Net-Zero America - wisconsin state report

Larson et al. 2020

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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).

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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	3.31	4.14	0	0	0	0
Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric Resistance (%)	51.1	61.5	93.4	99.7	100	100	100
Sales of cooking units - Gas (%)	48.9	38.5	6.59	0.332	0	0	0
Sales of space heating units - Electric Heat Pump	3.66	8.85	32.5	79.5	89.5	90.4	90.3
(%)							
Sales of space heating units - Electric Resistance	13.4	18.8	15	6.74	4.9	4.78	4.99
(%)							
Sales of space heating units - Fossil (%)	9.47	16	12.3	6.05	4.79	4.67	4.5
Sales of space heating units - Gas (%)	73.5	56.3	40.2	7.71	0.776	0.203	0.19
Sales of water heating units - Electric Heat Pump	0	0.766	10.6	32.6	37.2	37.5	37.6
(%)							
Sales of water heating units - Electric Resistance	24.6	40.6	46.1	59	62.1	62.3	62.3
(%)							
Sales of water heating units - Gas Furnace (%)	75.4	58.6	43.2	8.25	0.653	0.021	0
Sales of water heating units - Other (%)	0.053	0.114	0.115	0.114	0.112	0.112	0.113

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	1,089	2,796	4,523	6,855	7,457	7,112
(million \$2018)							
Public EV charging plugs - DC Fast (1000 units)	0.143	0	2.06	0	9	0	14.5
Public EV charging plugs - L2 (1000 units)	0.459	0	49.6	0	216	0	350
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 (%)	1.58	1.84	1.27	0.407	0.075	0.013	0
Vehicle sales - Light-duty - EV (%)	3.8	14.8	45.9	81.6	96.3	99.3	100
Vehicle sales - Light-duty - gasoline (%)	90.1	78.4	49.4	16.7	3.32	0.591	0
Vehicle sales - Light-duty - hybrid (%)	4.31	4.46	3.18	1.18	0.288	0.063	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.342	0.206	0.064	0.013	0.002	0
Vehicle sales - Light-duty - other (%)	0.103	0.099	0.065	0.023	0.004	0.001	0
Vehicle sales - Medium-duty - diesel (%)	64.7	59.7	42.3	14.4	2.59	0.384	0
Vehicle sales - Medium-duty - EV (%)	0.784	5.07	25.3	60.8	76.5	79.5	80
Vehicle sales - Medium-duty - gasoline (%)	33.7	33.3	25.5	9.32	1.77	0.277	0
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.402	0.341	0.14	0.03	0.005	0
Vehicle sales - Medium-duty - hydrogen 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)	194	191	184	171	157	146	140
Final energy use - Industry (PJ)	516	524	516	503	496	492	490
Final energy use - Residential (PJ)	247	230	215	188	157	132	115
Final energy use - Transportation (PJ)	508	474	413	338	271	230	212

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

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s -	0	19,303	21,086	0	0	0	0
Cumulative 5-yr (million \$2018)							
Sales of cooking units - Electric Resistance (%)	41	54.2	82.9	88.6	88.9	88.9	88.9
Sales of cooking units - Gas (%)	59	45.8	17.1	11.4	11.1	11.1	11.1
Sales of space heating units - Electric Heat Pump (%)	0.938	6.01	29.4	77.8	88.2	89	89.1
Sales of space heating units - Electric Resistance (%)	3.03	3.48	5.44	9.73	10.5	10.6	10.6
Sales of space heating units - Fossil (%)	5.62	2.66	0.503	0.021	0	0	0

Table 4: E+ scenario -	PTI I AR 1. Efficiency	//Flectrification -	Commercial	(continued)
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Item	2020	2025	2030	2035	2040	2045	2050
Sales of space heating units - Gas Furnace (%)	90.4	87.9	64.6	12.4	1.3	0.384	0.356
Sales of water heating units - Electric Heat Pump (%)	0.306	1.32	13.9	42.1	48.3	48.8	48.8
Sales of water heating units - Electric Resistance (%)	2.97	4.18	16.6	44.4	50.5	51	51
Sales of water heating units - Gas Furnace (%)	96.6	94.3	69.4	13.2	1.05	0.035	0
Sales of water heating units - Other (%)	0.173	0.186	0.186	0.187	0.186	0.187	0.187

