - Up to 1 years (jobs) On-the-Job Training - All sectors - Up to 1 years (jobs) On-the-Job Training - All sectors - Up 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 Related work experience - All sectors - 992 1,238 1,227 1,296 1,318 1,713								
On-Site or In-Plant Training - Total jobs - None (jobs)         2,611         3,278         3,205         3,361         3,399         4,455           None (jobs)         134         171         176         191         189         240           Over 10 years (jobs)         0n-Site or In-Plant Training - Total jobs - Up to 1 year (jobs)         9,524         11,950         11,832         12,469         12,603         16,456           Up to 1 year (jobs)         0n-the-Job Training - All sectors - 1 to 4 years (jobs)         3,369         4,229         4,263         4,533         4,510         5,780           On-the-Job Training - All sectors - 4 to 10 years (jobs)         1,076         1,339         1,368         1,458         1,400         1,755           On-the-Job Training - All sectors - None (jobs)         891         1,101         1,066         1,104         1,112         1,463           On-the-Job Training - All sectors - Over 10 years (jobs)         162         206         197         204         210         277           Related work experience - All sectors - 1 to 4 years (jobs)         3,727         4,633         4,616         4,881         4,875         6,284           To 10 years (jobs)         2,301         2,900         2,900         3,076         3,078         3,991     <			1,100	1,358	1,377	1,462	1,406	1,764
None (jobs)								
On-Site or In-Plant Training - Total jobs - Over 10 years (jobs)         134         171         176         191         189         240           On-Site or In-Plant Training - Total jobs - Up to 1 year (jobs)         9,524         11,950         11,832         12,469         12,603         16,456           Up to 1 year (jobs)         0n-the-Job Training - All sectors - 1 to 4 years (jobs)         3,369         4,229         4,263         4,533         4,510         5,780           On-the-Job Training - All sectors - 4 to 10 years (jobs)         1,076         1,339         1,368         1,458         1,400         1,755           On-the-Job Training - All sectors - None (jobs)         891         1,101         1,066         1,104         1,112         1,463           In-the-Job Training - All sectors - Over 10 years (jobs)         162         206         197         204         210         277           Related work experience - All sectors - Up to 1 years (jobs)         10,485         13,168         13,004         13,696         13,870         18,147           Related work experience - All sectors - 1 to 4 years (jobs)         5,753         7,164         7,115         7,504         7,518         9,742           to 10 years (jobs)         80,000         2,900         3,076         3,078         3,991	= = =		2,611	3,278	3,205	3,361	3,399	4,455
Over 10 years (jobs)         9,524         11,950         11,832         12,469         12,603         16,456           Up to 1 year (jobs)         0n-the-Job Training - All sectors - 1 to 4 years (jobs)         3,369         4,229         4,263         4,533         4,510         5,780           On-the-Job Training - All sectors - 4 to 10 years (jobs)         1,076         1,339         1,368         1,458         1,400         1,755           On-the-Job Training - All sectors - None (jobs)         891         1,101         1,066         1,104         1,112         1,463           (jobs)         0n-the-Job Training - All sectors - Over 10 years (jobs)         10,485         13,168         13,004         13,696         13,870         18,147           Year (jobs)         10,485         13,168         13,004         13,696         13,870         18,147           Year (jobs)         10,485         13,168         13,004         13,696         13,870         18,147           Year (jobs)         10,485         13,168         13,004         13,696         13,870         18,147           Related work experience - All sectors - 1 to 4 years (jobs)         5,753         7,164         7,115         7,504         7,518         9,742           To 4 years (jobs) <td< td=""><td></td><td></td><td>12.</td><td></td><td></td><td>101</td><td>100</td><td></td></td<>			12.			101	100	
On-Site or In-Plant Training - Total jobs - Up to 1 year (jobs)         9,524         11,950         11,832         12,469         12,603         16,456           Up to 1 year (jobs)         On-the-Job Training - All sectors - 1 to 4 years (jobs)         3,369         4,229         4,263         4,533         4,510         5,780           On-the-Job Training - All sectors - 4 to 10 (jobs)         1,076         1,339         1,368         1,458         1,400         1,755           On-the-Job Training - All sectors - None (jobs)         891         1,101         1,066         1,104         1,112         1,463           On-the-Job Training - All sectors - Over 10 years (jobs)         162         206         197         204         210         277           Vear (jobs)         10,485         13,168         13,004         13,696         13,870         18,147           Year (jobs)         10,485         13,168         13,004         13,696         13,870         18,147           Related work experience - All sectors - 1 to 10 years (jobs)         5,753         7,164         7,115         7,504         7,518         9,742           Related work experience - All sectors - 2 (301         2,900         2,900         3,076         3,078         3,991           None (jobs)         Rel			134	1/1	1/6	191	189	240
Up to 1 year (jobs)			0.507	11.050	11 000	10 / /0	10 (00	1/ / 5/
On-the-Job Training - All sectors - 1 to 4 years (jobs)         3,369         4,229         4,263         4,533         4,510         5,780           On-the-Job Training - All sectors - 4 to 10 years (jobs)         1,076         1,339         1,368         1,458         1,400         1,755           years (jobs)         200         1,101         1,066         1,104         1,112         1,463           (jobs)         1,104         1,112         1,463         1,463         1,104         1,112         1,463           (jobs)         1,104         1,104         1,112         1,463         1,463         1,104         1,112         1,463           (jobs)         1,104         1,112         1,463         1,104         1,112         1,463         1,146         1,104         1,112         1,463         1,146         1,146         1,146			9,524	11,950	11,832	12,469	12,603	16,456
years (jobs)         1,076         1,339         1,368         1,458         1,400         1,755           years (jobs)         0n-the-Job Training - All sectors - None (jobs)         891         1,101         1,066         1,104         1,112         1,463           (jobs)         0n-the-Job Training - All sectors - Over 10 years (jobs)         162         206         197         204         210         277           years (jobs)         10,485         13,168         13,004         13,696         13,870         18,147           year (jobs)         10,485         13,168         13,004         7,150         7,504         7,518         9,742           to 4 years (jobs)         20,000         2,900         3,076         3,078         3,078         3,078         3,078         3,078         3,078         3,078         3,078         3,078         3,078         3,078         3,07			2 240	/, 220	/. 042	/. E22	/, E10	E 700
On-the-Job Training - All sectors - 4 to 10 years (jobs)         1,076         1,339         1,368         1,458         1,400         1,755 years (jobs)           On-the-Job Training - All sectors - None (jobs)         891         1,101         1,066         1,104         1,112         1,463 (jobs)           On-the-Job Training - All sectors - Over 10 years (jobs)         162         206         197         204         210         277 (jobs)           Related work experience - All sectors - Up to 1 years (jobs)         10,485         13,168         13,004         13,696         13,870         18,147 (jobs)           Related work experience - All sectors - 1 to 4 years (jobs)         5,753         7,164         7,115         7,504         7,518         9,742 (jobs)           Related work experience - All sectors - 4 to 10 years (jobs)         3,727         4,633         4,616         4,881         4,875         6,284 (jobs)           Related work experience - All sectors - 2,301         2,900         2,900         3,076         3,078         3,991 (jobs)           Related work experience - All sectors - 992         1,238         1,227         1,296         1,318         1,713			3,369	4,229	4,203	4,555	4,510	5,160
years (jobs)         891         1,101         1,066         1,104         1,112         1,463           (jobs)         On-the-Job Training - All sectors - Over 10 years (jobs)         162         206         197         204         210         277           years (jobs)         On-the-Job Training - All sectors - Up to 1 year (jobs)         10,485         13,168         13,004         13,696         13,870         18,147           Related work experience - All sectors - 1 to 4 years (jobs)         5,753         7,164         7,115         7,504         7,518         9,742           Related work experience - All sectors - 4 to 10 years (jobs)         3,727         4,633         4,616         4,881         4,875         6,284           Related work experience - All sectors - None (jobs)         2,301         2,900         2,900         3,076         3,078         3,991           Related work experience - All sectors - 992         1,238         1,227         1,296         1,318         1,713			1 076	1 330	1368	1 / 58	17.00	1755
On-the-Job Training - All sectors - None (jobs)         891         1,101         1,066         1,104         1,112         1,463           On-the-Job Training - All sectors - Over 10 years (jobs)         162         206         197         204         210         277           On-the-Job Training - All sectors - Up to 1 year (jobs)         10,485         13,168         13,004         13,696         13,870         18,147           Related work experience - All sectors - 1 to 4 years (jobs)         5,753         7,164         7,115         7,504         7,518         9,742           Related work experience - All sectors - 4 to 10 years (jobs)         3,727         4,633         4,616         4,881         4,875         6,284           Related work experience - All sectors - None (jobs)         2,301         2,900         2,900         3,076         3,078         3,991           Related work experience - All sectors - 992         1,238         1,227         1,296         1,318         1,713			1,010	1,557	1,300	1,430	1,400	1,100
(jobs)       162       206       197       204       210       277         years (jobs)       0n-the-Job Training - All sectors - Up to 1 year (jobs)       10,485       13,168       13,004       13,696       13,870       18,147         Related work experience - All sectors - 1 to 4 years (jobs)       5,753       7,164       7,115       7,504       7,518       9,742         Related work experience - All sectors - 4 to 10 years (jobs)       3,727       4,633       4,616       4,881       4,875       6,284         Related work experience - All sectors - None (jobs)       2,301       2,900       2,900       3,076       3,078       3,991         Related work experience - All sectors - 992       1,238       1,227       1,296       1,318       1,713			891	1101	1066	1104	1 112	1 463
On-the-Job Training - All sectors - Over 10 years (jobs)         162         206         197         204         210         277           On-the-Job Training - All sectors - Up to 1 year (jobs)         10,485         13,168         13,004         13,696         13,870         18,147           Related work experience - All sectors - 1 to 4 years (jobs)         5,753         7,164         7,115         7,504         7,518         9,742           Related work experience - All sectors - 4 to 10 years (jobs)         3,727         4,633         4,616         4,881         4,875         6,284           Related work experience - All sectors - None (jobs)         2,301         2,900         2,900         3,076         3,078         3,991           Related work experience - All sectors - 992         1,238         1,227         1,296         1,318         1,713	_		371	.,	1,000	.,	.,	1, 100
years (jobs)         10,485         13,168         13,004         13,696         13,870         18,147           year (jobs)         Related work experience - All sectors - 1 to 4 years (jobs)         5,753         7,164         7,115         7,504         7,518         9,742           Related work experience - All sectors - 4 to 10 years (jobs)         3,727         4,633         4,616         4,881         4,875         6,284           Related work experience - All sectors - None (jobs)         2,301         2,900         2,900         3,076         3,078         3,991           Related work experience - All sectors - None (jobs)         992         1,238         1,227         1,296         1,318         1,713			162	206	197	204	210	277
On-the-Job Training - All sectors - Up to 1 year (jobs)         10,485         13,168         13,004         13,696         13,870         18,147           Related work experience - All sectors - 1 to 4 years (jobs)         5,753         7,164         7,115         7,504         7,518         9,742           Related work experience - All sectors - 4 to 10 years (jobs)         3,727         4,633         4,616         4,881         4,875         6,284           Related work experience - All sectors - None (jobs)         2,301         2,900         2,900         3,076         3,078         3,991           Related work experience - All sectors - 992         1,238         1,227         1,296         1,318         1,713	=							
year (jobs)       5,753       7,164       7,115       7,504       7,518       9,742         to 4 years (jobs)       8       3,727       4,633       4,616       4,881       4,875       6,284         to 10 years (jobs)       8       2,301       2,900       2,900       3,076       3,078       3,991         None (jobs)       992       1,238       1,227       1,296       1,318       1,713			10,485	13,168	13,004	13,696	13,870	18,147
to 4 years (jobs)  Related work experience - All sectors - 4 to 10 years (jobs)  Related work experience - All sectors - 2,301 2,900 2,900 3,076 3,078 3,991  None (jobs)  Related work experience - All sectors - 992 1,238 1,227 1,296 1,318 1,713								•
Related work experience - All sectors - 4 to 10 years (jobs)       3,727       4,633       4,616       4,881       4,875       6,284         Related work experience - All sectors - None (jobs)       2,301       2,900       2,900       3,076       3,078       3,991         Related work experience - All sectors - 992       1,238       1,227       1,296       1,318       1,713			5,753	7,164	7,115	7,504	7,518	9,742
to 10 years (jobs)  Related work experience - All sectors - 2,301 2,900 2,900 3,076 3,078 3,991  None (jobs)  Related work experience - All sectors - 992 1,238 1,227 1,296 1,318 1,713								
Related work experience - All sectors - None (jobs)       2,301       2,900       2,900       3,076       3,078       3,991         Related work experience - All sectors - 992       1,238       1,227       1,296       1,318       1,713	Related work experience - All sectors - 4		3,727	4,633	4,616	4,881	4,875	6,284
None (jobs)         992         1,238         1,227         1,296         1,318         1,713								
Related work experience - All sectors - 992 1,238 1,227 1,296 1,318 1,713	Related work experience - All sectors -		2,301	2,900	2,900	3,076	3,078	3,991
0			992	1,238	1,227	1,296	1,318	1,713
	Over 10 years (jobs)							
			3,210	4,110	4,040	4,238	4,314	5,692
to 1 year (jobs)					4 : ==			
Wage income - All (million \$2019) 1,111 1,390 1,407 1,506 1,518 1,981	Wage income - All (million \$2019)		1,111	1,390	1,407	1,506	1,518	1,981

