Net-Zero America - colorado state report

Larson et al. 2020

February 2021

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 https://netzeroamerica.princeton.edu.)

Notes

- These data are a subset of all data from the study available at https://netzeroamerica.princeton.edu.
- 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 state-level 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.)
- Some results are not model outputs, but rather they are limits that apply across all scenarios (e.g., maximum carbon storage potential in agricultural soils).

List of Tables

1	E+ scenario - PILLAR 1: Efficiency/Electrification - Residential	4
2	E+ scenario - PILLAR 1: Efficiency/Electrification - Transportation	4
3	E+ scenario - PILLAR 1: Efficiency/Electrification - Overview	4
4	E+ scenario - PILLAR 1: Efficiency/Electrification - Commercial	4
5	E+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand	5
6	E+ scenario - PILLAR 2: Clean Electricity - Generating capacity	5
7	E+ scenario - PILLAR 2: Clean Electricity - Generation	5
8	E+ scenario - PILLAR 3: Clean fuels - Bioenergy	5
9	E+ scenario - PILLAR 4: CCUS - CO2 capture	6
10	E+ scenario - PILLAR 4: CCUS - CO2 storage	6
11	E+ scenario - PILLAR 4: CCUS - CO2 pipelines	6
12	E+ scenario - PILLAR 6: Land sinks - Agriculture	6
13	E+ scenario - PILLAR 6: Land sinks - Forests	7
14	E+ scenario - IMPACTS - Health	9
15	E+ scenario - IMPACTS - Jobs	9
16	E+ scenario - IMPACTS - Fossil fuel industries	10
17	E- scenario - PILLAR 1: Efficiency/Electrification - Residential	10

18	E- scenario - PILLAR 1: Efficiency/Electrification - Transportation	10
19	E- scenario - PILLAR 1: Efficiency/Electrification - Overview	11
20	E- scenario - PILLAR 1: Efficiency/Electrification - Commercial	11
21	E- scenario - PILLAR 1: Efficiency/Electrification - Electricity demand	11
22	E- scenario - PILLAR 6: Land sinks - Agriculture	11
23	E- scenario - PILLAR 6: Land sinks - Forests	12
24	E- scenario - IMPACTS - Health	14
25	E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Residential	14
26	E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Transportation	15
27	E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Overview	15
28	E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Commercial	15
29	E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand	16
30	E+RE+ scenario - PILLAR 2: Clean Electricity - Generating capacity	16
31	E+RE+ scenario - PILLAR 2: Clean Electricity - Generation	16
32	E+RE+ scenario - PILLAR 6: Land sinks - Agriculture	16
33	E+RE+ scenario - PILLAR 6: Land sinks - Forests	17
34	E+RE+ scenario - IMPACTS - Health	19
35	E+RE- scenario - PILLAR 1: Efficiency/Electrification - Residential	19
36	E+RE- scenario - PILLAR 1: Efficiency/Electrification - Transportation	19
37	E+RE- scenario - PILLAR 1: Efficiency/Electrification - Overview	20
38	E+RE- scenario - PILLAR 1: Efficiency/Electrification - Commercial	20
39	E+RE- scenario - PILLAR 1: Efficiency/Electrification - Electricity demand	20
40	E+RE- scenario - PILLAR 2: Clean Electricity - Generating capacity	20
41	E+RE- scenario - PILLAR 2: Clean Electricity - Generation	20
42	E+RE- scenario - PILLAR 6: Land sinks - Agriculture	20
43	E+RE- scenario - PILLAR 6: Land sinks - Forests	21
44	E+RE- scenario - IMPACTS - Health	23
45	E-B+ scenario - PILLAR 1: Efficiency/Electrification - Residential	23
46	E-B+ scenario - PILLAR 1: Efficiency/Electrification - Transportation	24
47	E-B+ scenario - PILLAR 1: Efficiency/Electrification - Overview	24
48	E-B+ scenario - PILLAR 1: Efficiency/Electrification - Commercial	24
49	E-B+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand	24
50	E-B+ scenario - PILLAR 2: Clean Electricity - Generating capacity	25
51	E-B+ scenario - PILLAR 2: Clean Electricity - Generation	25
52	E-B+ scenario - PILLAR 3: Clean fuels - Bioenergy	25
53	E-B+ scenario - PILLAR 4: CCUS - CO2 capture	25
54	E-B+ scenario - PILLAR 4: CCUS - CO2 storage	25
55	E-B+ scenario - PILLAR 4: CCUS - CO2 pipelines	25
56	E-B+ scenario - PILLAR 6: Land sinks - Agriculture	26
57	E-B+ scenario - PILLAR 6: Land sinks - Forests	27
58	REF scenario - PILLAR 1: Efficiency/Electrification - Residential	29

59	REF scenario - PILLAR 1: Efficiency/Electrification - Transportation	29
60	REF scenario - PILLAR 1: Efficiency/Electrification - Overview	29
61	REF scenario - PILLAR 1: Efficiency/Electrification - Commercial	29
62	REF scenario - PILLAR 1: Efficiency/Electrification - Electricity demand	30
63	REF scenario - PILLAR 6: Land sinks - Forests	30
64	REF scenario - IMPACTS - Health	32

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

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs. REF -	0	4.42	4.7	0	0	0	0
Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric Resistance (%)	50.5	61	93.3	99.7	100	100	100
Sales of cooking units - Gas (%)	49.5	39	6.67	0.336	0	0	0
Sales of space heating units - Electric Heat Pump	5.62	14.5	37.2	82.6	92	92.7	92.7
(%)							
Sales of space heating units - Electric Resistance	7.65	13.8	11	4.91	3.67	3.58	3.63
(%)							
Sales of space heating units - Fossil (%)	3.24	5.67	4.53	2.12	1.56	1.5	1.52
Sales of space heating units - Gas (%)	83.5	66	47.3	10.4	2.8	2.21	2.19
Sales of water heating units - Electric Heat Pump	0	0.93	12.1	36.4	41.4	41.7	41.8
(%)							
Sales of water heating units - Electric Resistance	13.2	25.9	34.2	52.7	56.7	57	57
(%)							
Sales of water heating units - Gas Furnace (%)	85.7	72	52.4	9.64	0.728	0.02	0
Sales of water heating units - Other (%)	1.07	1.23	1.23	1.23	1.21	1.21	1.21

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

Item	2020	2025	2030	2035	2040	2045	2050
Light-duty vehicle capital costs - Cumulative 5-yr	0	1,014	2,644	4,211	6,408	6,943	6,637
(million \$2018)							
Public EV charging plugs - DC Fast (1000 units)	0.303	0	1.77	0	7.25	0	11.6
Public EV charging plugs - L2 (1000 units)	2.12	0	42.5	0	174	0	280
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 (%)	1.78	2.01	1.35	0.434	0.078	0.013	0
Vehicle sales - Light-duty - EV (%)	3.16	12.9	42.9	80.4	96.2	99.3	100
Vehicle sales - Light-duty - gasoline (%)	91.2	80.6	52.5	18	3.48	0.596	0
Vehicle sales - Light-duty - hybrid (%)	3.68	4.01	2.95	1.12	0.269	0.057	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.353	0.221	0.07	0.014	0.002	0
Vehicle sales - Light-duty - other (%)	0.112	0.108	0.073	0.026	0.005	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 FC (%)	0.196	1.27	6.33	15.2	19.1	19.9	20
Vehicle sales - Medium-duty - other (%)	0.253	0.255	0.205	0.083	0.019	0.004	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	162	162	159	152	144	138	135
Final energy use - Industry (PJ)	171	180	187	200	221	233	246
Final energy use - Residential (PJ)	237	229	221	199	170	148	133
Final energy use - Transportation (PJ)	472	443	394	334	279	243	226

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

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s -	0	14,374	15,990	0	0	0	0
Cumulative 5-yr (million \$2018)							
Sales of cooking units - Electric Resistance (%)	41.9	54.6	83	88.6	88.9	88.9	88.9
Sales of cooking units - Gas (%)	58.1	45.4	17	11.4	11.1	11.1	11.1
Sales of space heating units - Electric Heat Pump (%)	2.64	8.18	30.6	79.8	90	90.8	90.8
Sales of space heating units - Electric Resistance (%)	2.48	3.49	4.92	8.08	8.66	8.7	8.7
Sales of space heating units - Fossil (%)	0	0.208	0.04	0.002	0	0	0

Table 4: F+ scenario	DILLAD 1. Efficience	V/Flootnification	Commonaial	(continued)
- 1able 4: E+ Scenorio :	- PILLAR I: EIIICIRNO	:v/E18C11'111C011011	- Gommerciai	rconunuear

Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Gas Furnace (%)	94.9	88.1	64.4	12.2	1.37	0.522	0.498
Sales of water heating units - Electric Heat Pump (%)	0.022	1.12	14.3	42.9	48.9	49.4	49.4
Sales of water heating units - Electric Resistance (%)	1.1	2.5	15.4	43.8	49.7	50.2	50.2
Sales of water heating units - Gas Furnace (%)	98.6	96	69.9	12.9	0.972	0.027	0
Sales of water heating units - Other (%)	0.269	0.383	0.382	0.383	0.382	0.383	0.383

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

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -	0	2.81	2.93	5.73	6.16	6.1	6.47
Cumulative 5-yr (billion \$2018)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Capital invested - Biomass power plant (billion	0	0	0	0	0	0	0
\$2018)							
Capital invested - Biomass w/ccu allam power	0	0	0	0	0	0.01	0
plant (billion \$2018)							
Capital invested - Biomass w/ccu power plant	0	0	0	0	0	0.041	0.399
(billion \$2018)							
Capital invested - Solar PV - Base (billion \$2018)	0	0.669	0.644	2.54	2.97	3.43	2.48
Capital invested - Solar PV - Constrained (billion	0	1.95	1.04	2.19	2.61	2.02	0.721
\$2018)							
Capital invested - Wind - Base (billion \$2018)	0	0.226	1.91	0.621	2.45	2.98	1.38
Capital invested - Wind - Constrained (billion	0	1.32	2.22	2.91	6.72	6.61	3.73
\$2018)							

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	9.89	9.89
Biomass w/ccu power plant (GWh)	0	0	0	0	0	46.2	494
Solar - Base land use assumptions (GWh)	1,142	1,091	1,209	5,124	6,381	7,849	6,054
Solar - Constrained land use assumptions (GWh)	856	0	2,293	6,152	8,882	3,132	5,821
Wind - Base land use assumptions (GWh)	16,760	572	5,100	1,679	7,152	8,907	4,322
Wind - Constrained land use assumptions (GWh)	16,760	587	2,499	4,372	15,416	15,442	9,986

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

Tuble 6. E. decitat to Tillian 6. Great facto Br	Jerrer gy						
Item	2020	2025	2030	2035	2040	2045	2050
Biomass purchases (million \$2018/year)	0	0	0	0	23.6	190	345
Conversion capital investment - Cumulative 5-yr	0	0	0	0	330	2,342	2,221
(million \$2018)							
Number of facilities - Allam power w ccu	0	0	0	0	0	1	1
(quantity)							
Number of facilities - Beccs hydrogen (quantity)	0	0	0	0	1	3	5
Number of facilities - Diesel (quantity)	0	0	0	0	0	0	0
Number of facilities - Diesel ccu (quantity)	0	0	0	0	0	1	1
Number of facilities - Power (quantity)	0	0	0	0	0	0	0
Number of facilities - Power ccu (quantity)	0	0	0	0	0	2	3
Number of facilities - Pyrolysis (quantity)	0	0	0	0	0	0	0
Number of facilities - Pyrolysis ccu (quantity)	0	0	0	0	0	1	1
Number of facilities - Sng (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng ccu (quantity)	0	0	0	0	0	1	1

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)	0	0	0.02	3.38	3.77	6.87	9.81
Annual - BECCS (MMT)	0	0	0	0	0.42	3.41	6.22
Annual - Cement and lime (MMT)	0	0	0	3.35	3.32	3.42	3.53
Annual - NGCC (MMT)	0	0	0.02	0.02	0.03	0.03	0.05
Cumulative - All (MMT)	0	0	0.02	3.4	7.17	14	23.9
Cumulative - BECCS (MMT)	0	0	0	0	0.42	3.83	10.1
Cumulative - Cement and lime (MMT)	0	0	0	3.35	6.67	10.1	13.6
Cumulative - NGCC (MMT)	0	0	0.02	0.04	0.07	0.1	0.15