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

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -	0	3.38	3.48	6.55	7	5.91	6.17
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	0
plant (billion \$2018)							
Capital invested - Biomass w/ccu power plant	0	0	0	0	0	0	0
(billion \$2018)							
Capital invested - Solar PV - Base (billion \$2018)	0	0	0.104	1.36	0.29	0	0.356
Capital invested - Solar PV - Constrained (billion	0	0.719	0.334	1.27	1.13	0.49	0.187
\$2018)							
Capital invested - Wind - Base (billion \$2018)	0	1.17	2.17	2.36	4.1	6.87	14.1
Capital invested - Wind - Constrained (billion	0	1.44	3.18	14.1	13	9.68	4.97
\$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	0	0
Biomass w/ccu power plant (GWh)	0	0	0	0	0	0	0
Solar - Base land use assumptions (GWh)	830	0	152	2,156	473	0	668
Solar - Constrained land use assumptions (GWh)	788	0	152	663	686	218	351
Wind - Base land use assumptions (GWh)	3,031	2,823	5,534	6,350	11,354	20,096	43,687
Wind - Constrained land use assumptions (GWh)	3,031	1,385	6,515	31,976	39,110	28,200	15,387

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

Table 6: E7 decitatio 1 122/iii 6: Gleati jacio Bio							
Item	2020	2025	2030	2035	2040	2045	2050
Biomass purchases (million \$2018/year)	0	0	0	0	0	653	1,824
Conversion capital investment - Cumulative 5-yr	0	0	0	0	0	9,964	24,682
(million \$2018)							
Number of facilities - Allam power w ccu	0	0	0	0	0	0	0
(quantity)							
Number of facilities - Beccs hydrogen (quantity)	0	0	0	0	0	11	14
Number of facilities - Diesel (quantity)	0	0	0	0	0	0	0
Number of facilities - Diesel ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Power (quantity)	0	0	0	0	0	0	0
Number of facilities - Power ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Pyrolysis (quantity)	0	0	0	0	0	0	4
Number of facilities - Pyrolysis ccu (quantity)	0	0	0	0	0	0	11
Number of facilities - Sng (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng ccu (quantity)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)	0	0	0	0	0	12.8	25.1
Annual - BECCS (MMT)	0	0	0	0	0	12.8	25.1
Annual - Cement and lime (MMT)	0	0	0	0	0	0	0
Annual - NGCC (MMT)	0	0	0	0	0	0	0
Cumulative - All (MMT)	0	0	0	0	0	12.8	37.9
Cumulative - BECCS (MMT)	0	0	0	0	0	12.8	37.9
Cumulative - Cement and lime (MMT)	0	0	0	0	0	0	0
Cumulative - NGCC (MMT)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (MMT)	0	0	0	0	0	0	0
Injection wells (wells)	0	0	0	0	0	0	0
Resource characterization, appraisal, permitting costs (million \$2020)	0	0	0	0	0	0	0
Wells and facilities construction costs (million \$2020)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
All (km)	0	0	0	0	0	176	1,528
Cumulative investment - All (million \$2018)	0	0	0	0	0	253	1,249
Cumulative investment - Spur (million \$2018)	0	0	0	0	0	253	1,249
Cumulative investment - Trunk (million \$2018)	0	0	0	0	0	0	0
Spur (km)	0	0	0	0	0	176	1,528
Trunk (km)	0	0	0	0	0	0	0