Table 17: E- scenario - PILLAR 1: Efficiency/Electrification - Commercial

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s -		7,079	7,740				
Cumulative 5-yr (million \$2018)							
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
Sales of space heating units - Electric	4.76	7.71	11	20.9	40.9	61.8	73
Heat Pump (%)							
Sales of space heating units - Electric	2.29	2.3	3.61	7.63	14.2	19.1	21
Resistance (%)							
Sales of space heating units - Fossil (%)	42.2	36.1	33.8	25.4	12.4	3.94	1.03
Sales of space heating units - Gas Furnace	50.7	53.9	51.7	46	32.5	15.2	4.94
(%)							
Sales of water heating units - Electric	2.81	2.92	4.33	9.01	20.1	33.9	42
Heat Pump (%)							
Sales of water heating units - Electric	13.8	12	13	17.7	28.2	41.2	48.8
Resistance (%)							
Sales of water heating units - Gas Furnace	78.2	80.8	78.7	69.9	49.2	23	7.51
(%)							
Sales of water heating units - Other (%)	5.24	4.31	3.95	3.35	2.49	1.86	1.68

Table 18: E- scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -		0.975	0.97	1.63	1.7	3.09	3.32
Cumulative 5-yr (billion \$2018)							

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

	,, =						
Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	120	114	111	108	105	101	96.5
Final energy use - Industry (PJ)	64.9	63.5	62.9	62.4	62.9	63.5	63.2
Final energy use - Residential (PJ)	155	144	135	128	118	105	91.1
Final energy use - Transportation (PJ)	228	214	195	179	167	152	134

Table 20: E- scenario - PILLAR 1: Efficiency/Electrification - Residential

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs.		3.14	3.73				
REF - Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric	71.7	72.5	75.1	81.9	91.4	97.2	99.2
Resistance (%)							
Sales of cooking units - Gas (%)	28.3	27.5	24.9	18.1	8.64	2.79	0.75
Sales of space heating units - Electric	7.5	7.1	12.5	28.5	55.7	78.2	88.3
Heat Pump (%)							
Sales of space heating units - Electric	4.92	6.49	6.23	5.8	4.6	2.99	2.13
Resistance (%)							
Sales of space heating units - Fossil (%)	53.1	66.3	61.9	48.5	27.6	13.1	7.61
Sales of space heating units - Gas (%)	34.4	20.1	19.4	17.2	12.1	5.68	1.98
Sales of water heating units - Electric	0	0.484	1.83	6.09	15.2	25.5	31.2
Heat Pump (%)							
Sales of water heating units - Electric	35.5	53.7	54.4	56.4	60.1	63.5	65.2
Resistance (%)							
Sales of water heating units - Gas Furnace	46.8	33.9	32.8	29.2	20.5	9.58	3.12
(%)							
Sales of water heating units - Other (%)	17.6	11.9	11	8.3	4.13	1.41	0.461

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

Item	2020	2025	2030	2035	2040	2045	2050
Light-duty vehicle capital costs -		0	91	186	634	1,979	2,888
Cumulative 5-yr (million \$2018)							
Public EV charging plugs - DC Fast (1000	0.229		0.29		1.39		3.84
units)							
Public EV charging plugs - L2 (1000 units)	0.794		6.97		33.5		92.2
Vehicle sales - Heavy-duty - diesel (%)	97.4	96	91.3	79.8	58.2	32.1	13.7
Vehicle sales - Heavy-duty - EV (%)	0.498	1.45	4.11	10.8	23.6	39.5	51
Vehicle sales - Heavy-duty - gasoline (%)	0.228	0.236	0.239	0.225	0.179	0.109	0.051
Vehicle sales - Heavy-duty - hybrid (%)	0.083	0.094	0.104	0.107	0.092	0.06	0.03
Vehicle sales - Heavy-duty - hydrogen FC	0.332	0.969	2.74	7.17	15.7	26.3	34
(%)							
Vehicle sales - Heavy-duty - other (%)	1.5	1.28	1.46	1.95	2.25	1.96	1.14
Vehicle sales - Light-duty - diesel (%)	1.33	1.78	2.01	1.59	0.999	0.509	0.219
Vehicle sales - Light-duty - EV (%)	2.17	5.3	13.1	27.8	50.5	73.4	88.1
Vehicle sales - Light-duty - gasoline (%)	90.9	86.3	77.7	64.2	43.8	23.4	10.4
Vehicle sales - Light-duty - hybrid (%)	5.4	6.17	6.83	6.1	4.45	2.56	1.22
Vehicle sales - Light-duty - hydrogen FC	0.112	0.373	0.312	0.234	0.163	0.089	0.042
(%)							
Vehicle sales - Light-duty - other (%)	0.093	0.096	0.086	0.074	0.053	0.029	0.013
Vehicle sales - Medium-duty - diesel (%)	64.8	62.2	57.7	49.4	35.6	19.6	8.37
Vehicle sales - Medium-duty - EV (%)	0.664	1.94	5.49	14.3	31.4	52.6	68
Vehicle sales - Medium-duty - gasoline (%)	33.8	34.7	34.7	31.9	24.4	14.2	6.33
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.418	0.464	0.478	0.414	0.275	0.141
Vehicle sales - Medium-duty - hydrogen	0.166	0.485	1.37	3.58	7.86	13.2	17
FC (%)							
Vehicle sales - Medium-duty - other (%)	0.253	0.266	0.279	0.286	0.258	0.184	0.102

Table 22: E- scenario - PILLAR 6: Land sinks - Agriculture

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive							0
deployment - Corn-ethanol to energy							
grasses (1000 tCO2e/y)							
Carbon sink potential - Aggressive							-79
deployment - Cropland measures (1000							
tCO2e/y)							
Carbon sink potential - Aggressive							-3.14
deployment - Permanent conservation							
cover (1000 tC02e/y)							
Carbon sink potential - Aggressive							-82.1
deployment - Total (1000 tCO2e/y)							
Carbon sink potential - Moderate							0
deployment - Corn-ethanol to energy							
grasses (1000 tC02e/y)							
Carbon sink potential - Moderate							-41.5
deployment - Cropland measures (1000							
tCO2e/y)							4.57
Carbon sink potential - Moderate							-1.57
deployment - Permanent conservation							
cover (1000 tCO2e/y)  Carbon sink potential - Moderate							-43.1
=							-43.1
deployment - Total (1000 tC02e/y) Land impacted for carbon sink -							0
Aggressive deployment - Corn-ethanol to							U
energy grasses (1000 hectares)							
Land impacted for carbon sink -							54.5
Aggressive deployment - Cropland							54.5
measures (1000 hectares)							
Land impacted for carbon sink -		-			-		5.72
Aggressive deployment - Permanent							0.12
conservation cover (1000 hectares)							

Table 22: E- scenario - PILLAR 6: Land sinks - Agriculture (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink -							60.2
Aggressive deployment - Total (1000							
hectares)							
Land impacted for carbon sink - Moderate							0
deployment - Corn-ethanol to energy							
grasses (1000 hectares)							
Land impacted for carbon sink - Moderate							28.7
deployment - Cropland measures (1000							
hectares)							
Land impacted for carbon sink - Moderate							2.86
deployment - Permanent conservation							
cover (1000 hectares)							
Land impacted for carbon sink - Moderate							31.5
deployment - Total (1000 hectares)							