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

Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (MMT)	0	0	0	0.88	0.9	1.72	2.8
Injection wells (wells)	0	0	0	2	3	5	6
Resource characterization, appraisal, permitting	0	36	86.3	101	101	101	101
costs (million \$2020)							
Wells and facilities construction costs (million	0	0	12	46.7	83.2	139	173
\$2020)							

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

Item	2020	2025	2030	2035	2040	2045	2050
All (km)	0	0	256	556	861	1,099	2,219
Cumulative investment - All (million \$2018)	0	0	1,225	1,484	1,687	1,902	2,649
Cumulative investment - Spur (million \$2018)	0	0	0.3	259	463	677	1,424
Cumulative investment - Trunk (million \$2018)	0	0	1,225	1,225	1,225	1,225	1,225
Spur (km)	0	0	0.5	301	605	843	1,963
Trunk (km)	0	0	255	255	255	255	255

Table 12: E+ scenario - PILLAR 6: Land sinks - Agriculture

Corn-ethanol to energy grasses (1000 tC02e/y) Carbon sink potential - Aggressive deployment - 0 0 -2,0 Cropland measures (1000 tC02e/y)	14
Carbon sink potential - Aggressive deployment - 0 0 -2,6 Cropland measures (1000 tC02e/y) Carbon sink potential - Aggressive deployment - 0 0 -2	14
Cropland measures (1000 tC02e/y) Carbon sink potential - Aggressive deployment - 0 0 -2	14
Carbon sink potential - Aggressive deployment - 0 0 -2	
Permanent conservation cover (1000 tCO2e/y)	
	7.0
Carbon sink potential - Aggressive deployment - 0 0 -3,0	48
Total (1000 tCO2e/y)	
Carbon sink potential - Moderate deployment - 0 0 -	73
Corn-ethanol to energy grasses (1000 tCO2e/y)	
Carbon sink potential - Moderate deployment - 0 0 -1,3	34
Cropland measures (1000 tCO2e/y)	
Carbon sink potential - Moderate deployment - 0 0 -1	07
Permanent conservation cover (1000 tCO2e/y)	
Carbon sink potential - Moderate deployment - 0 0 -1,6	54
Total (1000 tCO2e/y)	
Land impacted for carbon sink - Aggressive 0 0	72
deployment - Corn-ethanol to energy grasses	
(1000 hectares)	
Land impacted for carbon sink - Aggressive 0 0, 3,5	77
deployment - Cropland measures (1000	
hectares)	
Land impacted for carbon sink - Aggressive 0 0 3	29
deployment - Permanent conservation cover	
(1000 hectares)	
Land impacted for carbon sink - Aggressive 0 0 4,4	78
deployment - Total (1000 hectares)	
	72
deployment - Corn-ethanol to energy grasses	
(1000 hectares)	

Table 12: E+ scenario - PILLAR 6: Land sinks - Agriculture (continued)

Item	2020	2025	2050
Land impacted for carbon sink - Moderate	0	0	2,071
deployment - Cropland measures (1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	164
deployment - Permanent conservation cover			
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	2,407
deployment - Total (1000 hectares)			

Table 13: E+ scenario - PILLAR 6: Land sinks - Fo	rests		
Item	2020	2025	2050
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)	0	0	1,620
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)	0	0	48,148
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)	0	0	1,559
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)	0	0	9,233
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)	0	0	26.8
Carbon sink potential - High - Increase retention of HWP (1000 tC02e/y)	0	0	174
Carbon sink potential - High - Increase trees outside forests (1000 tC02e/y)	0	0	1,273
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)	0	0	24,902
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)	0	0	3,239
Carbon sink potential - High - Restore productivity (1000 tC02e/y)	0	0	6,121
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)	0	0	812
Carbon sink potential - Low - All (not counting overlap) (1000 tC02e/y)	0	0	19,895
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)	0	0	260
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)	0	0	3,547
Carbon sink potential - Low - Improve plantations (1000 tC02e/y)	0	0	13.7
Carbon sink potential - Low - Increase retention of HWP (1000 tC02e/y)	0	0	58.1
Carbon sink potential - Low - Increase trees outside forests (1000 tC02e/y)	0	0	446
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)	0	0	12,451
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)	0	0	245
Carbon sink potential - Low - Restore productivity (1000 tC02e/y)	0	0	2,063
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)	0	0	1,216
Carbon sink potential - Mid - All (not counting overlap) (1000 tC02e/y)	0	0	34,021
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)	0	0	909
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)	0	0	6,390
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)	0	0	20
Carbon sink potential - Mid - Increase retention of HWP (1000 tC02e/y)	0	0	116

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

Team	Table 13: E+ scenario - PILLAR 6: Land sinks - Fo	rests (contin	ued)	
outside forests (1000 tC02e/y) 0 18,676 Carbon sink potential - Mid - Reforest cropland (1000 tC02e/y) 0 1,742 Carbon sink potential - Mid - Reforest pasture (1000 tC02e/y) 0 1,742 Carbon sink potential - Mid - Restore productivity (1000 tC02e/y) 0 4,092 productivity (1000 tC02e/y) Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares) 0 265 Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) 0 271 Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) 0 4,708 Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) 0 9,889 Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) 0 0 Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) 0 0 Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) 0 0 Land impacted for carbon sink potential - High - Rostore productivity (1000 hectares) 0 0 Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) 0 0 <td></td> <td>2020</td> <td>2025</td> <td>2050</td>		2020	2025	2050
Carbon sink potential - Mid - Reforest cropland 0		0	0	859
(1000 tC02e/y) Carbon sink potential - Mid - Reforest pasture 0	outside forests (1000 tCO2e/y)			
Carbon sink potential - Mid - Reforest pasture 0	Carbon sink potential - Mid - Reforest cropland	0	0	18,676
Carbon sink potential - Mid - Restore				
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/v) 265 26	Carbon sink potential - Mid - Reforest pasture	0	0	1,742
Decounts				
Decounts	Carbon sink potential - Mid - Restore	0	0	4,092
Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - High - O O O O O O O O O O O O O O O O O O				
Land impacted for carbon sink potential - High - Novel deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) Land impacted for carbon sink potential - High - 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 - Restore productivity (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 - Restore productivity (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 - Restore productivity (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 - Restore productivity (1000 hectares) Land impacted for carbon sink potenti	Land impacted for carbon sink potential - High -	0	0	265
Land impacted for carbon sink potential - High - Novel deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) Land impacted for carbon sink potential - High - 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 - Restore productivity (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 - Restore productivity (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 - Restore productivity (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 - Restore productivity (1000 hectares) Land impacted for carbon sink potenti				
Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - High - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - High - Important of the potential - Important of the pot		0	0	211
Land impacted for carbon sink potential - High - Carbon sink potential - Low - Carbon sink potentia	·			
Land impacted for carbon sink potential - High - Land impacted for carbon sink potential - High - Land impacted for carbon sink potential - High - Land impacted for carbon sink potential - High - Land impacted for carbon sink potential - High - Land impacted for carbon sink potential - High - Land impacted for carbon sink potential - High - Land impacted for carbon sink potential - High - Land impacted for carbon sink potential - High - Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Ligh - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Low - O O O 133 Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Low - O O 198 Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - O O 198 Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - O O 1,804 Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Low - O O 0 4,95 Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low - O O 0 6,3.7 Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Low - O O 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				
Extend rotation length (1000 hectares) Land impacted for carbon sink potential - High- Improve plantations (1000 hectares) Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Low - Recelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - Low - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - Low - Reforest cropland (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 year		0	0	4.708
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) Decided to the provided to the provid				,
Improve plantations (1000 hectares)		0	0	9.89
Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares) Comparison of the Compari			-	
Increase retention of HWP (1000 hectares)		0	0	0
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) Land impacted for carbon sink potential - High - Restore productivity (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 - Restore and impacted for carbon sink potential - Low - Restore and impacted for carbon sink potential - Low - Restore and impacted for carbon sink potential - Low - Restore 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 - Restore productivity (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 - Restore productivity (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 - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Rid - 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			0	0
Increase trees outside forests (1000 hectares) Indi impacted for carbon sink potential - High - Reforest cropland (1000 hectares) Indi impacted for carbon sink potential - High - Reforest pasture (1000 hectares) Indi impacted for carbon sink potential - High - Reforest pasture (1000 hectares) Indi impacted for carbon sink potential - High - Restore productivity (1000 hectares) Indi impacted for carbon sink potential - High - Restore productivity (1000 hectares) Indi impacted for carbon sink potential - Low - Indi impacted (over 30 years) (1000 hectares) Indi impacted for carbon sink potential - Low - Indi impacted for carbon sink potential - Low - Indi impacted for carbon sink potential - Indi - Indi impacted for carbon sink potential - Indi - Indi impacted for carbon sink potential - Indi - Indi impacted for carbon sink potential - Indi - Indi Impacted for carbon sink potential - Indi - Indi Impacted for carbon sink potential - Indi - Indi Impacted for carbon sink potential - Indi - Indi Impacted for carbon sink potential - Indi - Indi Impacted for carbon sink potential - Indi - Indi Impa		0	0	121
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) Land impacted (over 30 years) (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 - Restore productivity (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 - Restore productivity (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 - Restorest cropland (1000 hectares) Land impacted for carbon sink potential - Low - Restorest cropland (1000 hectares) Land impacted for carbon sink potential - Low - Restorest cropland (1000 hectares) Land impacted for carbon sink potential - Low - Restorest productivity (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 - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Low - 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 plantations (1000 hectares) Land impacted for carbon sink			0	121
Reforest cropland (1000 hectares) Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) Land impacted for carbon sink potential - High - Total impacted for carbon sink potential - High - Total impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Land impacted for carbon sink potential - Low - Land impacted for carbon sink potential - Low - Land impacted for carbon sink potential - Low - Land impacted for carbon sink potential - Low - Land impacted for carbon sink potential - Low - Land impacted for carbon sink potential - Low - Land impacted for carbon sink potential - Low - Land impacted for carbon sink potential - Low - 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 - Reforest pasture (1000 hectares) Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Low - O O O O O O O O O O O O O O O O O O		0	0	1 4 / . 4
Land impacted for carbon sink potential - High - Reforest pasture (1000 hectares) Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) Land impacted for carbon sink potential - High - O O O O O O O O O O O O O O O O O O			0	1,040
Reforest pasture (1000 hectares) Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Avoid deforestation length (1000 hectares) Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) 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 - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Low - Total impacted for carbon sink potential - Low - Restore productivity (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 - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Mid - Avoid deforestation length (1000 hectares) Land impacted for carbon sink potential - Mid - Avoid deforestation for Avoid hectares) Land impacted for carbon sink potential - Mid - Avoid deforestation of HWP (1000 hectares) Land impacted for carbon sink potential - Mid - Improve plantations (1000 he		0	0	00
Land impacted for carbon sink potential - High - Restore productivity (1000 hectares) Land impacted for carbon sink potential - High - Total impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) 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 - O O 1,228 Restore productivity (1000 hectares) Land impacted for carbon sink potential - Low - O O 1,228 Restore productivity (1000 hectares) Land impacted for carbon sink potential - Mid - O O 199 Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Mid - O O 205 Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Mid - O O 7,44 Improve plantations (1000 hectares) Land impacted for carbon sink potential - Mid - O O 7,44 Improve plantations (1000 hectares) Land impacted for carbon sink potential - Mid - O O 7,44 Improve plantations (1000 hectares) Land impacted for carbon sink potential - Mid - O O 7,44 Improve plantations (1000 hectares) Land impacted for carbon sink potential - Mid - O O 7,44 Improve plantations (1000 hectares) Land impacted for carbo		0	0	92
Restore productivity (1000 hectares) Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - Low - O O S23 Reforest cropland (1000 hectares) Land impacted for carbon sink potential - Low - O O S23 Land impacted for carbon sink potential - Low - O O S24 Land impacted for carbon sink potential - Low - O O S25 Land impacted for carbon sink potential - Low - O O O S25 Land impacted for carbon sink potential - Low - O O O S26 Land impacted for carbon sink potential - Low - O O O O O O O O O O O O O O O O O O			0	0.000
Land impacted for carbon sink potential - High - Total impacted (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - O O O O O O O O O O O O O O O O O O		0	U	2,029
Total impacted (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low -				0.000
Land impacted for carbon sink potential - Low - Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low - Improve plantation (1000 hectares) Land impacted for carbon sink potential - Mid - Improve plantation (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 - Improve plantations (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 - Improve plantations (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 - Improve plantations (1000 hectares) Land impacted for carbon sink potential -		0	U	9,083
Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Low -				
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Low - Detail impacted for carbon sink potential - Mid - Detail im		0	0	133
Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Low - 0 0 4.95 Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low - 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				
hectares) Land impacted for carbon sink potential - Low -		0	0	198
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) 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 (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 - 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 - Improve plantations (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 - Improve plantations (1000 hectares)				
Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside forest (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside for carbon sink potential - Low - Increase trees outside for carbon sink potential - Low - Increase trees outside for carbon sink potential - Low - Increase trees outside for carbon sink potential - Mid - Increase trees outside 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 - 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 - Low - Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside for carbon sink potential - Low - Increase trees outside for carbon sink potential - Low - Increase trees outside for carbon sink potential - Low - Increase retention (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 - 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)	·	0	0	1,804
Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low -				
Land impacted for carbon sink potential - Low - Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - Low - OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO	·	0	0	4.95
Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Low -	Improve plantations (1000 hectares)			
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 - O O O O O O O O O O O O O O O O O O		0	0	0
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 - O O O O O O O O O O O O O O O O O O	Increase retention of HWP (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 - Mid - Restore regeneration (1000 hectares) Land impacted for carbon sink potential - Mid - Restore regeneration (1000 hectares) Land impacted for carbon sink potential - Mid - Restored for carb	Land impacted for carbon sink potential - Low -	0	0	63.7
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 - O O O O O O O O O O O O O O O O O O				
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 - O O O O O O O O O O O O O O O O O O	Land impacted for carbon sink potential - Low -	0	0	823
Reforest pasture (1000 hectares) Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Low - O O O O O O O O O O O O O O O O O O	Reforest cropland (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 - 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 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 - Low -	0	0	15.9
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 - 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 - Increase retention of HWP (1000 hectares)	Reforest pasture (1000 hectares)			
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 - 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 - Increase retention of HWP (1000 hectares)	Land impacted for carbon sink potential - Low -	0	0	1,228
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 - 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)	·			
Total impacted (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Mid -		0	0	4.270
Land impacted for carbon sink potential - Mid - O O 199 Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Mid - O O 205 Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Mid - O O 3,256 Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Mid - O O 7.44 Improve plantations (1000 hectares) Land impacted for carbon sink potential - Mid - O O O O O O O O O O O O O O O O O O				.,
Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - Mid -		0	0	199
Land impacted for carbon sink potential - Mid - OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO				.,,
Avoid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Mid -		0	0	205
hectares) Land impacted for carbon sink potential - Mid - 0 0 3,256 Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Mid - 0 0 7.44 Improve plantations (1000 hectares) Land impacted for carbon sink potential - Mid - 0 0 0 Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Mid - 0 0 92.3			0	200
Land impacted for carbon sink potential - Mid -	· · · · · · · · · · · · · · · · · · ·			
Extend rotation length (1000 hectares) Land impacted for carbon sink potential - Mid - 0 7.44 Improve plantations (1000 hectares) Land impacted for carbon sink potential - Mid - 0 0 0 Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Mid - 0 0 92.3		n	n	3 254
Land impacted for carbon sink potential - Mid - 0 0 7.44 Improve plantations (1000 hectares) Land impacted for carbon sink potential - Mid - 0 0 0 Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Mid - 0 0 92.3		"	U	3,230
Improve plantations (1000 hectares) Land impacted for carbon sink potential - Mid - 0 0 0 Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Mid - 0 0 92.3			0	7//
Land impacted for carbon sink potential - Mid - 0 0 0 Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Mid - 0 0 92.3		"	U	1.44
Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Mid - 0 0 92.3				
Land impacted for carbon sink potential - Mid - 0 92.3		0	U	U
				20.0
THE THE SOUTSIDE TO PESTS (1000 NECTAPES)		U	U	92.3
	increase trees outside forests (1000 hectares)			