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

Carbon sink potential - Aggressive deployment - Corn-ethanol to energy grasses (1000 tC02e/y) Carbon sink potential - Aggressive deployment - Cropland measures (1000 tC02e/y) Carbon sink potential - Aggressive deployment - O O -4,557 Carbon sink potential - Aggressive deployment - O O -189 Permanent conservation cover (1000 tC02e/y) Carbon sink potential - Aggressive deployment - O O -5,975 Total (1000 tC02e/y) Carbon sink potential - Moderate deployment - O O -1,228 Corn-ethanol to energy grasses (1000 tC02e/y) Carbon sink potential - Moderate deployment - O O -2,397 Cropland measures (1000 tC02e/y) Carbon sink potential - Moderate deployment - O O -94.6 Permanent conservation cover (1000 tC02e/y) Carbon sink potential - Moderate deployment - O O -3,720 Total (1000 tC02e/y) Land impacted for carbon sink - Aggressive O O A 479 deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive O O O 3,259 deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive O O O 4,082 deployment - Total (1000 hectares) Land impacted for carbon sink - Aggressive O O O 4,082 deployment - Total (1000 hectares) Land impacted for carbon sink - Aggressive O O O 4,082 deployment - Total (1000 hectares)	Item	2020	2025	2050
Carbon sink potential - Aggressive deployment - Cropland measures (1000 tCO2e/y) Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y) Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y) Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Potal (1000 tCO2e/y) Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses	Carbon sink potential - Aggressive deployment -	0	0	-1,228
Cropland measures (1000 tCO2e/y) Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tCO2e/y) Carbon sink potential - Aggressive deployment - Total (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares)	Corn-ethanol to energy grasses (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment - Permanent conservation cover (1000 tC02e/y) Carbon sink potential - Aggressive deployment - Total (1000 tC02e/y) Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tC02e/y) Carbon sink potential - Moderate deployment - Cropland measures (1000 tC02e/y) Carbon sink potential - Moderate deployment - Cropland measures (1000 tC02e/y) Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tC02e/y) Carbon sink potential - Moderate deployment - Total (1000 tC02e/y) Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses	Carbon sink potential - Aggressive deployment -	0	0	-4,557
Permanent conservation cover (1000 tC02e/y) Carbon sink potential - Aggressive deployment - Total (1000 tC02e/y) Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tC02e/y) Carbon sink potential - Moderate deployment - Corpland measures (1000 tC02e/y) Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tC02e/y) Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tC02e/y) Carbon sink potential - Moderate deployment - Portal (1000 tC02e/y) Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses	Cropland measures (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment - Total (1000 tC02e/y) Carbon sink potential - Moderate deployment - 0 0 -1,228 Corn-ethanol to energy grasses (1000 tC02e/y) Carbon sink potential - Moderate deployment - 0 0 -2,397 Cropland measures (1000 tC02e/y) Carbon sink potential - Moderate deployment - 0 0 -94.6 Permanent conservation cover (1000 tC02e/y) Carbon sink potential - Moderate deployment - 0 0 -3,720 Total (1000 tC02e/y) Land impacted for carbon sink - Aggressive 0 0 479 deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive 0 0 3,259 deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive 0 0 0 344 deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive 0 0 0 4,082 deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate 0 0 0 479 deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate 0 0 0 479 deployment - Corn-ethanol to energy grasses	Carbon sink potential - Aggressive deployment -	0	0	-189
Total (1000 tC02e/y) Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tC02e/y) Carbon sink potential - Moderate deployment - Cropland measures (1000 tC02e/y) Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tC02e/y) Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tC02e/y) Carbon sink potential - Moderate deployment - Total (1000 tC02e/y) Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses	Permanent conservation cover (1000 tC02e/y)			
Carbon sink potential - Moderate deployment - Corn-ethanol to energy grasses (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y) Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses	Carbon sink potential - Aggressive deployment -	0	0	-5,975
Corn-ethanol to energy grasses (1000 tCO2e/y) Carbon sink potential - Moderate deployment - 0 0 -2,397 Cropland measures (1000 tCO2e/y) Carbon sink potential - Moderate deployment - 0 0 -94.6 Permanent conservation cover (1000 tCO2e/y) Carbon sink potential - Moderate deployment - 0 0 -3,720 Total (1000 tCO2e/y) Land impacted for carbon sink - Aggressive 0 0 479 deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive 0 0 3,259 deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive 0 0 344 deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive 0 0 4,082 deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate 0 0 479 deployment - Corn-ethanol to energy grasses	Total (1000 tC02e/y)			
Carbon sink potential - Moderate deployment - Cropland measures (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tCO2e/y) Carbon sink potential - Moderate deployment - Total (1000 tCO2e/y) Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses	Carbon sink potential - Moderate deployment -	0	0	-1,228
Cropland measures (1000 tC02e/y) Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tC02e/y) Carbon sink potential - Moderate deployment - O O -3,720 Total (1000 tC02e/y) Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive O O O 3,259 deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive O O O 344 deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive O O O 4,082 deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate O O O 479 deployment - Corn-ethanol to energy grasses	Corn-ethanol to energy grasses (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment - Permanent conservation cover (1000 tC02e/y) Carbon sink potential - Moderate deployment - Total (1000 tC02e/y) Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses	Carbon sink potential - Moderate deployment -	0	0	-2,397
Permanent conservation cover (1000 tC02e/y) Carbon sink potential - Moderate deployment - Total (1000 tC02e/y) Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses	Cropland measures (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment - Total (1000 tC02e/y) Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses		0	0	-94.6
Total (1000 tCO2e/y) Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses	Permanent conservation cover (1000 tCO2e/y)			
Land impacted for carbon sink - Aggressive deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses		0	0	-3,720
deployment - Corn-ethanol to energy grasses (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses	•			
(1000 hectares) Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses	Land impacted for carbon sink - Aggressive	0	0	479
Land impacted for carbon sink - Aggressive deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive o o 4,082 deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses	deployment - Corn-ethanol to energy grasses			
deployment - Cropland measures (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses				
hectares) Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses	Land impacted for carbon sink - Aggressive	0	0	3,259
Land impacted for carbon sink - Aggressive deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses				
deployment - Permanent conservation cover (1000 hectares) Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses	hectares)			
(1000 hectares) 0 4,082 Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) 0 4,082 Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses 0 0 479	Land impacted for carbon sink - Aggressive	0	0	344
Land impacted for carbon sink - Aggressive deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate deployment - Corn-ethanol to energy grasses	deployment - Permanent conservation cover			
deployment - Total (1000 hectares) Land impacted for carbon sink - Moderate 0 0 479 deployment - Corn-ethanol to energy grasses				
Land impacted for carbon sink - Moderate 0 0 479 deployment - Corn-ethanol to energy grasses	Land impacted for carbon sink - Aggressive	0	0	4,082
deployment - Corn-ethanol to energy grasses				
		0	0	479
(1000 hectares)				
<u> </u>	(1000 hectares)			