Table 23: E- scenario - PILLAR 6: Land sinks - Forests

<del>-</del> .	s - Forests	000-	0000	000-	2012	00:-	
Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Accelerate							-54.6
regeneration (1000 tC02e/y)							
Carbon sink potential - High - All (not							-3,043
counting overlap) (1000 tC02e/y)							
Carbon sink potential - High - Avoid							-768
deforestation (1000 tCO2e/y)							
Carbon sink potential - High - Extend							-1,158
rotation length (1000 tCO2e/y)							
Carbon sink potential - High - Improve							-10.4
plantations (1000 tCO2e/y)							
Carbon sink potential - High - Increase							-360
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - High - Increase							-143
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - High - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - High - Reforest							-224
pasture (1000 tCO2e/y)							
Carbon sink potential - High - Restore							-325
productivity (1000 tCO2e/y)							
Carbon sink potential - Low - Accelerate							-27.4
regeneration (1000 tCO2e/y)							
Carbon sink potential - Low - All (not							-902
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - Low - Avoid							-128
deforestation (1000 tCO2e/y)							
Carbon sink potential - Low - Extend							-445
rotation length (1000 tCO2e/y)							
Carbon sink potential - Low - Improve							-5.3
plantations (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-120
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-50.1
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - Low - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - Low - Reforest							-17
pasture (1000 tC02e/y)							
Carbon sink potential - Low - Restore							-109
productivity (1000 tCO2e/y)							
Carbon sink potential - Mid - Accelerate							-41
regeneration (1000 tCO2e/y)							

Table 23: E- scenario - PILLAR 6: Land sinks - Forests (continued)

	2025	2030	2035	2040	2045	2050
2320	2320		2300	25-10	23-0	-1,973
						•
						-448
						-801
						-7.77
						-240
						-96.7
						0
						-121
						-217
						0.01
						8.94
						10/
						104
						591
						591
						3.84
						3.04
						0
						Ü
						13.6
						0
						6.37
						108
						835
						4.47
						97.6
						226
						1.92
						0
	2020	<u> </u>	, ,	,	· · · · · · · · · · · · · · · · · · ·	S-Forests (continued)  2020 2025 2030 2035 2040 2045

Table 23: E- scenario - PILLAR 6: Land sinks - Forests (continued)

Land impacted for carbon sink potential- Low - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential- Low - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential- Low - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential- Low - Restore productivity (1000 hectares)  Land impacted for carbon sink potential- Low - Total impacted for carbon sink potential- Low - Total impacted (over 30 years) (1000 hectares)  Land impacted for carbon sink potential- Mid - Accelerate regeneration (1000 hectares)  Land impacted for carbon sink potential- Mid - Accelerate regeneration (1000 hectares)  Land impacted for carbon sink potential- Mid - Extend rotation length (1000 hectares)  Land impacted for carbon sink potential- Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential- Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential- Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential- Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential- Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential- Mid - Reforest posture (1000 hectares)  Land impacted for carbon sink potential- Mid - Reforest posture (1000 hectares)  Land impacted for carbon sink potential- Mid - Reforest posture (1000 hectares)  Land impacted for carbon sink potential- Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential- Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential- Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential- Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential- Mid -	Item	2020	2025	2030	2035	2040	2045	2050
(1000 hectares)   Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)   Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)   Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)   Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)   Land impacted for carbon sink potential - Low - Total impacted (over 30 years)   (1000 hectares)   Land impacted for carbon sink potential - Low - Total impacted (over 30 years)   (1000 hectares)   Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)   Land impacted for carbon sink potential - Mid - Mid - Low -	Land impacted for carbon sink potential -							7.16
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)	Low - Increase trees outside forests							
Low - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares) Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Mid - Reforest poductivity (1000 hectares) Land impacted for carbon sink potential - Mid - Reforest possible for carbon sink potential - Mid - Reforest possible for carbon sink potential - Mid - Restorest possible for carbon sink potential - Mid - Restorest possible for carbon sink potential - Mid - Restorest possible for carbon sink potential - Mid - Restorest possible for carbon sink potential - Mid - Restorest possible for carbon sink potential - Mid - Restorest possible for carbon sink potential - Mid - Restorest possible for carbon sink potential - Mid - Restorest possible for carbon sink potential - Mid - Restorest possible for carbon sink potential - Mid - Restorest possible for carbon sink	(1000 hectares)							
Land impacted for carbon sink potential - Low - Reforest spasture (1000 hectares) Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares) Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Mid - Increase reteres outside forests (1000 hectares) Land impacted for carbon sink potential - Mid - Increase reteres outside forests (1000 hectares) Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - Mid - Restorest cropland (1000 hectares) Land impacted for carbon sink potential - Mid - Restorest cropland (1000 hectares) Land impacted for carbon sink potential - Mid - Restorest cropland (1000 hectares) Land impacted for carbon sink potential - Mid - Restorest cropland (1000 hectares) Land impacted for carbon sink potential - Mid - Restorest cropland (1000 hectares) Land impacted for carbon sink potential - Mid - Restorest carbon sink	Land impacted for carbon sink potential -							0
Low - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)  Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)  Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)  Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)  Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)  Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000) hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000)	Low - Reforest cropland (1000 hectares)							
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)  Land impacted (over 30 years) (1000 hectares)  Land impacted (over 30 years) (1000 hectares)  Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)  Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)  Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)  Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)  Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)	Land impacted for carbon sink potential -							1.1
Low - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)  Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)  Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)  Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)  Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retension of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total	Low - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)   Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)   Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)   Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)   Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)   Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)   Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)   Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)   Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)   Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)   Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)   Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)   Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)   Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)   Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)   Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)   Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)   Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)   Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)   Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)   Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)   Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)   Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)   Land i	Land impacted for carbon sink potential -							65.1
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) [1000 hectares)  Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)  Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) [1000 hectares]  Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) [1000 hectares]  Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential -	Low - Restore productivity (1000							
Low - Total impacted (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares) Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares) Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares) Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares) Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)	hectares)							
Committee   Comm	Land impacted for carbon sink potential -							404
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)  Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)  Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)  Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restorest posture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restorest posture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restorest posture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)	Low - Total impacted (over 30 years)							
Mid - Accelerate regeneration (1000 hectares)  Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)  Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)  Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000								
hectares) Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)  Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)  Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000	Land impacted for carbon sink potential -							6.7
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)  Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)  Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Improve plantations of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000	Mid - Accelerate regeneration (1000							
Mid - Avoid deforestation (over 30 years) (1000 hectares)  Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)  Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000	hectares)							
Compared for carbon sink potential - Mid - Extend rotation length (1000 hectares)   Compared for carbon sink potential - Mid - Extend rotation length (1000 hectares)   Compared for carbon sink potential - Mid - Improve plantations (1000 hectares)   Compared for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)   Compared for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)   Compared for carbon sink potential - Mid - Reforest cropland (1000 hectares)   Compared for carbon sink potential - Mid - Reforest pasture (1000 hectares)   Compared for carbon sink potential - Mid - Reforest pasture (1000 hectares)   Compared for carbon sink potential - Mid - Restore productivity (1000 hectares)   Compared for carbon sink potential - Mid - Restore productivity (1000 hectares)   Compared for carbon sink potential - Mid - Restore productivity (1000 hectares)   Compared for carbon sink potential - Mid - Restore productivity (1000 hectares)   Compared for carbon sink potential - Mid - Restore productivity (1000 hectares)   Compared for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)   Compared for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)   Compared for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)   Compared for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)   Compared for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for carbon sink potential - Mid - Total impacted for ca								101
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)  Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000	Mid - Avoid deforestation (over 30 years)							
Mid - Extend rotation length (1000 hectares)  Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000								
hectares)  Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000	Land impacted for carbon sink potential -							408
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000								
Mid - Improve plantations (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000	•							
Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000)								2.89
Mid - Increase retention of HWP (1000 hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000								
hectares)  Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000	Land impacted for carbon sink potential -							0
Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000	Mid - Increase retention of HWP (1000							
Mid - Increase trees outside forests (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000								
hectares)  Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000								10.4
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000	Mid - Increase trees outside forests (1000							
Mid - Reforest cropland (1000 hectares)  Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000	•							
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000								0
Mid - Reforest pasture (1000 hectares)  Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000								
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000								7.98
Mid - Restore productivity (1000 hectares)  Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)								
hectares) Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000								131
Land impacted for carbon sink potential - 668 Mid - Total impacted (over 30 years) (1000	Mid - Restore productivity (1000							
Mid - Total impacted (over 30 years) (1000								
	Land impacted for carbon sink potential -							668
hectares)								
	hectares)							

Table 24: E- scenario - IMPACTS - Health

2045 0.335	2050 0.01
0.335	0.01
4.81	5.98
695	473
0.038	0.001
0.543	0.675
78.2	53.2
_	695 0.038 0.543

Table 25: E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Commercial

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s -		7,080	7,732				
Cumulative 5-yr (million \$2018)							
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
Sales of space heating units - Electric	4.76	11	39.3	72.4	77.8	78.1	78.1
Heat Pump (%)							
Sales of space heating units - Electric	2.29	4.46	16.5	21.3	21.9	21.9	21.9
Resistance (%)							
Sales of space heating units - Fossil (%)	42.2	31.2	5.99	0.253	0	0	0
Sales of space heating units - Gas Furnace	50.7	53.4	38.2	6.11	0.363	0	0
(%)							
Sales of water heating units - Electric	2.81	3.52	15.9	41	45.5	45.9	45.9
Heat Pump (%)							
Sales of water heating units - Electric	13.8	12.6	24	48.1	52.3	52.5	52.5
Resistance (%)							
Sales of water heating units - Gas Furnace	78.2	80	58.2	9.28	0.549	0	0
(%)							
Sales of water heating units - Other (%)	5.24	3.95	1.94	1.61	1.6	1.59	1.61

Table 26: E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -		1.3	1.34	3.78	4.11	3.37	3.57
Cumulative 5-yr (billion \$2018)							

Table 27: E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Overview

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	120	114	109	101	93.4	88.1	84.9
Final energy use - Industry (PJ)	64.9	63.4	62.5	61.2	61.1	61.8	62.1
Final energy use - Residential (PJ)	155	143	130	112	94.5	81.6	73.9
Final energy use - Transportation (PJ)	228	212	186	152	122	104	95.6