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

Item	2020	2025	2050
Land impacted for carbon sink potential - Mid -	0	0	1,235
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	115
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	2,472
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	7,582
Total impacted (over 30 years) (1000 hectares)			

Table 14: E+ scenario - IMPACTS - Health

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal	0	221	0.265	0.264	0.2	0.124	0.001
(million 2019\$)							
Monetary damages from air pollution - Natural	0	278	224	189	184	111	26.5
Gas (million 2019\$)							
Monetary damages from air pollution -	0	914	899	717	433	203	77.7
Transportation (million 2019\$)							
Premature deaths from air pollution - Coal	0	24.8	0.03	0.03	0.022	0.014	0
(deaths)							
Premature deaths from air pollution - Natural	0	31.4	25.4	21.3	20.8	12.6	2.99
Gas (deaths)							
Premature deaths from air pollution -	0	103	101	80.7	48.7	22.8	8.74
Transportation (deaths)							

Table 15: E+ scenario - IMPACTS - Jobs

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)	226	227	238	217	150	226	312
By economic sector - Construction (jobs)	12,365	11,496	11,816	13,596	15,058	16,387	17,444
By economic sector - Manufacturing (jobs)	12,772	12,947	16,996	19,901	17,693	15,315	15,730
By economic sector - Mining (jobs)	17,342	14,440	11,148	8,609	5,627	3,632	2,001
By economic sector - Other (jobs)	1,101	908	996	1,497	1,953	2,417	3,325
By economic sector - Pipeline (jobs)	1,253	1,289	1,273	1,048	827	631	478
By economic sector - Professional (jobs)	7,212	6,910	6,768	7,408	8,021	8,895	9,641
By economic sector - Trade (jobs)	8,160	7,383	6,697	6,720	6,405	6,459	6,735
By economic sector - Utilities (jobs)	7,546	7,757	8,117	9,529	11,820	13,543	13,159
By education level - All sectors - Associates	19,960	18,679	19,184	20,847	21,005	21,249	21,888
degree or some college (jobs)							
By education level - All sectors - Bachelors	15,744	14,729	14,484	14,975	14,290	13,975	13,963
degree (jobs)							
By education level - All sectors - Doctoral degree	527	491	464	471	461	469	482
(jobs)							
By education level - All sectors - High school	28,045	25,997	26,575	28,796	28,463	28,478	29,132
diploma or less (jobs)							
By education level - All sectors - Masters or	3,702	3,461	3,342	3,437	3,335	3,333	3,359
professional degree (jobs)							
By resource sector - Biomass (jobs)	561	553	552	488	376	833	1,367
By resource sector - CO2 (jobs)	0	18.7	861	190	326	524	982
By resource sector - Coal (jobs)	3,653	1,735	395	82.3	68.3	59.3	51.9
By resource sector - Grid (jobs)	6,671	8,248	9,262	14,112	18,554	22,996	22,700
By resource sector - Natural Gas (jobs)	15,690	14,315	12,133	9,627	8,311	5,968	4,045
By resource sector - Nuclear (jobs)	0	0	0.003	0.007	0.008	0.018	0.03
By resource sector - Oil (jobs)	26,301	25,199	22,582	20,059	14,539	10,815	6,718
By resource sector - Solar (jobs)	11,163	7,221	8,199	13,796	15,639	17,400	23,905
By resource sector - Wind (jobs)	3,938	6,068	10,065	10,172	9,741	8,906	9,055
Median wages - Annual - All (\$2019 per job)	66,500	67,769	67,624	67,470	67,966	68,698	68,703
On-Site or In-Plant Training - Total jobs - 1 to 4	10,677	9,981	10,136	10,912	10,911	10,988	11,200
years (jobs)							
On-Site or In-Plant Training - Total jobs - 4 to 10	4,135	3,880	3,854	4,119	4,254	4,400	4,481
years (jobs)							
On-Site or In-Plant Training - Total jobs - None	10,990	10,232	10,367	11,085	10,907	10,893	11,212
(jobs)							

Table 15:	E+ scenario -	IMPACTS	Johs	(continued)
Table 10.	L' SCCHUITO	11'11 7010		i Continuaca.

Item	2020	2025	2030	2035	2040	2045	2050
On-Site or In-Plant Training - Total jobs - Over 10	495	473	492	542	560	576	592
years (jobs)							
On-Site or In-Plant Training - Total jobs - Up to 1	41,680	38,792	39,199	41,868	40,922	40,646	41,339
year (jobs)							
On-the-Job Training - All sectors - 1 to 4 years	13,588	12,708	12,898	13,881	13,945	14,086	14,368
_(jobs)							
On-the-Job Training - All sectors - 4 to 10 years	3,820	3,575	3,568	3,862	4,069	4,269	4,394
(jobs)							
On-the-Job Training - All sectors - None (jobs)	3,856	3,559	3,531	3,730	3,632	3,615	3,720
On-the-Job Training - All sectors - Over 10 years	676	630	657	709	686	668	688
(jobs)							
On-the-Job Training - All sectors - Up to 1 year	46,036	42,884	43,394	46,344	45,221	44,865	45,654
(jobs)							
Related work experience - All sectors - 1 to 4	25,067	23,367	23,442	24,915	24,462	24,385	24,708
years (jobs)	15 01/	1/ 010	1/ 000	15 077	15 (00	15 / 00	15.015
Related work experience - All sectors - 4 to 10	15,816	14,810	14,920	15,877	15,693	15,688	15,915
years (jobs)	0 / / 0	0.07.7	0.000	0//2	0.701	0.700	0.005
Related work experience - All sectors - None	9,448	8,844	8,982	9,663	9,621	9,689	9,925
[jobs]	1. 1.17	/. 1/.0	/, 010	1. 1.77	1. 21.1	/. 0/7	4,305
Related work experience - All sectors - Over 10	4,416	4,142	4,210	4,477	4,344	4,267	4,305
years (jobs)	10,000	10.107	10 / 0/	10 505	10 / 0/	10 /7/	10.071
Related work experience - All sectors - Up to 1	13,229	12,194	12,494	13,595	13,434	13,474	13,971
year (jobs)	/ 501	/ 00/	/ 001	/ /0/	/ 500	/ / 20	/ 700
Wage income - All (million \$2019)	4,521	4,294	4,331	4,624	4,592	4,638	4,729

Table 16: E+ scenario - IMPACTS - Fossil fuel industries

Item	2020	2025	2030	2035	2040	2045	2050
Natural gas consumption - Annual (tcf)	372	377	318	255	192	121	83.7
Natural gas consumption - Cumulative (tcf)	0	0	0	0	0	0	7,678
Natural gas production - Annual (tcf)	1,859	2,061	1,948	1,697	1,435	1,138	884
Oil consumption - Annual (million bbls)	93.8	87.6	75.4	57.8	41.6	28.7	18.8
Oil consumption - Cumulative (million bbls)	0	0	0	0	0	0	1,793
Oil production - Annual (million bbls)	213	230	231	231	183	149	98.9

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

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs. REF -	0	4.41	4.7	0	0	0	0
Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric Resistance (%)	50.3	51.6	56.1	68.1	84.8	95.1	98.7
Sales of cooking units - Gas (%)	49.7	48.4	43.9	31.9	15.2	4.9	1.32
Sales of space heating units - Electric Heat Pump	5.62	13.3	15.8	24.3	44	68.4	82.7
(%)							
Sales of space heating units - Electric Resistance	7.65	13.9	13.5	12.5	10.1	6.84	4.95
(%)							
Sales of space heating units - Fossil (%)	3.24	5.74	5.68	5.1	3.9	2.66	2.01
Sales of space heating units - Gas (%)	83.5	67.1	65	58.1	42	22.1	10.3
Sales of water heating units - Electric Heat Pump	0	0.46	1.74	5.96	16.1	28.9	36.5
(%)							
Sales of water heating units - Electric Resistance	13.2	25.6	26.5	29.7	37.4	47.1	52.9
(%)							
Sales of water heating units - Gas Furnace (%)	85.7	72.7	70.5	63.1	45.3	22.7	9.32
Sales of water heating units - Other (%)	1.07	1.23	1.23	1.23	1.22	1.22	1.21

Table 18: E- scenario - PILLAR 1: Efficiency/Electrification - Transportation

Item	2020	2025	2030	2035	2040	2045	2050
Light-duty vehicle capital costs - Cumulative 5-yr	0	0	172	344	1,178	3,652	5,339
(million \$2018)							
Public EV charging plugs - DC Fast (1000 units)	0.303	0	0.614	0	2.74	0	7.45
Public EV charging plugs - L2 (1000 units)	2.12	0	14.8	0	65.9	0	179
Vehicle sales - Heavy-duty - diesel (%)	97.4	96	91.3	79.8	58.2	32.1	13.7