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

Item	2020	2025	2050
Land impacted for carbon sink - Moderate	0	0	1,716
deployment - Cropland measures (1000			
hectares)			
Land impacted for carbon sink - Moderate	0	0	172
deployment - Permanent conservation cover			
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	2,367
deployment - Total (1000 hectares)			

Item	2020	2025	2050
Carbon sink potential - High - Accelerate	0	0	392
regeneration (1000 tCO2e/y)			
Carbon sink potential - High - All (not counting overlap) (1000 tCO2e/y)	0	0	32,495
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)	0	0	2,104
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)	0	0	8,126
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)	0	0	912
Carbon sink potential - High - Increase retention of HWP (1000 tCO2e/y)	0	0	6,364
Carbon sink potential - High - Increase trees outside forests (1000 tC02e/y)	0	0	1,651
Carbon sink potential - High - Reforest cropland (1000 tC02e/y)	0	0	2,230
Carbon sink potential - High - Reforest pasture (1000 tC02e/y)	0	0	6,496
Carbon sink potential - High - Restore productivity (1000 tC02e/y)	0	0	4,219
Carbon sink potential - Low - Accelerate regeneration (1000 tC02e/y)	0	0	197
Carbon sink potential - Low - All (not counting overlap) (1000 tCO2e/y)	0	0	9,86
Carbon sink potential - Low - Avoid deforestation (1000 tCO2e/y)	0	0	35
Carbon sink potential - Low - Extend rotation length (1000 tC02e/y)	0	0	3,12
Carbon sink potential - Low - Improve plantations (1000 tC02e/y)	0	0	464
Carbon sink potential - Low - Increase retention of HWP (1000 tC02e/y)	0	0	2,12
Carbon sink potential - Low - Increase trees outside forests (1000 tC02e/y)	0	0	578
Carbon sink potential - Low - Reforest cropland (1000 tCO2e/y)	0	0	1,115
Carbon sink potential - Low - Reforest pasture (1000 tCO2e/y)	0	0	492
Carbon sink potential - Low - Restore productivity (1000 tC02e/y)	0	0	1,422
Carbon sink potential - Mid - Accelerate regeneration (1000 tCO2e/y)	0	0	294
Carbon sink potential - Mid - All (not counting overlap) (1000 tCO2e/y)	0	0	21,170
Carbon sink potential - Mid - Avoid deforestation (1000 tCO2e/y)	0	0	1,227
Carbon sink potential - Mid - Extend rotation length (1000 tCO2e/y)	0	0	5,624
Carbon sink potential - Mid - Improve plantations (1000 tCO2e/y)	0	0	680
Carbon sink potential - Mid - Increase retention of HWP (1000 tC02e/y)	0	0	4,243