Table 28: E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Residential

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs.		3.13	3.5				
REF - Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric	71.8	77.8	96.2	99.8	100	100	100
Resistance (%)							
Sales of cooking units - Gas (%)	28.2	22.2	3.79	0.191	0	0	0
Sales of space heating units - Electric	7.5	14.9	62.3	88.8	92.4	92.6	92.6
Heat Pump (%)							
Sales of space heating units - Electric	4.92	6.44	5.03	2.19	1.67	1.64	1.81
Resistance (%)							
Sales of space heating units - Fossil (%)	53.1	58.8	18.6	6.59	5.61	5.57	5.44
Sales of space heating units - Gas (%)	34.4	19.8	14	2.38	0.3	0.169	0.163
Sales of water heating units - Electric	0	1.56	13.2	30.7	33.7	33.9	33.9
Heat Pump (%)							
Sales of water heating units - Electric	35.5	54.6	60.4	65.2	66	66	66
Resistance (%)							
Sales of water heating units - Gas Furnace	46.8	33.5	24.3	3.88	0.229	0	0
(%)							
Sales of water heating units - Other (%)	17.6	10.3	2.05	0.206	0.126	0.127	0.126

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

Item	2020	2025	2030	2035	2040	2045	2050
Light-duty vehicle capital costs -		549	1,419	2,279	3,460	3,757	3,587
Cumulative 5-yr (million \$2018)							
Public EV charging plugs - DC Fast (1000	0.229		0.879		3.72		5.99
units)							
Public EV charging plugs - L2 (1000 units)	0.794		21.1		89.3		144
Vehicle sales - Heavy-duty - diesel (%)	97.2	92.1	67	23.3	4.22	0.628	0
Vehicle sales - Heavy-duty - EV (%)	0.588	3.81	19	45.6	57.4	59.6	60
Vehicle sales - Heavy-duty - gasoline (%)	0.227	0.227	0.176	0.066	0.013	0.002	0
Vehicle sales - Heavy-duty - hybrid (%)	0.082	0.09	0.077	0.031	0.007	0.001	0
Vehicle sales - Heavy-duty - hydrogen FC	0.392	2.54	12.7	30.4	38.2	39.7	40
(%)							
Vehicle sales - Heavy-duty - other (%)	1.5	1.23	1.07	0.568	0.163	0.038	0
Vehicle sales - Light-duty - diesel (%)	1.31	1.6	1.16	0.37	0.071	0.013	0
Vehicle sales - Light-duty - EV (%)	4.71	17.6	50.1	83.2	96.5	99.3	100
Vehicle sales - Light-duty - gasoline (%)	88.6	75.2	45.1	15.1	3.1	0.584	0
Vehicle sales - Light-duty - hybrid (%)	5.19	5.1	3.47	1.26	0.312	0.069	0
Vehicle sales - Light-duty - hydrogen FC	0.109	0.326	0.184	0.056	0.012	0.002	0
(%)							
Vehicle sales - Light-duty - other (%)	0.091	0.086	0.054	0.019	0.004	0.001	0
Vehicle sales - Medium-duty - diesel (%)	64.7	59.7	42.3	14.4	2.59	0.384	0
Vehicle sales - Medium-duty - EV (%)	0.784	5.07	25.3	60.8	76.5	79.5	80
Vehicle sales - Medium-duty - gasoline (%)	33.7	33.3	25.5	9.32	1.77	0.277	0
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.402	0.341	0.14	0.03	0.005	0
Vehicle sales - Medium-duty - hydrogen	0.196	1.27	6.33	15.2	19.1	19.9	20
FC (%)							
Vehicle sales - Medium-duty - other (%)	0.253	0.255	0.205	0.083	0.019	0.004	0

Table 30: E+RE+ scenario - PILLAR 2: Clean Electricity - Generating capacity

Item	2020	2025	2030	2035	2040	2045	2050
Capital invested - Solar PV - Base (billion		0	3.3	0.826	0.459	0	0
\$2018)							
Capital invested - Wind - Base (billion		0	0.755	0.336	0.169	0	0.073
\$2018)							
Installed renewables - OffshoreWind -	0	0	0	0	0	0	0
Base land use assumptions (MW)							
Installed renewables - OffshoreWind -	0	0	0	0	0	0	0
Constrained land use assumptions (MW)							
Installed renewables - Solar - Base land	92.9	92.9	3,322	4,199	4,717	4,717	4,717
use assumptions (MW)							
Installed renewables - Solar -	186	186	10,034	14,152	16,244	16,244	16,244
Constrained land use assumptions (MW)							
Installed renewables - Wind - Base land	5.8	5.8	321	472	551	551	590
use assumptions (MW)							
Installed renewables - Wind - Constrained	11.6	11.6	697	776	877	877	942
land use assumptions (MW)							

Table 31: E+RE+ scenario - PILLAR 2: Clean Electricity - Generation

Item	2020	2025	2030	2035	2040	2045	2050
OffshoreWind - Base land use	0	0	0	0	0	0	0
assumptions (GWh)							
OffshoreWind - Constrained land use	0	0	0	0	0	0	0
assumptions (GWh)							
Solar - Base land use assumptions (GWh)	169	169	5,099	6,409	7,180	7,180	7,180
Solar - Constrained land use assumptions	337	337	15,298	21,470	24,597	24,597	24,597
(GWh)							
Wind - Base land use assumptions (GWh)	24	24	1,153	1,676	1,955	1,955	2,088
Wind - Constrained land use assumptions	48	48	2,519	2,800	3,144	3,144	3,371
(GWh)							

Table 32: E+RE+ scenario - PILLAR 6: Land sinks - Agriculture

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive							0
deployment - Corn-ethanol to energy							
grasses (1000 tC02e/y)							70
Carbon sink potential - Aggressive							-79
deployment - Cropland measures (1000							
tCO2e/y)							0.11
Carbon sink potential - Aggressive							-3.14
deployment - Permanent conservation							
cover (1000 tCO2e/y)							001
Carbon sink potential - Aggressive							-82.1
deployment - Total (1000 tC02e/y)							
Carbon sink potential - Moderate							0
deployment - Corn-ethanol to energy							
grasses (1000 tC02e/y)							
Carbon sink potential - Moderate							-41.5
deployment - Cropland measures (1000							
tCO2e/y)							
Carbon sink potential - Moderate							-1.57
deployment - Permanent conservation							
cover (1000 tC02e/y)							
Carbon sink potential - Moderate							-43.1
deployment - Total (1000 tC02e/y)							
Land impacted for carbon sink -							0
Aggressive deployment - Corn-ethanol to							
energy grasses (1000 hectares)							
Land impacted for carbon sink -							54.5
Aggressive deployment - Cropland							
measures (1000 hectares)							
Land impacted for carbon sink -							5.72
Aggressive deployment - Permanent							
conservation cover (1000 hectares)							
Land impacted for carbon sink -							60.2
Aggressive deployment - Total (1000							
hectares)							
Land impacted for carbon sink - Moderate							0
deployment - Corn-ethanol to energy							
grasses (1000 hectares)							
Land impacted for carbon sink - Moderate							28.7
deployment - Cropland measures (1000							
hectares)							
Land impacted for carbon sink - Moderate							2.86
deployment - Permanent conservation							
cover (1000 hectares)							
Land impacted for carbon sink - Moderate							31.5
deployment - Total (1000 hectares)							

Table 33: E+RE+ scenario - PILLAR 6: Land sinks - Forests

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Accelerate							-54.6
regeneration (1000 tCO2e/y)							
Carbon sink potential - High - All (not							-3,043
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - High - Avoid							-768
deforestation (1000 tCO2e/y)							
Carbon sink potential - High - Extend							-1,158
rotation length (1000 tCO2e/y)							
Carbon sink potential - High - Improve							-10.4
plantations (1000 tCO2e/y)							
Carbon sink potential - High - Increase							-360
retention of HWP (1000 tCO2e/y)							

Table 33: E+RE+ scenario - PILLAR 6: Land sinks - Forests (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Increase							-14:
trees outside forests (1000 tC02e/y)							
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)							(
Carbon sink potential - High - Reforest pasture (1000 tC02e/y)							-224
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)							-32
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)							-27.4
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)							-90:
Carbon sink potential - Low - Avoid deforestation (1000 tC02e/y)							-128
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)							-44
Carbon sink potential - Low - Improve plantations (1000 tC02e/y)							-5.3
Carbon sink potential - Low - Increase retention of HWP (1000 tC02e/y)							-120
Carbon sink potential - Low - Increase trees outside forests (1000 tCO2e/y)							-50.
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)							(
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)							-1
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)							-10
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)							-L
Carbon sink potential - Mid - All (not counting overlap) (1000 tC02e/y)							-1,97
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)							-44
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)							-80
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)							-7.7
Carbon sink potential - Mid - Increase retention of HWP (1000 tC02e/y)							-24
Carbon sink potential - Mid - Increase trees outside forests (1000 tC02e/y)							-96
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)							
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)							-12
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/y)							-21
Land impacted for carbon sink potential - High - Accelerate regeneration (1000							8.9
nectares) Land impacted for carbon sink potential -							10
High - Avoid deforestation (over 30 years) (1000 hectares)							
Land impacted for carbon sink potential - High - Extend rotation length (1000							59
hectares) Land impacted for carbon sink potential - High - Improve plantations (1000							3.8

Table 33: E+RE+ scenario - PILLAR 6: Land sinks - Forests (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - High - Increase retention of HWP (1000							0
hectares)							
Land impacted for carbon sink potential -							13.6
High - Increase trees outside forests							
(1000 hectares)							
Land impacted for carbon sink potential -							0
High - Reforest cropland (1000 hectares)							6.37
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares)							6.37
Land impacted for carbon sink potential -							108
High - Restore productivity (1000							100
hectares)							
Land impacted for carbon sink potential -							835
High - Total impacted (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							4.47
Low - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							97.6
Low - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							226
Low - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							1.92
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 -							7.16
Low - Increase trees outside forests							
(1000 hectares)							0
Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares)							U
Land impacted for carbon sink potential -							1.1
Low - Reforest pasture (1000 hectares)							1.1
Land impacted for carbon sink potential -							65.1
Low - Restore productivity (1000							00.1
hectares)							
Land impacted for carbon sink potential -							404
Low - Total impacted (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							6.7
Mid - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							101
Mid - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							408
Mid - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							2.89
Mid - Improve plantations (1000 hectares)							
Land impacted for carbon sink potential -							0
Mid - Increase retention of HWP (1000							
hectares)							40.7
Land impacted for carbon sink potential -							10.4
Mid - Increase trees outside forests (1000							
hectares)							

Table 33: E+RE+	. cronaria -	DTII AD A.	I and cinke -	Forests	(continued)
14018 33. E+KE+	· SCEHUITO -	PILLAR O.	LUHU SHIKS -	FULESTS	COMUNICEUR

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential -							0
Mid - Reforest cropland (1000 hectares)							
Land impacted for carbon sink potential -							7.98
Mid - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							131
Mid - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -							668
Mid - Total impacted (over 30 years) (1000							
hectares)							