Table 18: E- scenario -	PTI I AR 1: Efficienc	v/Flectrification - `	Transnortation	(continued)

Item	2020	2025	2030	2035	2040	2045	2050
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 (%)	1.79	2.16	2.1	1.68	1.1	0.567	0.242
Vehicle sales - Light-duty - EV (%)	1.62	4.1	10.6	23.9	46.2	70.6	87
Vehicle sales - Light-duty - gasoline (%)	92.6	88.6	81.5	69.1	48.7	26.4	11.6
Vehicle sales - Light-duty - hybrid (%)	3.8	4.66	5.29	4.92	3.8	2.31	1.14
Vehicle sales - Light-duty - hydrogen FC (%)	0.113	0.387	0.339	0.264	0.191	0.107	0.05
Vehicle sales - Light-duty - other (%)	0.113	0.116	0.107	0.094	0.069	0.038	0.017
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 FC (%)	0.166	0.485	1.37	3.58	7.86	13.2	17
Vehicle sales - Medium-duty - other (%)	0.253	0.266	0.279	0.286	0.258	0.184	0.102

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	162	162	161	160	158	155	151
Final energy use - Industry (PJ)	171	181	188	203	226	238	250
Final energy use - Residential (PJ)	237	229	225	220	212	196	175
Final energy use - Transportation (PJ)	472	446	410	379	355	326	292

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

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s -	0	14,373	15,986	0	0	0	0
Cumulative 5-yr (million \$2018)							
Sales of cooking units - Electric Resistance (%)	41.9	46.2	50.2	60.8	75.4	84.6	87.8
Sales of cooking units - Gas (%)	58.1	53.8	49.8	39.2	24.6	15.4	12.2
Sales of space heating units - Electric Heat Pump	2.64	7.26	9.83	18.3	38.7	64.6	80
(%)							
Sales of space heating units - Electric Resistance	2.48	3.43	3.58	4.11	5.42	7.07	8.03
(%)							
Sales of space heating units - Fossil (%)	0	0.241	0.225	0.171	0.089	0.035	0.016
Sales of space heating units - Gas Furnace (%)	94.9	89.1	86.4	77.4	55.8	28.3	12
Sales of water heating units - Electric Heat Pump	0.022	0.571	2.07	7.05	19	34.1	43.1
(%)							
Sales of water heating units - Electric Resistance	1.1	2	3.47	8.35	20.1	35.1	44
(%)							
Sales of water heating units - Gas Furnace (%)	98.6	97	94.1	84.2	60.5	30.4	12.5
Sales of water heating units - Other (%)	0.269	0.383	0.382	0.383	0.382	0.383	0.383

Table 21: E- scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -	0	2.32	2.38	3.28	3.43	5.13	5.47
Cumulative 5-yr (billion \$2018)							

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

Item	2020	2025	2050
Carbon sink potential - Aggressive deployment -	0	0	-173
Corn-ethanol to energy grasses (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-2,661
Cropland measures (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-214
Permanent conservation cover (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-3,048
Total (1000 tC02e/y)			

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

Table 22. E Section of TEEAN O. Earla Siliks F	igi icaitai c (c	ontinacaj	
Item	2020	2025	2050
Carbon sink potential - Moderate deployment -	0	0	-173
Corn-ethanol to energy grasses (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment -	0	0	-1,384
Cropland measures (1000 tC02e/y)			
Carbon sink potential - Moderate deployment -	0	0	-107
Permanent conservation cover (1000 tC02e/y)			
Carbon sink potential - Moderate deployment -	0	0	-1,664
Total (1000 tC02e/y)			
Land impacted for carbon sink - Aggressive	0	0	172
deployment - Corn-ethanol to energy grasses			
(1000 hectares)			
Land impacted for carbon sink - Aggressive	0	0	3,977
deployment - Cropland measures (1000			
hectares)			
Land impacted for carbon sink - Aggressive	0	0	329
deployment - Permanent conservation cover			
(1000 hectares)			
Land impacted for carbon sink - Aggressive	0	0	4,478
deployment - Total (1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	172
deployment - Corn-ethanol to energy grasses			
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	2,071
deployment - Cropland measures (1000			
hectares)			
Land impacted for carbon sink - Moderate	0	0	164
deployment - Permanent conservation cover			
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	2,407
deployment - Total (1000 hectares)			
- <u> </u>			

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

Item	2020	2025	2050
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)	0	0	1,620
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)	0	0	48,148
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)	0	0	1,559
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)	0	0	9,233
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)	0	0	26.8
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)	0	0	174
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)	0	0	1,273
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)	0	0	24,902
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)	0	0	3,239
Carbon sink potential - High - Restore productivity (1000 tC02e/y)	0	0	6,121
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)	0	0	812
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)	0	0	19,895
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)	0	0	260
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)	0	0	3,547
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)	0	0	13.7

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

Table 23: E- scenario - PILLAR 6: Land sinks - Fo	orests (contin	иеај	
Item	2020	2025	2050
Carbon sink potential - Low - Increase retention	0	0	58.1
of HWP (1000 tCO2e/y)			
Carbon sink potential - Low - Increase trees	0	0	446
outside forests (1000 tCO2e/y)			
Carbon sink potential - Low - Reforest cropland	0	0	12,451
(1000 tC02e/y)			
Carbon sink potential - Low - Reforest pasture	0	0	245
(1000 tCO2e/y)			
Carbon sink potential - Low - Restore	0	0	2,063
productivity (1000 tCO2e/y)			
Carbon sink potential - Mid - Accelerate	0	0	1,216
regeneration (1000 tCO2e/y)			
Carbon sink potential - Mid - All (not counting	0	0	34,021
overlap) (1000 tCO2e/y)			
Carbon sink potential - Mid - Avoid deforestation	0	0	909
(1000 tC02e/y)			
Carbon sink potential - Mid - Extend rotation	0	0	6,390
length (1000 tC02e/y)			•
Carbon sink potential - Mid - Improve plantations	0	0	20
(1000 tC02e/y)			
Carbon sink potential - Mid - Increase retention	0	0	116
of HWP (1000 tCO2e/y)			110
Carbon sink potential - Mid - Increase trees	0	0	859
outside forests (1000 tCO2e/y)			007
Carbon sink potential - Mid - Reforest cropland	0	0	18,676
(1000 tC02e/y)		0	10,010
Carbon sink potential - Mid - Reforest pasture	0	0	1,742
(1000 tCO2e/y)		0	1,172
Carbon sink potential - Mid - Restore	0	0	4,092
productivity (1000 tC02e/y)		0	4,072
Land impacted for carbon sink potential - High -	0	0	265
Accelerate regeneration (1000 hectares)		0	203
Land impacted for carbon sink potential - High -	0	0	211
Avoid deforestation (over 30 years) (1000		0	211
hectares)			
Land impacted for carbon sink potential - High -	0	0	4,708
Extend rotation length (1000 hectares)		0	4,100
Land impacted for carbon sink potential - High -	0	0	9.89
Improve plantations (1000 hectares)	0	0	9.09
	0	0	0
Land impacted for carbon sink potential - High -	0	U	U
Increase retention of HWP (1000 hectares)		0	101
Land impacted for carbon sink potential - High -	0	0	121
Increase trees outside forests (1000 hectares)			1///
Land impacted for carbon sink potential - High -	0	0	1,646
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	92
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	2,029
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	9,083
Total impacted (over 30 years) (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	133
Accelerate regeneration (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	198
Avoid deforestation (over 30 years) (1000			
hectares)			
Land impacted for carbon sink potential - Low -	0	0	1,804
Extend rotation length (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	4.95
	1		
Improve plantations (1000 hectares)			
	0	0	0

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

Thom			2050
Item	2020	2025	2050
Land impacted for carbon sink potential - Low -	0	0	63.7
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	823
Reforest cropland (1000 hectares)		_	
Land impacted for carbon sink potential - Low -	0	0	15.9
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	1,228
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	4,270
Total impacted (over 30 years) (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	199
Accelerate regeneration (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	205
Avoid deforestation (over 30 years) (1000			
hectares)			
Land impacted for carbon sink potential - Mid -	0	0	3,256
Extend rotation length (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	7.44
Improve plantations (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	0
Increase retention of HWP (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	92.3
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	1,235
Reforest cropland (1000 hectares)			.,
Land impacted for carbon sink potential - Mid -	0	0	115
Reforest pasture (1000 hectares)			110
Land impacted for carbon sink potential - Mid -	0	0	2,472
Restore productivity (1000 hectares)		ŭ	∠ ₁ → 1 ∠
Land impacted for carbon sink potential - Mid -	0	0	7,582
Total impacted (over 30 years) (1000 hectares)		٦	1,002
Total illipacted (over 50 years) (1000 liectal es)			

Table 24: E- scenario - IMPACTS - Health

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal	0	221	0.265	0.264	0.2	0.124	0.001
(million 2019\$)							
Monetary damages from air pollution - Natural	0	275	198	169	121	58.2	16.9
Gas (million 2019\$)							
Monetary damages from air pollution -	0	929	987	1,006	945	783	556
Transportation (million 2019\$)							
Premature deaths from air pollution - Coal	0	24.8	0.03	0.03	0.022	0.014	0
(deaths)							
Premature deaths from air pollution - Natural	0	31.1	22.4	19.1	13.7	6.58	1.91
Gas (deaths)							
Premature deaths from air pollution -	0	104	111	113	106	88	62.5
Transportation (deaths)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs. REF -	0	4.42	4.7	0	0	0	0
Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric Resistance (%)	50.5	61	93.3	99.7	100	100	100
Sales of cooking units - Gas (%)	49.5	39	6.67	0.336	0	0	0
Sales of space heating units - Electric Heat Pump	5.62	14.5	37.2	82.6	92	92.7	92.7
(%)							
Sales of space heating units - Electric Resistance	7.65	13.8	11	4.91	3.67	3.58	3.63
(%)							
Sales of space heating units - Fossil (%)	3.24	5.67	4.53	2.12	1.56	1.5	1.52
Sales of space heating units - Gas (%)	83.5	66	47.3	10.4	2.8	2.21	2.19
Sales of water heating units - Electric Heat Pump	0	0.93	12.1	36.4	41.4	41.7	41.8
(%)							

Table 25: E+RE+ scenario - PILLAR 1: Efficiency/Electrification - Residential (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Sales of water heating units - Electric Resistance	13.2	25.9	34.2	52.7	56.7	57	57
(%)							
Sales of water heating units - Gas Furnace (%)	85.7	72	52.4	9.64	0.728	0.02	0
Sales of water heating units - Other (%)	1.07	1.23	1.23	1.23	1.21	1.21	1.21

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

Item	2020	2025	2030	2035	2040	2045	2050
Light-duty vehicle capital costs - Cumulative 5-yr	0	1,014	2,644	4,211	6,408	6,943	6,637
(million \$2018)	U	1,014	2,044	4,211	0,400	0,743	0,031
Public EV charging plugs - DC Fast (1000 units)	0.303	0	1.77	0	7.25	0	11.6
					_	ŭ	
Public EV charging plugs - L2 (1000 units)	2.12	0	42.5	0	174	0	280
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 (%)	1.78	2.01	1.35	0.434	0.078	0.013	0
Vehicle sales - Light-duty - EV (%)	3.16	12.9	42.9	80.4	96.2	99.3	100
Vehicle sales - Light-duty - gasoline (%)	91.2	80.6	52.5	18	3.48	0.596	0
Vehicle sales - Light-duty - hybrid (%)	3.68	4.01	2.95	1.12	0.269	0.057	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.353	0.221	0.07	0.014	0.002	0
Vehicle sales - Light-duty - other (%)	0.112	0.108	0.073	0.026	0.005	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 FC (%)	0.196	1.27	6.33	15.2	19.1	19.9	20
Vehicle sales - Medium-duty - other (%)	0.253	0.255	0.205	0.083	0.019	0.004	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	162	162	159	152	144	138	135
Final energy use - Industry (PJ)	171	180	187	200	221	233	246
Final energy use - Residential (PJ)	237	229	221	199	170	148	133
Final energy use - Transportation (PJ)	472	443	394	334	279	243	226