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

Tem	Table 13: E+ scenario - PILLAR 6: Land sinks - Fo	•	ued)	
Dutside forests (1000 tC02e/y) Carbon sink potential - Mid - Reforest cropland (1000 tC02e/y) Carbon sink potential - Mid - Reforest pasture (1000 tC02e/y) Carbon sink potential - Mid - Restore productivity (1000 tC02e/y) Carbon sink potential - Mid - Restore productivity (1000 tC02e/y) Carbon sink potential - Mid - Restore productivity (1000 tC02e/y) Carbon sink potential - Migh - Accelerate regeneration (1000 hectares) Carbon sink potential - Migh - Accelerate regeneration (1000 hectares) Carbon sink potential - High - Accelerate regeneration (1000 hectares) Carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) Carbon sink potential - High - Carbon sink potential - Low - Carbon sink potential - L		2020	2025	2050
Carbon sink potential - Mid - Reforest cropland 0		0	0	1,114
(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	1,673
Carbon sink potential - Mid - Restore				
Carbon sink potential - Mid - Restore productivity (1000 tCO2e/v) Cand impacted for carbon sink potential - High - Accelerate regeneration (1000 hectares) Carbon sink potential - High - Accelerate regeneration (1000 hectares) Carbon sink potential - High - Accelerate regeneration (1000 hectares) Carbon sink potential - High - Avoid deforestation (over 30 years) (1000 hectares) Carbon sink potential - High - Extend rotation length (1000 hectares) Carbon sink potential - High - Extend rotation length (1000 hectares) Carbon sink potential - High - Carbon sink potential - Low - Carbon sink potent	Carbon sink potential - Mid - Reforest pasture	0	0	3,494
Decountable Decounts Decoun				
Decountable Decounts Decoun	Carbon sink potential - Mid - Restore	0	0	2,820
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 - 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 - 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 - Ligh - 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 engeneration (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 - 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 - 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 - Increase retention of HWP (1000 hectares) Land impacted for				
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 - 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 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 retention of HWP (1000 hectares) Land impacted for carbon sink potential - High - Increase retention (1000 hectares) Land impacted for carbon sink potential - High - Increase retention (1000 hectares) Land impacted for carbon sink potential - High - Increase retention (1000 hectares) Land impacted for carbon sink potential - Low - Increase regeneration (1000 hectares) Land impacted for carbon sink potential - Low - Increase regeneration (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 - 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 - 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 -	Land impacted for carbon sink potential - High -	0	0	64.2
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 - 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 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 retention of HWP (1000 hectares) Land impacted for carbon sink potential - High - Increase retention (1000 hectares) Land impacted for carbon sink potential - High - Increase retention (1000 hectares) Land impacted for carbon sink potential - High - Increase retention (1000 hectares) Land impacted for carbon sink potential - Low - Increase regeneration (1000 hectares) Land impacted for carbon sink potential - Low - Increase regeneration (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 - 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 - 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 -				
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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 O O O O O O O O O O O O O O O				
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 - 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 - 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 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 pasture (1000 hectares) Land impacted for carbon sink potential - Low - Reforest pasture (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		0	0	4.144
Land impacted for carbon sink potential - High - Improve plantations (1000 hectares) December 200 December 336 Improve plantations (1000 hectares) December 34				,
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 - 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 - 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 - Extend rotation length (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 - Reforest cropland (1000 hectares) Land impacted for carbon sink potential - Low - Reforest cropland (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 - Novid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Mid - Novid deforestation (over 30 years) (1000 hectares) Land impacted for carbon sink po		0	0	336
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 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 - Reforest cropland (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 - Mid - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Mid - Resto			0	0
Increase trees outside forests (1000 hectares) Indicators (1000 hectar		n	n	157
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 - High - Total 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 - Reforest cropland (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 - Mid - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Mid - Restore productivity (1000 hectares) Land impacted for carbon sink potential - Mid - Restore plantat			0	101
Reforest cropland (1000 hectares)		0	0	1/.7
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				100
THE THE SOUTSIDE TO PESTS (1000 NECTAPES)		U	U	120
	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	111
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	231
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	1,704
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	5,608
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	458	0.376	0.366	0.321	0.224	0.013
(million 2019\$)							
Monetary damages from air pollution - Natural	0	134	93.8	52.9	42.8	27	12.1
Gas (million 2019\$)							
Monetary damages from air pollution -	0	1,048	981	749	435	201	81.6
Transportation (million 2019\$)							
Premature deaths from air pollution - Coal	0	51.4	0.042	0.041	0.036	0.025	0.001
(deaths)							
Premature deaths from air pollution - Natural	0	15.1	10.6	5.97	4.84	3.05	1.37
Gas (deaths)							
Premature deaths from air pollution -	0	118	110	84.2	49	22.6	9.18
Transportation (deaths)							