#### Table 34: E+RE+ scenario - IMPACTS - Health

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution -		361	0.581	0.58	0.562	0.335	0.01
Coal (million 2019\$)							
Monetary damages from air pollution -		210	108	60.8	50.2	18.8	6.07
Natural Gas (million 2019\$)							
Monetary damages from air pollution -		995	923	697	399	179	67.5
Transportation (million 2019\$)							
Premature deaths from air pollution -		40.8	0.066	0.065	0.063	0.038	0.001
Coal (deaths)							
Premature deaths from air pollution -		23.8	12.1	6.86	5.66	2.12	0.685
Natural Gas (deaths)							
Premature deaths from air pollution -		112	104	78.3	44.9	20.2	7.59
Transportation (deaths)							

# Table 35: E+RE- scenario - PILLAR 1: Efficiency/Electrification - Commercial

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s - Cumulative 5-yr (million \$2018)		7,080	7,732				
Sales of cooking units - Electric Resistance (%)	36.9	49.9	81.2	87.4	87.7	87.7	87.7
Sales of cooking units - Gas (%)	63.1	50.1	18.8	12.6	12.3	12.3	12.3
Sales of space heating units - Electric Heat Pump (%)	4.76	11	39.3	72.4	77.8	78.1	78.1
Sales of space heating units - Electric Resistance (%)	2.29	4.46	16.5	21.3	21.9	21.9	21.9
Sales of space heating units - Fossil (%)	42.2	31.2	5.99	0.253	0	0	0
Sales of space heating units - Gas Furnace (%)	50.7	53.4	38.2	6.11	0.363	0	0
Sales of water heating units - Electric Heat Pump (%)	2.81	3.52	15.9	41	45.5	45.9	45.9
Sales of water heating units - Electric Resistance (%)	13.8	12.6	24	48.1	52.3	52.5	52.5
Sales of water heating units - Gas Furnace (%)	78.2	80	58.2	9.28	0.549	0	0
Sales of water heating units - Other (%)	5.24	3.95	1.94	1.61	1.6	1.59	1.61

#### Table 36: E+RE- scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -		1.3	1.34	3.78	4.11	3.37	3.57
Cumulative 5-yr (billion \$2018)							

# Table 37: E+RE- scenario - PILLAR 1: Efficiency/Electrification - Overview

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	120	114	109	101	93.4	88.1	84.9

Table 37: E+RE- scenario - PILLAR 1: Efficiency/Electrification - Overview (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Industry (PJ)	64.9	63.4	62.5	61.2	61.1	61.8	62.1
Final energy use - Residential (PJ)	155	143	130	112	94.5	81.6	73.9
Final energy use - Transportation (PJ)	228	212	186	152	122	104	95.6

Table 38: E+RE- scenario - PILLAR 1: Efficiency/Electrification - Residential

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs.		3.13	3.5				
REF - Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric	71.8	77.8	96.2	99.8	100	100	100
Resistance (%)							
Sales of cooking units - Gas (%)	28.2	22.2	3.79	0.191	0	0	0
Sales of space heating units - Electric	7.5	14.9	62.3	88.8	92.4	92.6	92.6
Heat Pump (%)							
Sales of space heating units - Electric	4.92	6.44	5.03	2.19	1.67	1.64	1.81
Resistance (%)							
Sales of space heating units - Fossil (%)	53.1	58.8	18.6	6.59	5.61	5.57	5.44
Sales of space heating units - Gas (%)	34.4	19.8	14	2.38	0.3	0.169	0.163
Sales of water heating units - Electric	0	1.56	13.2	30.7	33.7	33.9	33.9
Heat Pump (%)							
Sales of water heating units - Electric	35.5	54.6	60.4	65.2	66	66	66
Resistance (%)							
Sales of water heating units - Gas Furnace	46.8	33.5	24.3	3.88	0.229	0	0
(%)							
Sales of water heating units - Other (%)	17.6	10.3	2.05	0.206	0.126	0.127	0.126

Table 39: E+RE- scenario - PILLAR 1: Efficiency/Electrification - Transportation

Item	2020	2025	2030	2035	2040	2045	2050
Light-duty vehicle capital costs -		549	1,419	2,279	3,460	3,757	3,587
Cumulative 5-yr (million \$2018)							
Public EV charging plugs - DC Fast (1000	0.229		0.879		3.72		5.99
units)							
Public EV charging plugs - L2 (1000 units)	0.794		21.1		89.3		144
Vehicle sales - Heavy-duty - diesel (%)	97.2	92.1	67	23.3	4.22	0.628	0
Vehicle sales - Heavy-duty - EV (%)	0.588	3.81	19	45.6	57.4	59.6	60
Vehicle sales - Heavy-duty - gasoline (%)	0.227	0.227	0.176	0.066	0.013	0.002	0
Vehicle sales - Heavy-duty - hybrid (%)	0.082	0.09	0.077	0.031	0.007	0.001	0
Vehicle sales - Heavy-duty - hydrogen FC	0.392	2.54	12.7	30.4	38.2	39.7	40
(%)							
Vehicle sales - Heavy-duty - other (%)	1.5	1.23	1.07	0.568	0.163	0.038	0
Vehicle sales - Light-duty - diesel (%)	1.31	1.6	1.16	0.37	0.071	0.013	0
Vehicle sales - Light-duty - EV (%)	4.71	17.6	50.1	83.2	96.5	99.3	100
Vehicle sales - Light-duty - gasoline (%)	88.6	75.2	45.1	15.1	3.1	0.584	0
Vehicle sales - Light-duty - hybrid (%)	5.19	5.1	3.47	1.26	0.312	0.069	0
Vehicle sales - Light-duty - hydrogen FC	0.109	0.326	0.184	0.056	0.012	0.002	0
(%)							
Vehicle sales - Light-duty - other (%)	0.091	0.086	0.054	0.019	0.004	0.001	0
Vehicle sales - Medium-duty - diesel (%)	64.7	59.7	42.3	14.4	2.59	0.384	0
Vehicle sales - Medium-duty - EV (%)	0.784	5.07	25.3	60.8	76.5	79.5	80
Vehicle sales - Medium-duty - gasoline (%)	33.7	33.3	25.5	9.32	1.77	0.277	0
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.402	0.341	0.14	0.03	0.005	0
Vehicle sales - Medium-duty - hydrogen	0.196	1.27	6.33	15.2	19.1	19.9	20
FC (%)							
Vehicle sales - Medium-duty - other (%)	0.253	0.255	0.205	0.083	0.019	0.004	0

Table 40: E+RE- scenario - PILLAR 2: Clean Electricity - Generating capacity

Item	2020	2025	2030	2035	2040	2045	2050
Capital invested - Solar PV - Base (billion \$2018)		3.19	0	0	0.619	0	0
Capital invested - Solar PV - Constrained (billion \$2018)		1.64	1.06	0	1.56	0	0.347
Capital invested - Wind - Base (billion \$2018)		0	0.273	0	0	0.106	0.283
Capital invested - Wind - Constrained (billion \$2018)		0	0.396	0	0	0	0.338
Installed renewables - OffshoreWind - Base land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - OffshoreWind - Constrained land use assumptions (MW)	0	0	0	0	0	0	0
Installed renewables - Solar - Base land use assumptions (MW)	1,488	4,278	4,278	4,278	4,975	4,975	4,975
Installed renewables - Solar - Constrained land use assumptions (MW)	2,365	3,797	4,832	4,832	6,587	6,587	7,026
Installed renewables - Wind - Base land use assumptions (MW)	5.8	5.8	120	120	120	173	321
Installed renewables - Wind - Constrained land use assumptions (MW)	5.8	5.8	171	171	171	171	349

# Table 41: E+RE- scenario - PILLAR 2: Clean Electricity - Generation

Item	2020	2025	2030	2035	2040	2045	2050
OffshoreWind - Base land use	0	0	0	0	0	0	0
assumptions (GWh)							
OffshoreWind - Constrained land use	0	0	0	0	0	0	0
assumptions (GWh)							
Solar - Base land use assumptions (GWh)	2,320	6,549	6,549	6,549	7,589	7,589	7,589
Solar - Constrained land use assumptions	3,653	5,825	7,405	7,405	10,045	10,045	10,707
(GWh)							
Wind - Base land use assumptions (GWh)	24	24	433	433	433	625	1,153
Wind - Constrained land use assumptions	24	24	628	628	628	628	1,259
(GWh)							

#### Table 42: E+RE- scenario - PILLAR 6: Land sinks - Agriculture

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive							0
deployment - Corn-ethanol to energy							
grasses (1000 tCO2e/y)							
Carbon sink potential - Aggressive							-79
deployment - Cropland measures (1000							
tCO2e/y)							
Carbon sink potential - Aggressive							-3.14
deployment - Permanent conservation							
cover (1000 tCO2e/y)							
Carbon sink potential - Aggressive							-82.1
deployment - Total (1000 tCO2e/y)							
Carbon sink potential - Moderate							0
deployment - Corn-ethanol to energy							
grasses (1000 tCO2e/y)							
Carbon sink potential - Moderate							-41.5
deployment - Cropland measures (1000							
tCO2e/y)							
Carbon sink potential - Moderate							-1.57
deployment - Permanent conservation							
cover (1000 tCO2e/y)							
Carbon sink potential - Moderate							-43.1
deployment - Total (1000 tCO2e/y)							

Table 42: E+RE- scenario - PILLAR 6: Land sinks - Agriculture (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink -							0
Aggressive deployment - Corn-ethanol to							
energy grasses (1000 hectares)							
Land impacted for carbon sink -							54.5
Aggressive deployment - Cropland							
measures (1000 hectares)							
Land impacted for carbon sink -							5.72
Aggressive deployment - Permanent							
conservation cover (1000 hectares)							
Land impacted for carbon sink -							60.2
Aggressive deployment - Total (1000							
hectares)							
Land impacted for carbon sink - Moderate							0
deployment - Corn-ethanol to energy							
grasses (1000 hectares)							
Land impacted for carbon sink - Moderate							28.7
deployment - Cropland measures (1000							
hectares)							
Land impacted for carbon sink - Moderate							2.86
deployment - Permanent conservation							
cover (1000 hectares)							
Land impacted for carbon sink - Moderate							31.5
deployment - Total (1000 hectares)							