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

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s -	0	14,374	15,990	0	0	0	0
Cumulative 5-yr (million \$2018)							
Sales of cooking units - Electric Resistance (%)	41.9	54.6	83	88.6	88.9	88.9	88.9
Sales of cooking units - Gas (%)	58.1	45.4	17	11.4	11.1	11.1	11.1
Sales of space heating units - Electric Heat Pump	2.64	8.18	30.6	79.8	90	90.8	90.8
(%)							
Sales of space heating units - Electric Resistance	2.48	3.49	4.92	8.08	8.66	8.7	8.7
(%)							
Sales of space heating units - Fossil (%)	0	0.208	0.04	0.002	0	0	0
Sales of space heating units - Gas Furnace (%)	94.9	88.1	64.4	12.2	1.37	0.522	0.498
Sales of water heating units - Electric Heat Pump	0.022	1.12	14.3	42.9	48.9	49.4	49.4
(%)							
Sales of water heating units - Electric Resistance	1.1	2.5	15.4	43.8	49.7	50.2	50.2
(%)							
Sales of water heating units - Gas Furnace (%)	98.6	96	69.9	12.9	0.972	0.027	0
Sales of water heating units - Other (%)	0.269	0.383	0.382	0.383	0.382	0.383	0.383

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

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -	0	2.81	2.93	5.73	6.16	6.1	6.47
Cumulative 5-yr (billion \$2018)							

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 \$2018)	0	0	2.45	2.57	4.26	7.7	35.7
Capital invested - Wind - Base (billion \$2018)	0	0.715	1.61	2.18	6.64	8.39	38.4

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	1,142	0	4,510	5,224	9,077	17,551	85,919
Solar - Constrained land use assumptions (GWh)	1,142	1,743	6,552	2,471	7,600	13,494	90,049
Wind - Base land use assumptions (GWh)	16,760	1,766	4,273	6,042	18,802	24,359	111,347
Wind - Constrained land use assumptions (GWh)	16,760	706	2,976	14,054	35,526	48,314	152,249

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

Table 52: E+RE+ Scenurio - PILLAR 6: Lunu Siliks	•		
Item	2020	2025	2050
Carbon sink potential - Aggressive deployment -	0	0	-173
Corn-ethanol to energy grasses (1000 tC02e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-2,661
Cropland measures (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-214
Permanent conservation cover (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-3,048
Total (1000 tC02e/y)			
Carbon sink potential - Moderate deployment -	0	0	-173
Corn-ethanol to energy grasses (1000 tC02e/y)			
Carbon sink potential - Moderate deployment -	0	0	-1,384
Cropland measures (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment -	0	0	-107
Permanent conservation cover (1000 tC02e/y)			
Carbon sink potential - Moderate deployment -	0	0	-1,664
Total (1000 tCO2e/y)			
Land impacted for carbon sink - Aggressive	0	0	172
deployment - Corn-ethanol to energy grasses			
(1000 hectares)			
Land impacted for carbon sink - Aggressive	0	0	3,977
deployment - Cropland measures (1000			<i>'</i>
hectares)			
Land impacted for carbon sink - Aggressive	0	0	329
deployment - Permanent conservation cover			
(1000 hectares)			
Land impacted for carbon sink - Aggressive	0	0	4,478
deployment - Total (1000 hectares)			, -
Land impacted for carbon sink - Moderate	0	0	172
deployment - Corn-ethanol to energy grasses		-	
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	2,071
deployment - Cropland measures (1000			_,•
hectares)			
Land impacted for carbon sink - Moderate	0	0	164
deployment - Permanent conservation cover			.0 7
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	2,407
deployment - Total (1000 hectares)		·	2,701
aopioymone Total (1000 hotal 63)			

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

Table 33: E+RE+ scenario - PILLAR 6: Land sinks	- Forests		
Item	2020	2025	2050
Carbon sink potential - High - Accelerate	0	0	1,620
regeneration (1000 tCO2e/y)			
Carbon sink potential - High - All (not counting	0	0	48,148
overlap) (1000 tC02e/y)			
Carbon sink potential - High - Avoid deforestation	0	0	1,559
(1000 tC02e/y)			
Carbon sink potential - High - Extend rotation	0	0	9,233
length (1000 tC02e/y)			-,=
Carbon sink potential - High - Improve	0	0	26.8
plantations (1000 tCO2e/y)			20.0
Carbon sink potential - High - Increase retention	0	0	174
of HWP (1000 tCO2e/y)	0	0	
Carbon sink potential - High - Increase trees	0	0	1,273
outside forests (1000 tC02e/y)	0	0	1,213
Carbon sink potential - High - Reforest cropland	0	0	24,902
	U	0	24,902
(1000 tC02e/y)	0	0	0.000
Carbon sink potential - High - Reforest pasture	0	0	3,239
(1000 tC02e/y)			
Carbon sink potential - High - Restore	0	0	6,121
productivity (1000 tCO2e/y)			
Carbon sink potential - Low - Accelerate	0	0	812
regeneration (1000 tCO2e/y)			
Carbon sink potential - Low - All (not counting	0	0	19,895
overlap) (1000 tCO2e/y)			
Carbon sink potential - Low - Avoid deforestation	0	0	260
(1000 tC02e/y)			
Carbon sink potential - Low - Extend rotation	0	0	3,547
length (1000 tCO2e/y)			-,-
Carbon sink potential - Low - Improve	0	0	13.7
plantations (1000 tCO2e/y)			
Carbon sink potential - Low - Increase retention	0	0	58.1
of HWP (1000 tC02e/y)	0	0	00.1
Carbon sink potential - Low - Increase trees	0	0	446
outside forests (1000 tCO2e/y)	0	0	440
Carbon sink potential - Low - Reforest cropland	0	0	12,451
(1000 tCO2e/y)	o	0	12,431
Carbon sink potential - Low - Reforest pasture	0	0	245
·	U	U	245
(1000 tC02e/y)	0	0	0.070
Carbon sink potential - Low - Restore	0	0	2,063
productivity (1000 tC02e/y)			
Carbon sink potential - Mid - Accelerate	0	0	1,216
regeneration (1000 tCO2e/y)			
Carbon sink potential - Mid - All (not counting	0	0	34,021
overlap) (1000 tCO2e/y)			
Carbon sink potential - Mid - Avoid deforestation	0	0	909
(1000 tC02e/y)			
Carbon sink potential - Mid - Extend rotation	0	0	6,390
length (1000 tCO2e/y)			
Carbon sink potential - Mid - Improve plantations	0	0	20
(1000 tC02e/y)			
Carbon sink potential - Mid - Increase retention	0	0	116
of HWP (1000 tCO2e/y)			
Carbon sink potential - Mid - Increase trees	0	0	859
outside forests (1000 tC02e/y)	0	0	001
Carbon sink potential - Mid - Reforest cropland	0	0	10 474
	U	U	18,676
(1000 tC02e/y)			17/0
Carbon sink potential - Mid - Reforest pasture	0	0	1,742
(1000 tC02e/y)			
Carbon sink potential - Mid - Restore	0	0	4,092
1 11 11 (1000)			
productivity (1000 tCO2e/y)			
productivity (1000 tC02e/y) Land impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares)	0	0	265

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

Table 33: E+RE+ scenario - PILLAR 6: Land sinks	•		
Item	2020	2025	2050
Land impacted for carbon sink potential - High -	0	0	211
Avoid deforestation (over 30 years) (1000			
hectares)			
Land impacted for carbon sink potential - High -	0	0	4,708
Extend rotation length (1000 hectares)		_	.,
Land impacted for carbon sink potential - High -	0	0	9.89
	U	0	7.07
Improve plantations (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	0
Increase retention of HWP (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	121
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	1,646
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	92
Reforest pasture (1000 hectares)	· ·		,_
Land impacted for carbon sink potential - High -	0	0	2,029
	U	0	2,029
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	9,083
Total impacted (over 30 years) (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	133
Accelerate regeneration (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	198
Avoid deforestation (over 30 years) (1000		_	
hectares)			
-	0	0	1,804
Land impacted for carbon sink potential - Low -	U	١	1,004
Extend rotation length (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	4.95
Improve plantations (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	0
Increase retention of HWP (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	63.7
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	823
Reforest cropland (1000 hectares)	o	0	020
	0	0	15.0
Land impacted for carbon sink potential - Low -	0	0	15.9
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	1,228
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	4,270
Total impacted (over 30 years) (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	199
Accelerate regeneration (1000 hectares)			.,,
Land impacted for carbon sink potential - Mid -	0	0	205
	o	0	203
Avoid deforestation (over 30 years) (1000			
hectares)			
Land impacted for carbon sink potential - Mid -	0	0	3,256
Extend rotation length (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	7.44
Improve plantations (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	0
Increase retention of HWP (1000 hectares)	· ·		Ü
Land impacted for carbon sink potential - Mid -	0	0	92.3
	U	0	72.3
Increase trees outside forests (1000 hectares)			1.005
Land impacted for carbon sink potential - Mid -	0	0	1,235
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	115
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	2,472
Restore productivity (1000 hectares)	-	-	, =
Land impacted for carbon sink potential - Mid -	0	0	7,582
Total impacted (over 30 years) (1000 hectares)	5	0	1,002
rotar impacted (over 30 years) (1000 nectares)			

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal	0	221	0.265	0.264	0.2	0.124	0.001
(million 2019\$)							
Monetary damages from air pollution - Natural	0	251	170	108	96.8	46.8	13.5
Gas (million 2019\$)							
Monetary damages from air pollution -	0	914	899	717	433	203	77.7
Transportation (million 2019\$)							
Premature deaths from air pollution - Coal	0	24.8	0.03	0.03	0.022	0.014	0
(deaths)							
Premature deaths from air pollution - Natural	0	28.4	19.2	12.2	10.9	5.28	1.53
Gas (deaths)							
Premature deaths from air pollution -	0	103	101	80.7	48.7	22.8	8.74
Transportation (deaths)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs. REF -	0	4.42	4.7	0	0	0	0
Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric Resistance (%)	50.5	61	93.3	99.7	100	100	100
Sales of cooking units - Gas (%)	49.5	39	6.67	0.336	0	0	0
Sales of space heating units - Electric Heat Pump	5.62	14.5	37.2	82.6	92	92.7	92.7
(%)							
Sales of space heating units - Electric Resistance	7.65	13.8	11	4.91	3.67	3.58	3.63
(%)							
Sales of space heating units - Fossil (%)	3.24	5.67	4.53	2.12	1.56	1.5	1.52
Sales of space heating units - Gas (%)	83.5	66	47.3	10.4	2.8	2.21	2.19
Sales of water heating units - Electric Heat Pump	0	0.93	12.1	36.4	41.4	41.7	41.8
(%)							
Sales of water heating units - Electric Resistance	13.2	25.9	34.2	52.7	56.7	57	57
(%)							
Sales of water heating units - Gas Furnace (%)	85.7	72	52.4	9.64	0.728	0.02	0
Sales of water heating units - Other (%)	1.07	1.23	1.23	1.23	1.21	1.21	1.21

Table 36: E+RE- scenario - PILLAR 1: Efficiency/Electrification - Transportation

Item	2020	2025	2030	2035	2040	2045	2050
Light-duty vehicle capital costs - Cumulative 5-yr	0	1,014	2,644	4,211	6,408	6,943	6,637
(million \$2018)							
Public EV charging plugs - DC Fast (1000 units)	0.303	0	1.77	0	7.25	0	11.6
Public EV charging plugs - L2 (1000 units)	2.12	0	42.5	0	174	0	280
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 (%)	1.78	2.01	1.35	0.434	0.078	0.013	0
Vehicle sales - Light-duty - EV (%)	3.16	12.9	42.9	80.4	96.2	99.3	100
Vehicle sales - Light-duty - gasoline (%)	91.2	80.6	52.5	18	3.48	0.596	0
Vehicle sales - Light-duty - hybrid (%)	3.68	4.01	2.95	1.12	0.269	0.057	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.353	0.221	0.07	0.014	0.002	0
Vehicle sales - Light-duty - other (%)	0.112	0.108	0.073	0.026	0.005	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 FC (%)	0.196	1.27	6.33	15.2	19.1	19.9	20
Vehicle sales - Medium-duty - other (%)	0.253	0.255	0.205	0.083	0.019	0.004	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	162	162	159	152	144	138	135
Final energy use - Industry (PJ)	171	180	187	200	221	233	246
Final energy use - Residential (PJ)	237	229	221	199	170	148	133
Final energy use - Transportation (PJ)	472	443	394	334	279	243	226