Table 15: E+ scenario - IMPACTS - Jobs

Item	2020	2025	2030	2035	2040	2045	2050
By economic sector - Agriculture (jobs)	1,061	1,079	1,220	1,016	574	900	1,821
By economic sector - Construction (jobs)	4,974	4,987	5,073	6,937	7,464	9,195	14,789
By economic sector - Manufacturing (jobs)	3,786	6,804	7,976	10,231	9,740	8,396	11,665
By economic sector - Mining (jobs)	2,969	2,322	1,587	1,067	687	423	269
By economic sector - Other (jobs)	330	312	344	666	704	906	1,560
By economic sector - Pipeline (jobs)	532	528	452	362	275	213	360
By economic sector - Professional (jobs)	2,918	2,918	2,957	3,558	4,075	6,429	11,532
By economic sector - Trade (jobs)	2,926	2,602	2,258	2,526	2,568	3,366	5,661
By economic sector - Utilities (jobs)	6,446	6,264	5,853	7,176	8,101	10,069	15,287
By education level - All sectors - Associates	7,728	8,381	8,391	10,424	10,849	12,626	19,752
degree or some college (jobs)							
By education level - All sectors - Bachelors	5,473	5,788	5,658	6,651	6,822	8,148	12,964
degree (jobs)							
By education level - All sectors - Doctoral degree	177	177	172	197	209	293	503
(jobs)							
By education level - All sectors - High school	11,259	12,126	12,188	14,736	14,710	16,816	26,439
diploma or less (jobs)							
By education level - All sectors - Masters or	1,305	1,345	1,309	1,531	1,597	2,015	3,285
professional degree (jobs)							
By resource sector - Biomass (jobs)	2,765	2,792	2,909	2,325	1,396	3,327	7,932
By resource sector - CO2 (jobs)	0	0	0	0	0	206	1,869
By resource sector - Coal (jobs)	2,134	1,355	369	0	0	0	0
By resource sector - Grid (jobs)	6,757	6,660	6,987	11,146	13,349	16,356	26,106
By resource sector - Natural Gas (jobs)	5,008	5,020	4,379	3,611	3,308	3,575	2,390
By resource sector - Nuclear (jobs)	660	649	508	185	0	0	0
By resource sector - Oil (jobs)	5,682	4,997	4,076	3,041	2,199	1,592	1,166
By resource sector - Solar (jobs)	2,047	2,968	3,291	6,000	5,459	4,772	7,090
By resource sector - Wind (jobs)	890	3,376	5,199	7,231	8,477	10,071	16,390
Median wages - Annual - All (\$2019 per job)	60,914	60,691	60,843	61,317	62,867	64,760	65,800
On-Site or In-Plant Training - Total jobs - 1 to 4	4,052	4,344	4,328	5,338	5,538	6,451	10,081
years (jobs)							
On-Site or In-Plant Training - Total jobs - 4 to 10	1,648	1,677	1,637	2,023	2,147	2,617	4,140
years (jobs)							
On-Site or In-Plant Training - Total jobs - None	4,130	4,470	4,481	5,413	5,519	6,500	10,311
(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	212	228	229	286	299	351	551
years (jobs)							
On-Site or In-Plant Training - Total jobs - Up to 1	15,901	17,098	17,044	20,479	20,684	23,980	37,861
year (jobs)							
On-the-Job Training - All sectors - 1 to 4 years	5,157	5,522	5,497	6,802	7,102	8,311	12,985
_(jobs)							
On-the-Job Training - All sectors - 4 to 10 years	1,569	1,592	1,558	1,955	2,095	2,571	4,072
(jobs)							
On-the-Job Training - All sectors - None (jobs)	1,430	1,509	1,487	1,775	1,786	2,097	3,347
On-the-Job Training - All sectors - Over 10 years	235	270	276	341	343	377	582
_(jobs)							
On-the-Job Training - All sectors - Up to 1 year	17,551	18,925	18,900	22,666	22,862	26,542	41,957
_(jobs)							
Related work experience - All sectors - 1 to 4	9,294	9,892	9,793	11,821	12,139	14,288	22,516
years (jobs)							
Related work experience - All sectors - 4 to 10	5,884	6,290	6,233	7,587	7,865	9,254	14,555
years (jobs)							
Related work experience - All sectors - None	3,806	4,057	4,045	4,880	4,945	5,772	9,107
_(jobs)							
Related work experience - All sectors - Over 10	1,574	1,734	1,737	2,117	2,173	2,482	3,869
_years (jobs)							
Related work experience - All sectors - Up to 1	5,385	5,845	5,910	7,134	7,065	8,102	12,896
year (jobs)							
Wage income - All (million \$2019)	1,580	1,688	1,687	2,057	2,149	2,584	4,142