Table 43: E+RE- scenario - PILLAR 6: Land sinks - Forests

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Accelerate							-54.6
regeneration (1000 tCO2e/y)							
Carbon sink potential - High - All (not							-3,043
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - High - Avoid							-768
deforestation (1000 tCO2e/y)							
Carbon sink potential - High - Extend							-1,158
rotation length (1000 tCO2e/y)							
Carbon sink potential - High - Improve							-10.4
plantations (1000 tCO2e/y)							
Carbon sink potential - High - Increase							-360
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - High - Increase							-143
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - High - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - High - Reforest							-224
pasture (1000 tCO2e/y)							
Carbon sink potential - High - Restore							-325
productivity (1000 tCO2e/y)							
Carbon sink potential - Low - Accelerate							-27.4
regeneration (1000 tCO2e/y)							
Carbon sink potential - Low - All (not							-902
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - Low - Avoid							-128
deforestation (1000 tCO2e/y)							
Carbon sink potential - Low - Extend							-445
rotation length (1000 tCO2e/y)							
Carbon sink potential - Low - Improve							-5.3
plantations (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-120
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-50.1
trees outside forests (1000 tCO2e/y)							

Table 43: E+RE- scenario - PILLAR 6: Land sinks - Forests (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Low - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - Low - Reforest							-17
pasture (1000 tC02e/y)							
Carbon sink potential - Low - Restore							-109
productivity (1000 tCO2e/y)							
Carbon sink potential - Mid - Accelerate							-41
regeneration (1000 tCO2e/y)							
Carbon sink potential - Mid - All (not							-1,973
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - Mid - Avoid							-448
deforestation (1000 tCO2e/y)							
Carbon sink potential - Mid - Extend							-801
rotation length (1000 tCO2e/y)							
Carbon sink potential - Mid - Improve							-7.77
plantations (1000 tCO2e/y)							
Carbon sink potential - Mid - Increase							-240
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - Mid - Increase							-96.7
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - Mid - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - Mid - Reforest							-121
pasture (1000 tCO2e/y)							
Carbon sink potential - Mid - Restore							-217
productivity (1000 tCO2e/y)							
Land impacted for carbon sink potential -							8.94
High - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							104
High - Avoid deforestation (over 30 years)							_
(1000 hectares)							
Land impacted for carbon sink potential -							591
High - Extend rotation length (1000							• • • • • • • • • • • • • • • • • • • •
hectares)							
Land impacted for carbon sink potential -							3.84
High - Improve plantations (1000							0.0 1
hectares)							
Land impacted for carbon sink potential -							0
High - Increase retention of HWP (1000							U
hectares)							
Land impacted for carbon sink potential -							13.6
High - Increase trees outside forests							13.0
(1000 hectares)							
Land impacted for carbon sink potential -							0
High - Reforest cropland (1000 hectares)							U
Land impacted for carbon sink potential -							6.37
							0.31
High - Reforest pasture (1000 hectares)							108
Land impacted for carbon sink potential -							108
High - Restore productivity (1000							
hectares)							005
Land impacted for carbon sink potential -							835
High - Total impacted (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							4.47
Low - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							97.6
Low - Avoid deforestation (over 30 years)							
(1000 hectares)							

Table 43: E+RE- scenario - PILLAR 6: Land sinks - Forests (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential -							226
Low - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							1.92
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 -							7.16
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 -							1.1
Low - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							65.1
Low - Restore productivity (1000							00
hectares)							
Land impacted for carbon sink potential -						+	404
Low - Total impacted (over 30 years)							404
(1000 hectares)							
Land impacted for carbon sink potential -						+	6.7
Mid - Accelerate regeneration (1000							0.7
= ,							
hectares) Land impacted for carbon sink potential -							101
							101
Mid - Avoid deforestation (over 30 years)							
(1000 hectares)							/ 00
Land impacted for carbon sink potential -							408
Mid - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							2.89
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 -							10.4
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 -							7.98
Mid - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							131
Mid - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -						+	668
Mid - Total impacted (over 30 years) (1000							550
hectares)							

Table 44: E+RE- scenario - IMPACTS - Health

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution -		361	0.581	0.58	0.562	0.335	0.01
Coal (million 2019\$)							
Monetary damages from air pollution -		218	117	135	105	56.9	11.6
Natural Gas (million 2019\$)							
Monetary damages from air pollution -		995	923	697	399	179	67.5
Transportation (million 2019\$)							
Premature deaths from air pollution -		40.8	0.066	0.065	0.063	0.038	0.001
Coal (deaths)							

#### Table 44: E+RE- scenario - IMPACTS - Health (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Premature deaths from air pollution -		24.6	13.2	15.2	11.9	6.42	1.31
Natural Gas (deaths)							
Premature deaths from air pollution -		112	104	78.3	44.9	20.2	7.59
Transportation (deaths)							

#### Table 45: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Commercial

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s -		7,079	7,740				
Cumulative 5-yr (million \$2018)							
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
Sales of space heating units - Electric	4.76	7.71	11	20.9	40.9	61.8	73
Heat Pump (%)							
Sales of space heating units - Electric	2.29	2.3	3.61	7.63	14.2	19.1	21
Resistance (%)							
Sales of space heating units - Fossil (%)	42.2	36.1	33.8	25.4	12.4	3.94	1.03
Sales of space heating units - Gas Furnace	50.7	53.9	51.7	46	32.5	15.2	4.94
(%)							
Sales of water heating units - Electric	2.81	2.92	4.33	9.01	20.1	33.9	42
Heat Pump (%)							
Sales of water heating units - Electric	13.8	12	13	17.7	28.2	41.2	48.8
Resistance (%)							
Sales of water heating units - Gas Furnace	78.2	80.8	78.7	69.9	49.2	23	7.51
(%)							
Sales of water heating units - Other (%)	5.24	4.31	3.95	3.35	2.49	1.86	1.68

# Table 46: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -		0.975	0.97	1.63	1.7	3.09	3.32
Cumulative 5-yr (billion \$2018)							

#### Table 47: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Overview

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	120	114	111	108	105	101	96.5
Final energy use - Industry (PJ)	64.9	63.5	62.9	62.4	62.9	63.5	63.2
Final energy use - Residential (PJ)	155	144	135	128	118	105	91.1
Final energy use - Transportation (PJ)	228	214	195	179	167	152	134

#### Table 48: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Residential

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs.		3.14	3.73				
REF - Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric	71.7	72.5	75.1	81.9	91.4	97.2	99.2
Resistance (%)							
Sales of cooking units - Gas (%)	28.3	27.5	24.9	18.1	8.64	2.79	0.75
Sales of space heating units - Electric	7.5	7.1	12.5	28.5	55.7	78.2	88.3
Heat Pump (%)							
Sales of space heating units - Electric	4.92	6.49	6.23	5.8	4.6	2.99	2.13
Resistance (%)							
Sales of space heating units - Fossil (%)	53.1	66.3	61.9	48.5	27.6	13.1	7.61
Sales of space heating units - Gas (%)	34.4	20.1	19.4	17.2	12.1	5.68	1.98
Sales of water heating units - Electric	0	0.484	1.83	6.09	15.2	25.5	31.2
Heat Pump (%)							
Sales of water heating units - Electric	35.5	53.7	54.4	56.4	60.1	63.5	65.2
Resistance (%)							

#### Table 48: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Residential (continued)

The state of the s	-	-		-			
Item	2020	2025	2030	2035	2040	2045	2050
Sales of water heating units - Gas Furnace (%)	46.8	33.9	32.8	29.2	20.5	9.58	3.12
Sales of water heating units - Other (%)	17.6	11.9	11	8.3	4.13	1.41	0.461

#### Table 49: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Transportation

	,.						
Item	2020	2025	2030	2035	2040	2045	2050
Light-duty vehicle capital costs -		0	91	186	634	1,979	2,888
Cumulative 5-yr (million \$2018)							
Public EV charging plugs - DC Fast (1000	0.229		0.29		1.39		3.84
units)							
Public EV charging plugs - L2 (1000 units)	0.794		6.97		33.5		92.2
Vehicle sales - Heavy-duty - diesel (%)	97.4	96	91.3	79.8	58.2	32.1	13.7
Vehicle sales - Heavy-duty - EV (%)	0.498	1.45	4.11	10.8	23.6	39.5	51
Vehicle sales - Heavy-duty - gasoline (%)	0.228	0.236	0.239	0.225	0.179	0.109	0.051
Vehicle sales - Heavy-duty - hybrid (%)	0.083	0.094	0.104	0.107	0.092	0.06	0.03
Vehicle sales - Heavy-duty - hydrogen FC	0.332	0.969	2.74	7.17	15.7	26.3	34
(%)							
Vehicle sales - Heavy-duty - other (%)	1.5	1.28	1.46	1.95	2.25	1.96	1.14
Vehicle sales - Light-duty - diesel (%)	1.33	1.78	2.01	1.59	0.999	0.509	0.219
Vehicle sales - Light-duty - EV (%)	2.17	5.3	13.1	27.8	50.5	73.4	88.1
Vehicle sales - Light-duty - gasoline (%)	90.9	86.3	77.7	64.2	43.8	23.4	10.4
Vehicle sales - Light-duty - hybrid (%)	5.4	6.17	6.83	6.1	4.45	2.56	1.22
Vehicle sales - Light-duty - hydrogen FC	0.112	0.373	0.312	0.234	0.163	0.089	0.042
(%)							
Vehicle sales - Light-duty - other (%)	0.093	0.096	0.086	0.074	0.053	0.029	0.013
Vehicle sales - Medium-duty - diesel (%)	64.8	62.2	57.7	49.4	35.6	19.6	8.37
Vehicle sales - Medium-duty - EV (%)	0.664	1.94	5.49	14.3	31.4	52.6	68
Vehicle sales - Medium-duty - gasoline (%)	33.8	34.7	34.7	31.9	24.4	14.2	6.33
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.418	0.464	0.478	0.414	0.275	0.141
Vehicle sales - Medium-duty - hydrogen	0.166	0.485	1.37	3.58	7.86	13.2	17
FC (%)							
Vehicle sales - Medium-duty - other (%)	0.253	0.266	0.279	0.286	0.258	0.184	0.102

#### Table 50: E-B+ scenario - PILLAR 2: Clean Electricity - Generating capacity

Item	2020	2025	2030	2035	2040	2045	2050
Capital invested - Biomass power plant	0	0	0	0	0	0	0
(billion \$2018)							
Capital invested - Biomass w/ccu allam	0	0	0	0	0	0	0
power plant (billion \$2018)							
Capital invested - Biomass w/ccu power	0	0	0	0	0	0	0
plant (billion \$2018)							