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

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s -	0	14,374	15,990	0	0	0	0
Cumulative 5-yr (million \$2018)							
Sales of cooking units - Electric Resistance (%)	41.9	54.6	83	88.6	88.9	88.9	88.9
Sales of cooking units - Gas (%)	58.1	45.4	17	11.4	11.1	11.1	11.1
Sales of space heating units - Electric Heat Pump	2.64	8.18	30.6	79.8	90	90.8	90.8
(%)							
Sales of space heating units - Electric Resistance	2.48	3.49	4.92	8.08	8.66	8.7	8.7
(%)							
Sales of space heating units - Fossil (%)	0	0.208	0.04	0.002	0	0	0
Sales of space heating units - Gas Furnace (%)	94.9	88.1	64.4	12.2	1.37	0.522	0.498
Sales of water heating units - Electric Heat Pump	0.022	1.12	14.3	42.9	48.9	49.4	49.4
(%)							
Sales of water heating units - Electric Resistance	1.1	2.5	15.4	43.8	49.7	50.2	50.2
(%)							
Sales of water heating units - Gas Furnace (%)	98.6	96	69.9	12.9	0.972	0.027	0
Sales of water heating units - Other (%)	0.269	0.383	0.382	0.383	0.382	0.383	0.383

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

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -	0	2.81	2.93	5.73	6.16	6.1	6.47
Cumulative 5-yr (billion \$2018)							

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)	0	1.75	1.27	0.371	2.34	0.528	2.49
Capital invested - Solar PV - Constrained (billion \$2018)	0	1.93	1.68	1.09	2.24	1.88	2.36
Capital invested - Wind - Base (billion \$2018)	0	0.169	1.35	0.606	1.04	1.29	0.427
Capital invested - Wind - Constrained (billion \$2018)	0	0.254	0.437	0.539	2.97	2.95	1.03

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	3,250	2,884	2,354	751	5,088	1,229	5,951
Solar - Constrained land use assumptions (GWh)	1,939	3,134	3,132	2,194	4,791	4,294	5,636
Wind - Base land use assumptions (GWh)	16,760	431	3,659	1,686	3,029	3,949	1,378
Wind - Constrained land use assumptions (GWh)	16,760	587	1,092	1,407	7,802	8,170	2,956

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

Item	2020	2025	2050
Carbon sink potential - Aggressive deployment -	0	0	-173
Corn-ethanol to energy grasses (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-2,661
Cropland measures (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-214
Permanent conservation cover (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-3,048
Total (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment -	0	0	-173
Corn-ethanol to energy grasses (1000 tCO2e/y)			

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

Table 12: ETTE decitation Tiletting: Earlie office	, ig. rourea.	o (comema	caj
Item	2020	2025	2050
Carbon sink potential - Moderate deployment -	0	0	-1,384
Cropland measures (1000 tC02e/y)			
Carbon sink potential - Moderate deployment -	0	0	-107
Permanent conservation cover (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment -	0	0	-1,664
Total (1000 tCO2e/y)			
Land impacted for carbon sink - Aggressive	0	0	172
deployment - Corn-ethanol to energy grasses			
(1000 hectares)			
Land impacted for carbon sink - Aggressive	0	0	3,977
deployment - Cropland measures (1000			
hectares)			
Land impacted for carbon sink - Aggressive	0	0	329
deployment - Permanent conservation cover			
(1000 hectares)			
Land impacted for carbon sink - Aggressive	0	0	4,478
deployment - Total (1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	172
deployment - Corn-ethanol to energy grasses			
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	2,071
deployment - Cropland measures (1000			
hectares)			
Land impacted for carbon sink - Moderate	0	0	164
deployment - Permanent conservation cover			
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	2,407
deployment - Total (1000 hectares)			

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

Item	2020	2025	2050
Carbon sink potential - High - Accelerate regeneration (1000 tCO2e/y)	0	0	1,620
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)	0	0	48,148
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)	0	0	1,559
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)	0	0	9,233
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)	0	0	26.8
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)	0	0	174
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)	0	0	1,273
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)	0	0	24,902
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)	0	0	3,239
Carbon sink potential - High - Restore productivity (1000 tCO2e/y)	0	0	6,121
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)	0	0	812
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)	0	0	19,895
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)	0	0	260
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)	0	0	3,547
Carbon sink potential - Low - Improve plantations (1000 tCO2e/y)	0	0	13.7
Carbon sink potential - Low - Increase retention of HWP (1000 tCO2e/y)	0	0	58.1

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

Table 43: E+RE- scenario - PILLAR 6: Land sinks	- Forests (co	ontinued)	
Item	2020	2025	2050
Carbon sink potential - Low - Increase trees	0	0	446
outside forests (1000 tCO2e/y)			
Carbon sink potential - Low - Reforest cropland	0	0	12,451
(1000 tC02e/y)			,
Carbon sink potential - Low - Reforest pasture	0	0	245
(1000 tC02e/y)			
Carbon sink potential - Low - Restore	0	0	2,063
productivity (1000 tCO2e/y)	0	0	2,000
Carbon sink potential - Mid - Accelerate	0	0	1,216
regeneration (1000 tC02e/y)	0	0	1,210
Carbon sink potential - Mid - All (not counting	0	0	27, 001
	U	U	34,021
overlap) (1000 tC02e/y)	0		000
Carbon sink potential - Mid - Avoid deforestation	0	0	909
(1000 tC02e/y)			/ 000
Carbon sink potential - Mid - Extend rotation	0	0	6,390
length (1000 tC02e/y)			
Carbon sink potential - Mid - Improve plantations	0	0	20
(1000 tCO2e/y)			
Carbon sink potential - Mid - Increase retention	0	0	116
of HWP (1000 tCO2e/y)			
Carbon sink potential - Mid - Increase trees	0	0	859
outside forests (1000 tCO2e/y)			
Carbon sink potential - Mid - Reforest cropland	0	0	18,676
(1000 tC02e/y)			
Carbon sink potential - Mid - Reforest pasture	0	0	1,742
(1000 tC02e/y)			,
Carbon sink potential - Mid - Restore	0	0	4,092
productivity (1000 tCO2e/y)			.,0,2
Land impacted for carbon sink potential - High -	0	0	265
Accelerate regeneration (1000 hectares)	0	0	200
Land impacted for carbon sink potential - High -	0	0	211
Avoid deforestation (over 30 years) (1000	0	0	211
hectares)			
Land impacted for carbon sink potential - High -	0	0	4,708
Extend rotation length (1000 hectares)	U	0	4,700
Land impacted for carbon sink potential - High -	0	0	9.89
	U	U	9.89
Improve plantations (1000 hectares)	0	-	
Land impacted for carbon sink potential - High -	0	0	0
Increase retention of HWP (1000 hectares)			404
Land impacted for carbon sink potential - High -	0	0	121
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	1,646
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	92
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	2,029
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	9,083
Total impacted (over 30 years) (1000 hectares)			•
Land impacted for carbon sink potential - Low -	0	0	133
Accelerate regeneration (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	198
Avoid deforestation (over 30 years) (1000	0	0	170
hectares)			
	0	0	1.00/
Land impacted for carbon sink potential - Low -	0	0	1,804
Extend rotation length (1000 hectares)			/ 05
Land impacted for carbon sink potential - Low -	0	0	4.95
Improve plantations (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	0
Inancasa natantian at IIMD (1000 haatanaa)			
Increase retention of HWP (1000 hectares)			
Land impacted for carbon sink potential - Low - Increase trees outside forests (1000 hectares)	0	0	63.7

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

	1010000		
Item	2020	2025	2050
Land impacted for carbon sink potential - Low -	0	0	823
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	15.9
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	1,228
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	4,270
Total impacted (over 30 years) (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	199
Accelerate regeneration (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	205
Avoid deforestation (over 30 years) (1000			
hectares)			
Land impacted for carbon sink potential - Mid -	0	0	3,256
Extend rotation length (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	7.44
Improve plantations (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	0
Increase retention of HWP (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	92.3
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	1,235
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	115
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	2,472
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	7,582
Total impacted (over 30 years) (1000 hectares)			
*			

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

Table 11121112 decitation 111111616 1164111							
Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal	0	221	0.265	0.264	0.2	0.124	0.001
(million 2019\$)							
Monetary damages from air pollution - Natural	0	267	186	193	368	169	19.3
Gas (million 2019\$)							
Monetary damages from air pollution -	0	914	899	717	433	203	77.7
Transportation (million 2019\$)							
Premature deaths from air pollution - Coal	0	24.8	0.03	0.03	0.022	0.014	0
(deaths)							
Premature deaths from air pollution - Natural	0	30.1	21	21.8	41.5	19	2.18
Gas (deaths)							
Premature deaths from air pollution -	0	103	101	80.7	48.7	22.8	8.74
Transportation (deaths)							

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

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs. REF -	0	4.41	4.7	0	0	0	0
Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric Resistance (%)	50.3	51.6	56.1	68.1	84.8	95.1	98.7
Sales of cooking units - Gas (%)	49.7	48.4	43.9	31.9	15.2	4.9	1.32
Sales of space heating units - Electric Heat Pump	5.62	13.3	15.8	24.3	44	68.4	82.7
(%)							
Sales of space heating units - Electric Resistance	7.65	13.9	13.5	12.5	10.1	6.84	4.95
(%)							
Sales of space heating units - Fossil (%)	3.24	5.74	5.68	5.1	3.9	2.66	2.01
Sales of space heating units - Gas (%)	83.5	67.1	65	58.1	42	22.1	10.3
Sales of water heating units - Electric Heat Pump	0	0.46	1.74	5.96	16.1	28.9	36.5
(%)							
Sales of water heating units - Electric Resistance	13.2	25.6	26.5	29.7	37.4	47.1	52.9
(%)							

Table 45: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Residential (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Sales of water heating units - Gas Furnace (%)	85.7	72.7	70.5	63.1	45.3	22.7	9.32
Sales of water heating units - Other (%)	1.07	1.23	1.23	1.23	1.22	1.22	1.21

Table 46: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Transportation

Item	2020	2025	2030	2035	2040	2045	2050
Light-duty vehicle capital costs - Cumulative 5-yr	0	0	172	344	1,178	3,652	5,339
(million \$2018)							
Public EV charging plugs - DC Fast (1000 units)	0.303	0	0.614	0	2.74	0	7.45
Public EV charging plugs - L2 (1000 units)	2.12	0	14.8	0	65.9	0	179
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 (%)	1.79	2.16	2.1	1.68	1.1	0.567	0.242
Vehicle sales - Light-duty - EV (%)	1.62	4.1	10.6	23.9	46.2	70.6	87
Vehicle sales - Light-duty - gasoline (%)	92.6	88.6	81.5	69.1	48.7	26.4	11.6
Vehicle sales - Light-duty - hybrid (%)	3.8	4.66	5.29	4.92	3.8	2.31	1.14
Vehicle sales - Light-duty - hydrogen FC (%)	0.113	0.387	0.339	0.264	0.191	0.107	0.05
Vehicle sales - Light-duty - other (%)	0.113	0.116	0.107	0.094	0.069	0.038	0.017
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 FC (%)	0.166	0.485	1.37	3.58	7.86	13.2	17
Vehicle sales - Medium-duty - other (%)	0.253	0.266	0.279	0.286	0.258	0.184	0.102

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

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	162	162	161	160	158	155	151
Final energy use - Industry (PJ)	171	181	188	203	226	238	250
Final energy use - Residential (PJ)	237	229	225	220	212	196	175
Final energy use - Transportation (PJ)	472	446	410	379	355	326	292