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

Item	2020	2025	2030	2035	2040	2045	2050
Natural gas consumption - Annual (tcf)	414	420	354	284	214	135	93.3
Natural gas consumption - Cumulative (tcf)	0	0	0	0	0	0	8,559
Natural gas production - Annual (tcf)	0	0	0	0	0	0	0
Oil consumption - Annual (million bbls)	117	112	99.9	80.7	62.9	48.7	38
Oil consumption - Cumulative (million bbls)	0	0	0	0	0	0	2,487
Oil production - Annual (million bbls)	0	0	0	0	0	0	0

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	3.29	4.06	0	0	0	0
Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric Resistance (%)	50.9	52.2	56.7	68.5	85	95.2	98.7
Sales of cooking units - Gas (%)	49.1	47.8	43.3	31.5	15	4.84	1.3
Sales of space heating units - Electric Heat Pump	3.66	7.03	8.43	13	23.5	36.7	44.5
(%)							
Sales of space heating units - Electric Resistance	13.4	19	18.7	17.9	16	13.7	12.5
(%)							
Sales of space heating units - Fossil (%)	9.47	16.4	16.3	15.5	14	12.3	11.1
Sales of space heating units - Gas (%)	73.5	57.5	56.6	53.6	46.4	37.4	31.9
Sales of water heating units - Electric Heat Pump	0	0.205	0.783	2.7	7.35	13.3	17
(%)							
Sales of water heating units - Electric Resistance	24.6	40.2	40.4	41.4	44.2	47.7	49.9
(%)							
Sales of water heating units - Gas Furnace (%)	75.4	59.4	58.7	55.8	48.3	38.9	33
Sales of water heating units - Other (%)	0.053	0.114	0.115	0.115	0.115	0.115	0.115