#### Table 51: 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 allam power plant (GWh)	0	0	0	0	0	0	0
Biomass w/ccu power plant (GWh)	0	0	0	0	0	0	0

#### Table 52: E-B+ scenario - PILLAR 3: Clean fuels - Bioenergy

Item	2020	2025	2030	2035	2040	2045	2050
Biomass purchases (million \$2018/year)		0	0	0	0	0	142
Conversion capital investment -		0	0	0	0	0	2,269
Cumulative 5-yr (million \$2018)							
Number of facilities - Allam power w ccu	0	0	0	0	0	0	0
(quantity)							

Table 52: E-B+ scenario - PILLAR 3: Clean fuels - Bioenergy (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Number of facilities - Beccs hydrogen	0	0	0	0	0	0	0
(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 - 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 - Pyrolysis (quantity)	0	0	0	0	0	0	2
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

Table 53: E-B+ scenario - PILLAR 4: CCUS - CO2 capture

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)		0	0	0	0	0	0.01
Annual - BECCS (MMT)		0	0	0	0	0	0
Annual - Cement and lime (MMT)		0	0	0	0	0	0
Annual - NGCC (MMT)		0	0	0	0	0	0.01
Cumulative - All (MMT)		0	0	0	0	0	0.01
Cumulative - BECCS (MMT)		0	0	0	0	0	0
Cumulative - Cement and lime (MMT)		0	0	0	0	0	0
Cumulative - NGCC (MMT)		0	0	0	0	0	0.01

Table 54: E-B+ scenario - PILLAR 4: CCUS - CO2 pipelines

Item	2020	2025	2030	2035	2040	2045	2050
All (km)		0	146	146	146	146	146
Cumulative investment - All (million \$2018)		0	262	262	262	262	262
Cumulative investment - Spur (million \$2018)		0	0.702	0.702	0.702	0.702	0.703
Cumulative investment - Trunk (million \$2018)		0	262	262	262	262	262
Spur (km)		0	1.21	1.21	1.21	1.21	1.21
Trunk (km)		0	145	145	145	145	145

Table 55: E-B+ scenario - PILLAR 4: CCUS - CO2 storage

Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (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 56: E-B+ scenario - PILLAR 6: Land sinks - Agriculture

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tCO2e/y)							0
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y)							-79
Carbon sink potential - Aggressive deployment - Cropland to woody energy crops (1000 tCO2e/y)							0

Table 56: E-B+ scenario - PILLAR 6: Land sinks - Agriculture (continued)

Iable 56: <i>E-B+ scenario - PILLAR 6: Land</i> 3 Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Aggressive							0
deployment - Pasture to energy crops							
(1000 tCO2e/y)							
Carbon sink potential - Aggressive							-3.14
deployment - Permanent conservation							
cover (1000 tCO2e/y)							
Carbon sink potential - Aggressive							-82.1
deployment - Total (1000 tCO2e/y)							
Carbon sink potential - Moderate							0
deployment - Corn-ethanol to energy							
grasses (1000 tCO2e/y)							
Carbon sink potential - Moderate							-41.5
deployment - Cropland measures (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 tC02e/y)							
Carbon sink potential - Moderate							-1.57
deployment - Permanent conservation							
cover (1000 tC02e/y)							
Carbon sink potential - Moderate							-43.1
deployment - Total (1000 tCO2e/y)							
Land impacted for carbon sink -							0
Aggressive deployment - Corn-ethanol to							
energy grasses (1000 hectares)							
Land impacted for carbon sink -							134
Aggressive deployment - Cropland							
measures (1000 hectares)							
Land impacted for carbon sink -							0
Aggressive deployment - Cropland to							
woody energy crops (1000 hectares)							0.040
Land impacted for carbon sink -							0.313
Aggressive deployment - Pasture to							
energy crops (1000 hectares)							F 70
Land impacted for carbon sink -							5.72
Aggressive deployment - Permanent							
conservation cover (1000 hectares)		-					1/1
Land impacted for carbon sink -							141
Aggressive deployment - Total (1000 hectares)							
Land impacted for carbon sink - Moderate							0
deployment - Corn-ethanol to energy							U
grasses (1000 hectares)							
Land impacted for carbon sink - Moderate							28.7
deployment - Cropland measures (1000							20.7
hectares)							
Land impacted for carbon sink - Moderate							0
deployment - Cropland to woody energy							U
crops (1000 hectares)  Land impacted for carbon sink - Moderate		+					0.313
							0.313
deployment - Pasture to energy crops (1000 hectares)							
,							0.07
Land impacted for carbon sink - Moderate deployment - Permanent conservation							2.86
cover (1000 hectares)							
Land impacted for carbon sink - Moderate							31.8
deployment - Total (1000 hectares)							31.0
ueniovillelit - Total HOUU HECtal EST		I					

Table 57: E-B+ scenario - PILLAR 6: Land sinks - Forests

Table 57: E-B+ scenario - PILLAR 6: Land s							
Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Accelerate							-54.6
regeneration (1000 tCO2e/y)							
Carbon sink potential - High - All (not							-3,043
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - High - Avoid							-768
deforestation (1000 tCO2e/y)							
Carbon sink potential - High - Extend							-1,158
rotation length (1000 tCO2e/y)							
Carbon sink potential - High - Improve							-10.4
plantations (1000 tCO2e/y)							
Carbon sink potential - High - Increase							-360
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - High - Increase							-143
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - High - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - High - Reforest							-224
pasture (1000 tCO2e/y)							
Carbon sink potential - High - Restore							-325
productivity (1000 tCO2e/y)							020
Carbon sink potential - Low - Accelerate						+	-27.4
regeneration (1000 tC02e/y)							-21.4
Carbon sink potential - Low - All (not							-902
•							-902
counting overlap) (1000 tC02e/y)							100
Carbon sink potential - Low - Avoid							-128
deforestation (1000 tCO2e/y)							
Carbon sink potential - Low - Extend							-445
rotation length (1000 tCO2e/y)							
Carbon sink potential - Low - Improve							-5.3
plantations (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-120
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-50.1
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - Low - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - Low - Reforest							-17
pasture (1000 tCO2e/y)							
Carbon sink potential - Low - Restore							-109
productivity (1000 tCO2e/y)							
Carbon sink potential - Mid - Accelerate							-41
regeneration (1000 tCO2e/y)							
Carbon sink potential - Mid - All (not							-1,973
counting overlap) (1000 tCO2e/y)							.,,,
Carbon sink potential - Mid - Avoid							-448
deforestation (1000 tCO2e/y)							770
Carbon sink potential - Mid - Extend		+					-801
rotation length (1000 tCO2e/y)							-001
Carbon sink potential - Mid - Improve		-					-7.77
plantations (1000 tCO2e/y)							-1.11
Carbon sink potential - Mid - Increase							-240
							-240
retention of HWP (1000 tC02e/y)							0/7
Carbon sink potential - Mid - Increase							-96.7
trees outside forests (1000 tC02e/y)							
Carbon sink potential - Mid - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - Mid - Reforest							-121
pasture (1000 tCO2e/y)							
Carbon sink potential - Mid - Restore							-217
productivity (1000 tCO2e/y)							

Table 57: E-B+ scenario - PILLAR 6: Land sinks - Forests (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - High - Accelerate regeneration (1000							8.94
hectares)							
Land impacted for carbon sink potential -							104
High - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							591
High - Extend rotation length (1000							
hectares)							0.07
Land impacted for carbon sink potential -							3.84
High - Improve plantations (1000							
hectares)  Land impacted for carbon sink potential -							0
High - Increase retention of HWP (1000							U
hectares)							
Land impacted for carbon sink potential -							13.6
High - Increase trees outside forests							10.0
(1000 hectares)							
Land impacted for carbon sink potential -							0
High - Reforest cropland (1000 hectares)							_
Land impacted for carbon sink potential -							6.37
High - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							108
High - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -							835
High - Total impacted (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							4.47
Low - Accelerate regeneration (1000							
hectares)							07.4
Land impacted for carbon sink potential -							97.6
Low - Avoid deforestation (over 30 years)							
(1000 hectares)  Land impacted for carbon sink potential -							226
Low - Extend rotation length (1000							220
hectares)							
Land impacted for carbon sink potential -							1.92
Low - Improve plantations (1000							1.72
hectares)							
Land impacted for carbon sink potential -							0
Low - Increase retention of HWP (1000							
hectares)							
Land impacted for carbon sink potential -							7.16
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 -							1.1
Low - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							65.1
Low - Restore productivity (1000							
hectares)							, , , ,
Land impacted for carbon sink potential -							404
Low - Total impacted (over 30 years) (1000 hectares)							
Land impacted for carbon sink potential -							6.7
Mid - Accelerate regeneration (1000							0.7
miu - Accelei ale i egellei alluli (1000							

Table 57: E-B+ scenario - PILLAR 6: Land sinks - Forests (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential -							101
Mid - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							408
Mid - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							2.89
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 -							10.4
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 -							7.98
Mid - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							131
Mid - Restore productivity (1000							
hectares)							
Land impacted for carbon sink potential -							668
Mid - Total impacted (over 30 years) (1000							
hectares)							

#### Table 58: E-B+ scenario - IMPACTS - Health

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution -		361	0.581	0.58	0.562	0.335	0.01
Coal (million 2019\$)							
Monetary damages from air pollution -		222	90.9	47.2	37.1	23	8.13
Natural Gas (million 2019\$)							
Monetary damages from air pollution -		1,013	1,020	985	880	695	473
Transportation (million 2019\$)							
Premature deaths from air pollution -		40.8	0.066	0.065	0.063	0.038	0.001
Coal (deaths)							
Premature deaths from air pollution -		25.1	10.3	5.33	4.18	2.6	0.918
Natural Gas (deaths)							
Premature deaths from air pollution -		114	115	111	99	78.2	53.2
Transportation (deaths)							

# Table 59: REF scenario - PILLAR 1: Efficiency/Electrification - Commercial

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s -		6,993	7,196				
Cumulative 5-yr (million \$2018)							
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
Sales of space heating units - Electric	4.76	13	41.2	64.2	67.9	68.3	68.4
Heat Pump (%)							
Sales of space heating units - Electric	2.29	2.72	7.48	19.8	29.9	31.6	31.6
Resistance (%)							
Sales of space heating units - Fossil (%)	42.2	34.8	24.4	9.58	1.37	0.108	0
Sales of space heating units - Gas Furnace	50.7	49.5	26.9	6.44	0.813	0.044	0
(%)							
Sales of water heating units - Electric	2.81	2.41	2.38	2.38	2.36	2.39	2.38
Heat Pump (%)							
Sales of water heating units - Electric	13.8	11.5	11.2	11.4	11.4	11.2	11.3
Resistance (%)							