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

2020	2025	2030	2035	2040	2045	2050
0	14,373	15,986	0	0	0	0
41.9	46.2	50.2	60.8	75.4	84.6	87.8
58.1	53.8	49.8	39.2	24.6	15.4	12.2
2.64	7.26	9.83	18.3	38.7	64.6	80
2.48	3.43	3.58	4.11	5.42	7.07	8.03
0	0.241	0.225	0.171	0.089	0.035	0.016
94.9	89.1	86.4	77.4	55.8	28.3	12
0.022	0.571	2.07	7.05	19	34.1	43.1
1.1	2	3.47	8.35	20.1	35.1	44
ı						
98.6	97	94.1	84.2	60.5	30.4	12.5
0.269	0.383	0.382	0.383	0.382	0.383	0.383
	0 41.9 58.1 2.64 2.48 0 94.9 0.022 1.1	41.9 46.2 58.1 53.8 2.64 7.26 2.48 3.43 0 0.241 94.9 89.1 0.022 0.571 1.1 2 98.6 97	0 14,373 15,986 41.9 46.2 50.2 58.1 53.8 49.8 2.64 7.26 9.83 2.48 3.43 3.58 0 0.241 0.225 94.9 89.1 86.4 0.022 0.571 2.07 1.1 2 3.47 98.6 97 94.1	0 14,373 15,986 0 41.9 46.2 50.2 60.8 58.1 53.8 49.8 39.2 2.64 7.26 9.83 18.3 2.48 3.43 3.58 4.11 0 0.241 0.225 0.171 94.9 89.1 86.4 77.4 0.022 0.571 2.07 7.05 1.1 2 3.47 8.35 98.6 97 94.1 84.2	0 14,373 15,986 0 0 41.9 46.2 50.2 60.8 75.4 58.1 53.8 49.8 39.2 24.6 2.64 7.26 9.83 18.3 38.7 2.48 3.43 3.58 4.11 5.42 0 0.241 0.225 0.171 0.089 94.9 89.1 86.4 77.4 55.8 0.022 0.571 2.07 7.05 19 1.1 2 3.47 8.35 20.1 98.6 97 94.1 84.2 60.5	0 14,373 15,986 0 0 0 41.9 46.2 50.2 60.8 75.4 84.6 58.1 53.8 49.8 39.2 24.6 15.4 2.64 7.26 9.83 18.3 38.7 64.6 2.48 3.43 3.58 4.11 5.42 7.07 0 0.241 0.225 0.171 0.089 0.035 94.9 89.1 86.4 77.4 55.8 28.3 0.022 0.571 2.07 7.05 19 34.1 1.1 2 3.47 8.35 20.1 35.1 98.6 97 94.1 84.2 60.5 30.4

Table 49: E-B+ scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

••	•		•				
Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -	0	2.32	2.38	3.28	3.43	5.13	5.47
Cumulative 5-yr (billion \$2018)							

lo 50· F_R+ cconario	DILLAD O. Clock	n Flootnioitu	Cononatina	aanaaitu

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	0.009	0	0.042
Capital invested - Biomass w/ccu power plant (billion \$2018)	0	0	0	0	0.139	0	0.584

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	9	9	51
Biomass w/ccu power plant (GWh)	0	0	0	0	156	156	812

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	117	458	500
Conversion capital investment - Cumulative 5-yr	0	0	0	0	1,360	3,889	588
(million \$2018)							
Number of facilities - Allam power w ccu	0	0	0	0	1	1	2
(quantity)							
Number of facilities - Beccs hydrogen (quantity)	0	0	0	0	1	5	5
Number of facilities - Diesel (quantity)	0	0	0	0	0	0	0
Number of facilities - Diesel ccu (quantity)	0	0	0	0	1	1	1
Number of facilities - Power (quantity)	0	0	0	0	0	0	0
Number of facilities - Power ccu (quantity)	0	0	0	0	1	1	2
Number of facilities - Pyrolysis (quantity)	0	0	0	0	0	0	0
Number of facilities - Pyrolysis ccu (quantity)	0	0	0	0	1	1	1
Number of facilities - Sng (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng ccu (quantity)	0	0	0	0	0	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	3.38	5.08	10.2	11
Annual - BECCS (MMT)	0	0	0	0	1.72	6.72	7.4
Annual - Cement and lime (MMT)	0	0	0	3.35	3.32	3.42	3.53
Annual - NGCC (MMT)	0	0	0	0.03	0.04	0.04	0.04
Cumulative - All (MMT)	0	0	0	3.38	8.46	18.6	29.6
Cumulative - BECCS (MMT)	0	0	0	0	1.72	8.44	15.8
Cumulative - Cement and lime (MMT)	0	0	0	3.35	6.67	10.1	13.6
Cumulative - NGCC (MMT)	0	0	0	0.03	0.07	0.11	0.15

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

Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (MMT)	0	0	0	2.14	3.56	4.92	5.02
Injection wells (wells)	0	0	1	3	6	9	12
Resource characterization, appraisal, permitting costs (million \$2020)	0	36	101	129	129	129	129
Wells and facilities construction costs (million \$2020)	0	0	24	93.3	166	278	345

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

Item	2020	2025	2030	2035	2040	2045	2050
All (km)	0	0	256	696	1,003	1,698	2,129
Cumulative investment - All (million \$2018)	0	0	1,225	1,699	2,013	2,575	2,836
Cumulative investment - Spur (million \$2018)	0	0	0.299	360	674	1,236	1,497
Cumulative investment - Trunk (million \$2018)	0	0	1,225	1,339	1,339	1,339	1,339
Spur (km)	0	0	0.5	441	747	1,442	1,874
Trunk (km)	0	0	255	255	255	255	255

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

Table 56: E-B+ scenario - PILLAR 6: Land sinks	- Agriculture		
Item	2020	2025	2050
Carbon sink potential - Aggressive deployment -	0	0	-376
Corn-ethanol to energy grasses (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-2,573
Cropland measures (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	0
Cropland to woody energy crops (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	0
Pasture to energy crops (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-205
Permanent conservation cover (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-3,153
Total (1000 tC02e/y)			
Carbon sink potential - Moderate deployment -	0	0	-376
Corn-ethanol to energy grasses (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment -	0	0	-1,338
Cropland measures (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment -	0	0	0
Cropland to woody energy crops (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment -	0	0	0
Pasture to energy crops (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment -	0	0	-102
Permanent conservation cover (1000 tC02e/y)			
Carbon sink potential - Moderate deployment -	0	0	-1,815
Total (1000 tC02e/y)			.
Land impacted for carbon sink - Aggressive	0	0	313
deployment - Corn-ethanol to energy grasses			
(1000 hectares)			
Land impacted for carbon sink - Aggressive	0	0	9,486
deployment - Cropland measures (1000			
hectares)			
Land impacted for carbon sink - Aggressive	0	0	8.67
deployment - Cropland to woody energy crops			
(1000 hectares)			
Land impacted for carbon sink - Aggressive	0	0	0.404
deployment - Pasture to energy crops (1000			
hectares)			
Land impacted for carbon sink - Aggressive	0	0	314
deployment - Permanent conservation cover		-	
(1000 hectares)			
Land impacted for carbon sink - Aggressive	0	0	10,123
deployment - Total (1000 hectares)			-, -
Land impacted for carbon sink - Moderate	0	0	313
deployment - Corn-ethanol to energy grasses			0.0
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	2,000
deployment - Cropland measures (1000			2,000
hectares)			
Land impacted for carbon sink - Moderate	0	0	8.67
deployment - Cropland to woody energy crops		•	0.01
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	0.404
deployment - Pasture to energy crops (1000		0	5.704
hectares)			
Land impacted for carbon sink - Moderate	0	0	157
deployment - Permanent conservation cover		0	101
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	2,479
deployment - Total (1000 hectares)		U	∠, \1 7
deproyment - rotal (1000 nectal es)			

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

Table 57: E-B+ scenario - PILLAR 6: Land sinks -			
Item	2020	2025	2050
Carbon sink potential - High - Accelerate	0	0	1,620
regeneration (1000 tCO2e/y)			
Carbon sink potential - High - All (not counting	0	0	48,148
overlap) (1000 tCO2e/y)			
Carbon sink potential - High - Avoid deforestation	0	0	1,559
_(1000 tC02e/y)			
Carbon sink potential - High - Extend rotation	0	0	9,233
length (1000 tCO2e/y)			
Carbon sink potential - High - Improve	0	0	26.8
plantations (1000 tCO2e/y)			
Carbon sink potential - High - Increase retention	0	0	174
of HWP (1000 tCO2e/y)			
Carbon sink potential - High - Increase trees	0	0	1,273
outside forests (1000 tCO2e/y)			
Carbon sink potential - High - Reforest cropland	0	0	24,902
(1000 tCO2e/y)			
Carbon sink potential - High - Reforest pasture	0	0	3,239
(1000 tCO2e/y)			
Carbon sink potential - High - Restore	0	0	6,121
productivity (1000 tCO2e/y)			
Carbon sink potential - Low - Accelerate	0	0	812
regeneration (1000 tCO2e/y)			
Carbon sink potential - Low - All (not counting	0	0	19,895
overlap) (1000 tCO2e/y)			,
Carbon sink potential - Low - Avoid deforestation	0	0	260
(1000 tC02e/y)			
Carbon sink potential - Low - Extend rotation	0	0	3,547
length (1000 tCO2e/y)			0,0
Carbon sink potential - Low - Improve	0	0	13.7
plantations (1000 tCO2e/y)		<u> </u>	10.1
Carbon sink potential - Low - Increase retention	0	0	58.1
of HWP (1000 tCO2e/y)		<u> </u>	00.1
Carbon sink potential - Low - Increase trees	0	0	446
outside forests (1000 tCO2e/y)		0	440
Carbon sink potential - Low - Reforest cropland	0	0	12,451
(1000 tC02e/y)		0	12,401
Carbon sink potential - Low - Reforest pasture	0	0	245
(1000 tCO2e/y)		0	240
Carbon sink potential - Low - Restore	0	0	2,063
productivity (1000 tCO2e/y)		0	2,003
Carbon sink potential - Mid - Accelerate	0	0	1,216
regeneration (1000 tCO2e/y)	"	0	1,210
Carbon sink potential - Mid - All (not counting	0	0	34,021
overlap) (1000 tCO2e/y)		0	34,021
	0	0	909
Carbon sink potential - Mid - Avoid deforestation	U	U	909
(1000 tC02e/y)	0	0	/ 200
Carbon sink potential - Mid - Extend rotation	0	0	6,390
length (1000 tC02e/y)			
Carbon sink potential - Mid - Improve plantations	0	0	20
(1000 tC02e/y)			
Carbon sink potential - Mid - Increase retention	0	0	116
of HWP (1000 tCO2e/y)			
Carbon sink potential - Mid - Increase trees	0	0	859
outside forests (1000 tCO2e/y)			
Carbon sink potential - Mid - Reforest cropland	0	0	18,676
(1000 tC02e/y)			
Carbon sink potential - Mid - Reforest pasture	0	0	1,742
(1000 tCO2e/y)			
Carbon sink potential - Mid - Restore	0	0	4,092
productivity (1000 tCO2e/y)			
Land impacted for carbon sink potential - High -	0	0	265
Accelerate regeneration (1000 hectares)			
	1		

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

Table 57: E-B+ scenario - PILLAR 6: Land sinks -	Forests (co	ntinued)	
Item	2020	2025	2050
Land impacted for carbon sink potential - High -	0	0	211
Avoid deforestation (over 30 years) (1000			
hectares)			
Land impacted for carbon sink potential - High -	0	0	4,708
Extend rotation length (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	9.89
Improve plantations (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	0
Increase retention of HWP (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	121
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	1,646
Reforest cropland (1000 hectares)		•	1,0 10
Land impacted for carbon sink potential - High -	0	0	92
Reforest pasture (1000 hectares)		0	72
Land impacted for carbon sink potential - High -	0	0	2,029
Restore productivity (1000 hectares)		0	2,029
Land impacted for carbon sink potential - High -	0	0	9,083
Total impacted (over 30 years) (1000 hectares)	0	0	9,003
	0	0	100
Land impacted for carbon sink potential - Low -	0	0	133
Accelerate regeneration (1000 hectares)			100
Land impacted for carbon sink potential - Low -	0	0	198
Avoid deforestation (over 30 years) (1000			
hectares)			
Land impacted for carbon sink potential - Low -	0	0	1,804
Extend rotation length (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	4.95
Improve plantations (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	0
Increase retention of HWP (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	63.7
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	823
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	15.9
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	1,228
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	4,270
Total impacted (over 30 years) (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	199
Accelerate regeneration (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	205
Avoid deforestation (over 30 years) (1000			
hectares)			
Land impacted for carbon sink potential - Mid -	0	0	3,256
Extend rotation length (1000 hectares)		0	3,230
Land impacted for carbon sink potential - Mid -	0	0	7.44
Improve plantations (1000 hectares)		0	1.44
Land impacted for carbon sink potential - Mid -	0	0	0
	0	U	U
Increase retention of HWP (1000 hectares)	0	0	00.0
Land impacted for carbon sink potential - Mid -	0	0	92.3
Increase trees outside forests (1000 hectares)			4.005
Land impacted for carbon sink potential - Mid -	0	0	1,235
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	115
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	2,472
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	7,582
Total impacted (over 30 years) (1000 hectares)			