#### Table 59: REF scenario - PILLAR 1: Efficiency/Electrification - Commercial (continued)

••			•	•			
Item	2020	2025	2030	2035	2040	2045	2050
Sales of water heating units - Gas Furnace (%)	78.2	81.7	82.2	82	82	82.3	82.2
Sales of water heating units - Other (%)	5.24	4.38	4.24	4.21	4.3	4.08	4.12

#### Table 60: REF scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -		1.02	1.02	2.7	2.9	2.76	2.92
Cumulative 5-yr (billion \$2018)							

#### Table 61: REF scenario - PILLAR 1: Efficiency/Electrification - Overview

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	120	116	117	116	115	117	121
Final energy use - Industry (PJ)	64.9	65.9	67.9	70.3	74.3	78.9	82.7
Final energy use - Residential (PJ)	155	145	139	135	132	130	128
Final energy use - Transportation (PJ)	228	214	197	187	187	193	200

#### Table 62: REF scenario - PILLAR 1: Efficiency/Electrification - Residential

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs.		3.06	3.2				
REF - Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric	71.5	71.5	71.5	71.5	71.5	71.5	71.5
Resistance (%)							
Sales of cooking units - Gas (%)	28.5	28.5	28.5	28.5	28.5	28.5	28.5
Sales of space heating units - Electric	7.29	8.79	9.1	9.58	9.77	9.98	10.3
Heat Pump (%)							
Sales of space heating units - Electric	4.95	6.28	6.15	6.11	6.12	5.85	5.64
Resistance (%)							
Sales of space heating units - Fossil (%)	53.3	57.9	31.1	12.3	11.1	11	11
Sales of space heating units - Gas (%)	34.5	27.1	53.6	72	73	73.2	73.1
Sales of water heating units - Electric	0	0	0	0	0	0	0
Heat Pump (%)							
Sales of water heating units - Electric	35.5	53.5	53.4	53.5	53.4	53.4	53.4
Resistance (%)							
Sales of water heating units - Gas Furnace	46.8	34.3	34.3	34.2	34.2	34.2	34.2
(%)							
Sales of water heating units - Other (%)	17.6	12.3	12.3	12.3	12.3	12.3	12.3

#### Table 63: REF scenario - PILLAR 1: Efficiency/Electrification - Transportation

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle sales - Heavy-duty - diesel (%)	98.1	98.2	97.9	97	95.6	93.5	91.6
Vehicle sales - Heavy-duty - EV (%)	0	0	0	0	0	0	0
Vehicle sales - Heavy-duty - gasoline (%)	0.229	0.242	0.257	0.274	0.294	0.317	0.343
Vehicle sales - Heavy-duty - hybrid (%)	0.083	0.096	0.112	0.13	0.15	0.174	0.202
Vehicle sales - Heavy-duty - hydrogen FC	0.119	0.138	0.16	0.186	0.216	0.25	0.29
(%)							
Vehicle sales - Heavy-duty - other (%)	1.51	1.31	1.57	2.37	3.69	5.71	7.57
Vehicle sales - Light-duty - diesel (%)	1.32	1.76	2.14	2	1.79	1.67	1.58
Vehicle sales - Light-duty - EV (%)	4.35	6.62	7.45	9.21	11.1	12.7	13.9
Vehicle sales - Light-duty - gasoline (%)	88.9	85.1	82.7	80.6	78.3	76.5	75
Vehicle sales - Light-duty - hybrid (%)	5.22	6.03	7.31	7.85	8.36	8.82	9.12
Vehicle sales - Light-duty - hydrogen FC	0.109	0.368	0.332	0.292	0.287	0.286	0.296
(%)							
Vehicle sales - Light-duty - other (%)	0.091	0.095	0.091	0.092	0.091	0.09	0.092
Vehicle sales - Medium-duty - diesel (%)	65.2	63.5	61.6	59.6	58	56.5	55.2
Vehicle sales - Medium-duty - EV (%)	0.027	0.105	0.329	0.671	0.895	0.973	0.993
Vehicle sales - Medium-duty - gasoline (%)	34	35.5	37	38.5	39.7	40.8	41.7

Table 63: REF scenario - PILLAR 1: Efficiency/Electrification - Transportation (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Vehicle sales - Medium-duty - hybrid (%)	0.365	0.427	0.496	0.577	0.674	0.793	0.929
Vehicle sales - Medium-duty - hydrogen FC (%)	0.175	0.208	0.242	0.285	0.339	0.409	0.487
Vehicle sales - Medium-duty - other (%)	0.255	0.271	0.298	0.345	0.42	0.528	0.671

#### Table 64: REF scenario - PILLAR 6: Land sinks - Forests

lable 64: REF scenario - PILLAR 6: Lana si			0000	000-	00:0	00:-	
Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - High - Accelerate							-54.6
regeneration (1000 tCO2e/y)							
Carbon sink potential - High - All (not							-3,043
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - High - Avoid							-768
deforestation (1000 tCO2e/y)							
Carbon sink potential - High - Extend							-1,158
rotation length (1000 tCO2e/y)							
Carbon sink potential - High - Improve							-10.4
plantations (1000 tC02e/y)							
Carbon sink potential - High - Increase							-360
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - High - Increase							-143
trees outside forests (1000 tC02e/y)							
Carbon sink potential - High - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - High - Reforest							-224
pasture (1000 tCO2e/y)							
Carbon sink potential - High - Restore							-325
productivity (1000 tCO2e/y)							
Carbon sink potential - Low - Accelerate							-27.4
regeneration (1000 tCO2e/y)							
Carbon sink potential - Low - All (not							-902
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - Low - Avoid							-128
deforestation (1000 tCO2e/y)							
Carbon sink potential - Low - Extend							-445
rotation length (1000 tCO2e/y)							
Carbon sink potential - Low - Improve							-5.3
plantations (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-120
retention of HWP (1000 tCO2e/y)							
Carbon sink potential - Low - Increase							-50.1
trees outside forests (1000 tCO2e/y)							
Carbon sink potential - Low - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - Low - Reforest							-17
pasture (1000 tCO2e/y)							
Carbon sink potential - Low - Restore							-109
productivity (1000 tCO2e/y)							
Carbon sink potential - Mid - Accelerate							-41
regeneration (1000 tC02e/y)							
Carbon sink potential - Mid - All (not							-1,973
counting overlap) (1000 tCO2e/y)							
Carbon sink potential - Mid - Avoid							-448
deforestation (1000 tCO2e/y)							
Carbon sink potential - Mid - Extend							-801
rotation length (1000 tCO2e/y)							
Carbon sink potential - Mid - Improve							-7.77
plantations (1000 tCO2e/y)							
Carbon sink potential - Mid - Increase							-240
retention of HWP (1000 tCO2e/y)							

Table 64: REF scenario - PILLAR 6: Land sinks - Forests (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)							-96.7
Carbon sink potential - Mid - Reforest							0
cropland (1000 tCO2e/y)							
Carbon sink potential - Mid - Reforest							-121
pasture (1000 tCO2e/y)							
Carbon sink potential - Mid - Restore							-217
productivity (1000 tC02e/y)							0.07
Land impacted for carbon sink potential - High - Accelerate regeneration (1000							8.94
hectares)							
Land impacted for carbon sink potential -							104
High - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							591
High - Extend rotation length (1000							
hectares)							
Land impacted for carbon sink potential -							3.84
High - Improve plantations (1000							
hectares)							
Land impacted for carbon sink potential - High - Increase retention of HWP (1000							0
hectares)							
Land impacted for carbon sink potential -							13.6
High - Increase trees outside forests							10.0
(1000 hectares)							
Land impacted for carbon sink potential -							0
High - Reforest cropland (1000 hectares)							
Land impacted for carbon sink potential -							6.37
High - Reforest pasture (1000 hectares)							
Land impacted for carbon sink potential -							108
High - Restore productivity (1000							
hectares)  Land impacted for carbon sink potential -							835
High - Total impacted (over 30 years)							033
(1000 hectares)							
Land impacted for carbon sink potential -							4.47
Low - Accelerate regeneration (1000							
hectares)							
Land impacted for carbon sink potential -							97.6
Low - Avoid deforestation (over 30 years)							
(1000 hectares)							
Land impacted for carbon sink potential -							226
Low - Extend rotation length (1000							
hectares)  Land impacted for carbon sink potential -							1.92
Low - Improve plantations (1000							1.92
hectares)							
Land impacted for carbon sink potential -							0
Low - Increase retention of HWP (1000							_
hectares)							
Land impacted for carbon sink potential -							7.16
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 -							1.1
Low - Reforest pasture (1000 hectares)			-				/E1
Land impacted for carbon sink potential - Low - Restore productivity (1000							65.1
hectares)							

Table 64: REF scenario - PILLAR 6: Land sinks - Forests (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)							404
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)							6.7
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000 hectares)							101
Land impacted for carbon sink potential - Mid - Extend rotation length (1000 hectares)							408
Land impacted for carbon sink potential - Mid - Improve plantations (1000 hectares)							2.89
Land impacted for carbon sink potential - Mid - Increase retention of HWP (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Increase trees outside forests (1000 hectares)							10.4
Land impacted for carbon sink potential - Mid - Reforest cropland (1000 hectares)							0
Land impacted for carbon sink potential - Mid - Reforest pasture (1000 hectares)							7.98
Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares)							131
Land impacted for carbon sink potential - Mid - Total impacted (over 30 years) (1000 hectares)							668

# Table 65: 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)	-10.2		-1.57				-1.41
Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y)	-0.098		-0.176				-0.183
Business-as-usual carbon sink - Total (Mt CO2e/y)	-10.3		-1.75				-1.59

# Table 66: REF scenario - IMPACTS - Health

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution -		996	649	609	593	582	521
Coal (million 2019\$)							
Monetary damages from air pollution -		149	122	158	173	182	172
Natural Gas (million 2019\$)							
Monetary damages from air pollution -		1,011	1,031	1,048	1,068	1,088	1,109
Transportation (million 2019\$)							
Premature deaths from air pollution -		112	73.4	68.8	67	65.8	58.8
Coal (deaths)							
Premature deaths from air pollution -		16.8	13.7	17.9	19.5	20.6	19.5
Natural Gas (deaths)							
Premature deaths from air pollution -		114	116	118	120	122	125
Transportation (deaths)							