Table 50: DEE connario	PILLAR 1: Efficiency/Electrification	_ Docidontial
Taule Jo. NET Scellul IU :	: FILLAN I. LIIIGIBIIGV/LIBGII IIIGUIIUII	- คะอเนะเบเนเ

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs. REF -	0	4.33	4.39	0	0	0	0
Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric Resistance (%)	49.8	49.8	49.8	49.8	49.8	49.8	49.8
Sales of cooking units - Gas (%)	50.2	50.2	50.2	50.2	50.2	50.2	50.2
Sales of space heating units - Electric Heat Pump	5.05	16.1	16.5	17	17.5	17.9	18.5
(%)							
Sales of space heating units - Electric Resistance	7.73	13.4	13.3	13.2	13.1	12.7	12.1
(%)							
Sales of space heating units - Fossil (%)	3.28	5.42	5.49	5.36	5.12	5.04	5.13
Sales of space heating units - Gas (%)	83.9	65	64.8	64.4	64.3	64.4	64.2
Sales of water heating units - Electric Heat Pump	0	0	0	0	0	0	0
(%)							
Sales of water heating units - Electric Resistance	13.2	25.2	25.3	25.3	25.4	25.4	25.4
(%)							
Sales of water heating units - Gas Furnace (%)	85.7	73.5	73.5	73.5	73.4	73.4	73.4
Sales of water heating units - Other (%)	1.07	1.23	1.23	1.23	1.22	1.22	1.22

Table 59: 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 (%)	1.78	2.16	2.22	2.07	1.87	1.75	1.66
Vehicle sales - Light-duty - EV (%)	2.81	4.63	5.31	6.47	7.94	9.34	10.5
Vehicle sales - Light-duty - gasoline (%)	91.5	88.1	86.4	84.8	82.9	81	79.3
Vehicle sales - Light-duty - hybrid (%)	3.7	4.58	5.63	6.22	6.84	7.52	8.12
Vehicle sales - Light-duty - hydrogen FC (%)	0.112	0.385	0.359	0.323	0.322	0.324	0.336
Vehicle sales - Light-duty - other (%)	0.112	0.116	0.113	0.114	0.114	0.113	0.116
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
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 60: REF scenario - PILLAR 1: Efficiency/Electrification - Overview

Item	2020	2025	2030	2035	2040	2045	2050
Final energy use - Commercial (PJ)	162	165	169	170	172	177	185
Final energy use - Industry (PJ)	171	186	198	211	225	243	262
Final energy use - Residential (PJ)	237	231	230	232	235	240	244
Final energy use - Transportation (PJ)	472	451	423	407	409	422	438

Table 61: REF scenario - PILLAR 1: Efficiency/Electrification - Commercial

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s -	0	14,192	14,841	0	0	0	0
Cumulative 5-yr (million \$2018)							
Sales of cooking units - Electric Resistance (%)	41.9	44.7	44.7	44.6	44.4	44.5	44.6
Sales of cooking units - Gas (%)	58.1	55.3	55.3	55.4	55.6	55.5	55.4
Sales of space heating units - Electric Heat Pump	2.64	13.8	46.2	73.2	77.9	78.5	78.5
(%)							
Sales of space heating units - Electric Resistance	2.48	4.35	8.94	16	20.3	21	21
(%)							
Sales of space heating units - Fossil (%)	0	0.226	0.135	0.038	0.005	0	0
Sales of space heating units - Gas Furnace (%)	94.9	81.6	44.8	10.8	1.79	0.573	0.499
Sales of water heating units - Electric Heat Pump	0.022	0.03	0.03	0.03	0.03	0.03	0.03
(%)							

Table 61: REF scenario - PILLAR 1: Efficiency/Electrification - Commercial (continued)

Item	2020	2025	2030	2035	2040	2045	2050
Sales of water heating units - Electric Resistance	1.1	1.47	1.47	1.48	1.46	1.48	1.47
(%)							
Sales of water heating units - Gas Furnace (%)	98.6	98.1	98.1	98.1	98.1	98.1	98.1
Sales of water heating units - Other (%)	0.269	0.383	0.382	0.383	0.382	0.383	0.383

Table 62: REF scenario - PILLAR 1: Efficiency/Electrification - Electricity demand

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -	0	2.52	2.6	3.5	3.68	4	4.2
Cumulative 5-yr (billion \$2018)							

Table 63: REF scenario - PILLAR 6: Land sinks - Forests

Table 63: REF scenario - PILLAR 6: Land sinks - F				
Item	2020	2025	2030	2050
Business-as-usual carbon sink - Natural uptake (Mt CO2e/y)	6.25	0	4.02	1.15
Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y)	-0.047	0	-0.099	-0.104
Business-as-usual carbon sink - Total (Mt CO2e/y)	6.2	0	3.93	1.05
Carbon sink potential - High - Accelerate	0	0	0	1,620
regeneration (1000 tCO2e/y)	0	0	0	
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)	0	0	0	48,148
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)	0	0	0	1,559
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)	0	0	0	9,233
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)	0	0	0	26.8
Carbon sink potential - High - Increase retention of HWP (1000 tC02e/y)	0	0	0	174
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)	0	0	0	1,273
Carbon sink potential - High - Reforest cropland (1000 tCO2e/y)	0	0	0	24,902
Carbon sink potential - High - Reforest pasture (1000 tCO2e/y)	0	0	0	3,239
Carbon sink potential - High - Restore productivity (1000 tC02e/y)	0	0	0	6,121
Carbon sink potential - Low - Accelerate regeneration (1000 tCO2e/y)	0	0	0	812
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)	0	0	0	19,895
Carbon sink potential - Low - Avoid deforestation	0	0	0	260
(1000 tCO2e/y) Carbon sink potential - Low - Extend rotation	0	0	0	3,547
length (1000 tC02e/y) Carbon sink potential - Low - Improve	0	0	0	13.7
plantations (1000 tC02e/y) Carbon sink potential - Low - Increase retention	0	0	0	58.1
of HWP (1000 tCO2e/y) Carbon sink potential - Low - Increase trees	0	0	0	446
outside forests (1000 tCO2e/y)				
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)	0	0	0	12,451
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)	0	0	0	245
Carbon sink potential - Low - Restore productivity (1000 tCO2e/y)	0	0	0	2,063
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)	0	0	0	1,216
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)	0	0	0	34,021

Table 63: REF scenario - PILLAR 6: Land sinks - Forests (continued)

Table 63: REF scenario - PILLAR 6: Land sinks - Fi				
Item	2020	2025	2030	2050
Carbon sink potential - Mid - Avoid deforestation	0	0	0	909
(1000 tC02e/y)	0		-	/ 000
Carbon sink potential - Mid - Extend rotation	0	0	0	6,390
length (1000 tC02e/y)	0	0	0	20
Carbon sink potential - Mid - Improve plantations	0	0	0	20
(1000 tC02e/y)	0	0	0	116
Carbon sink potential - Mid - Increase retention	U	U	U	116
of HWP (1000 tCO2e/y)	0	0	0	050
Carbon sink potential - Mid - Increase trees	0	0	0	859
outside forests (1000 tC02e/y)	0		-	10 /7/
Carbon sink potential - Mid - Reforest cropland	0	0	0	18,676
(1000 tCO2e/y) Carbon sink potential - Mid - Reforest pasture	0	0	0	1,742
(1000 tCO2e/y)	U	0	0	1,742
Carbon sink potential - Mid - Restore	0	0	0	4,092
productivity (1000 tCO2e/y)	0	0	0	4,072
Land impacted for carbon sink potential - High -	0	0	0	265
Accelerate regeneration (1000 hectares)	0	0	0	200
Land impacted for carbon sink potential - High -	0	0	0	211
Avoid deforestation (over 30 years) (1000	U	0	0	211
hectares)				
Land impacted for carbon sink potential - High -	0	0	0	4,708
Extend rotation length (1000 hectares)	0	0	0	4,100
Land impacted for carbon sink potential - High -	0	0	0	9.89
Improve plantations (1000 hectares)	0	0	0	7.07
Land impacted for carbon sink potential - High -	0	0	0	0
Increase retention of HWP (1000 hectares)	0	0	0	U
Land impacted for carbon sink potential - High -	0	0	0	121
Increase trees outside forests (1000 hectares)	0	0	0	121
Land impacted for carbon sink potential - High -	0	0	0	1,646
Reforest cropland (1000 hectares)	0	0	0	1,040
Land impacted for carbon sink potential - High -	0	0	0	92
Reforest pasture (1000 hectares)	0	0	0	72
Land impacted for carbon sink potential - High -	0	0	0	2,029
Restore productivity (1000 hectares)	0	0	0	2,029
Land impacted for carbon sink potential - High -	0	0	0	9,083
Total impacted (over 30 years) (1000 hectares)	0	0	0	7,000
Land impacted for carbon sink potential - Low -	0	0	0	133
Accelerate regeneration (1000 hectares)	0	0	0	100
Land impacted for carbon sink potential - Low -	0	0	0	198
Avoid deforestation (over 30 years) (1000	0	0	0	170
hectares)				
Land impacted for carbon sink potential - Low -	0	0	0	1,804
Extend rotation length (1000 hectares)	0	0	0	1,004
Land impacted for carbon sink potential - Low -	0	0	0	4.95
Improve plantations (1000 hectares)	0	0	0	4.70
Land impacted for carbon sink potential - Low -	0	0	0	0
Increase retention of HWP (1000 hectares)	0	0	0	U
Land impacted for carbon sink potential - Low -	0	0	0	63.7
Increase trees outside forests (1000 hectares)	0	0	0	00.1
Land impacted for carbon sink potential - Low -	0	0	0	823
Reforest cropland (1000 hectares)	0	0	0	020
Land impacted for carbon sink potential - Low -	0	0	0	15.9
Reforest pasture (1000 hectares)	0	0	0	10.7
Land impacted for carbon sink potential - Low -	0	0	0	1,228
Restore productivity (1000 hectares)	0	0	0	1,220
Land impacted for carbon sink potential - Low -	0	0	0	4,270
Total impacted (over 30 years) (1000 hectares)	0	U	0	4,210
Land impacted for carbon sink potential - Mid -	0	0	0	199
Accelerate regeneration (1000 hectares)	0	U	0	177
Land impacted for carbon sink potential - Mid -	0	0	0	205
Avoid deforestation (over 30 years) (1000	0	0	U	203
hectares)				
nootal ooj				

Table 63: REF scenario - PILLAR 6: Land sinks - Forests (continued)

Item	2020	2025	2030	2050
Land impacted for carbon sink potential - Mid -	0	0	0	3,256
Extend rotation length (1000 hectares)				
Land impacted for carbon sink potential - Mid -	0	0	0	7.44
Improve plantations (1000 hectares)				
Land impacted for carbon sink potential - Mid -	0	0	0	0
Increase retention of HWP (1000 hectares)				
Land impacted for carbon sink potential - Mid -	0	0	0	92.3
Increase trees outside forests (1000 hectares)				
Land impacted for carbon sink potential - Mid -	0	0	0	1,235
Reforest cropland (1000 hectares)				
Land impacted for carbon sink potential - Mid -	0	0	0	115
Reforest pasture (1000 hectares)				
Land impacted for carbon sink potential - Mid -	0	0	0	2,472
Restore productivity (1000 hectares)				
Land impacted for carbon sink potential - Mid -	0	0	0	7,582
Total impacted (over 30 years) (1000 hectares)				

Table 64: REF scenario - IMPACTS - Health

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal (million 2019\$)	0	507	247	140	110	96.1	92.3
Monetary damages from air pollution - Natural Gas (million 2019\$)	0	298	312	303	226	187	73.9
Monetary damages from air pollution - Transportation (million 2019\$)	0	927	999	1,069	1,143	1,217	1,293
Premature deaths from air pollution - Coal (deaths)	0	56.9	27.7	15.7	12.3	10.8	10.4
Premature deaths from air pollution - Natural Gas (deaths)	0	33.6	35.3	34.3	25.5	21.1	8.35
Premature deaths from air pollution - Transportation (deaths)	0	104	112	120	129	137	145