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	177	370	1,251	3,933	5,731
(million \$2018)							
Public EV charging plugs - DC Fast (1000 units)	0.143	0	0.646	0	3.34	0	9.32
Public EV charging plugs - L2 (1000 units)	0.459	0	15.5	0	80.4	0	224
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 (%)	1.6	2	2.06	1.64	1.05	0.542	0.232
Vehicle sales - Light-duty - EV (%)	1.85	4.59	11.7	25.6	48.1	71.8	87.5
Vehicle sales - Light-duty - gasoline (%)	91.9	87.6	79.9	67	46.6	25.1	11
Vehicle sales - Light-duty - hybrid (%)	4.47	5.28	5.94	5.42	4.08	2.42	1.18
Vehicle sales - Light-duty - hydrogen FC (%)	0.113	0.381	0.328	0.251	0.179	0.099	0.046
Vehicle sales - Light-duty - other (%)	0.104	0.108	0.098	0.086	0.062	0.034	0.016
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)	194	191	186	183	179	175	171
Final energy use - Industry (PJ)	516	524	517	508	504	500	498
Final energy use - Residential (PJ)	247	230	218	208	197	184	171
Final energy use - Transportation (PJ)	509	478	433	396	369	336	297

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

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s -	0	19,301	21,085	0	0	0	0
Cumulative 5-yr (million \$2018)							
Sales of cooking units - Electric Resistance (%)	41	45.8	49.8	60.5	75.4	84.5	87.7
Sales of cooking units - Gas (%)	59	54.2	50.2	39.5	24.6	15.5	12.3
Sales of space heating units - Electric Heat Pump	0.938	4.33	5.66	9.99	20.2	33.1	40.9
(%)							
Sales of space heating units - Electric Resistance	3.03	3.36	3.47	3.84	4.75	5.92	6.59
(%)							
Sales of space heating units - Fossil (%)	5.62	3.12	3.01	2.66	2.19	1.88	1.77
Sales of space heating units - Gas Furnace (%)	90.4	89.2	87.9	83.5	72.8	59.1	50.7
Sales of water heating units - Electric Heat Pump	0.306	0.605	1.35	3.8	9.77	17.5	22.2
(%)							
Sales of water heating units - Electric Resistance	2.97	3.47	4.17	6.6	12.5	20.1	24.7
(%)							
Sales of water heating units - Gas Furnace (%)	96.6	95.7	94.3	89.4	77.6	62.3	52.9
Sales of water heating units - Other (%)	0.173	0.186	0.186	0.187	0.186	0.187	0.187
<u> </u>					<u> </u>		

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

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -	0	2.66	2.66	3.62	3.74	5.53	5.85
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	-1,228
Corn-ethanol to energy grasses (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-4,557
Cropland measures (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-189
Permanent conservation cover (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-5,975
Total (1000 tC02e/y)			

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

Table 22. L Scenario I ILLAN G. Lana Sinks 7	igi icaitai c (c	ontinacaj	
Item	2020	2025	2050
Carbon sink potential - Moderate deployment -	0	0	-1,228
Corn-ethanol to energy grasses (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment -	0	0	-2,397
Cropland measures (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment -	0	0	-94.6
Permanent conservation cover (1000 tC02e/y)			
Carbon sink potential - Moderate deployment -	0	0	-3,720
Total (1000 tC02e/y)			
Land impacted for carbon sink - Aggressive	0	0	479
deployment - Corn-ethanol to energy grasses			
(1000 hectares)			
Land impacted for carbon sink - Aggressive	0	0	3,259
deployment - Cropland measures (1000			-
hectares)			
Land impacted for carbon sink - Aggressive	0	0	344
deployment - Permanent conservation cover			
(1000 hectares)			
Land impacted for carbon sink - Aggressive	0	0	4,082
deployment - Total (1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	479
deployment - Corn-ethanol to energy grasses			
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	1,716
deployment - Cropland measures (1000			•
hectares)			
Land impacted for carbon sink - Moderate	0	0	172
deployment - Permanent conservation cover			
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	2,367
deployment - Total (1000 hectares)			•

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

Item	2020	2025	2050
Carbon sink potential - High - Accelerate	0	0	392
regeneration (1000 tCO2e/y)			
Carbon sink potential - High - All (not counting	0	0	32,495
overlap) (1000 tCO2e/y)			
Carbon sink potential - High - Avoid deforestation	0	0	2,104
(1000 tCO2e/y)			
Carbon sink potential - High - Extend rotation	0	0	8,126
length (1000 tCO2e/y)			
Carbon sink potential - High - Improve	0	0	912
plantations (1000 tCO2e/y)			
Carbon sink potential - High - Increase retention	0	0	6,364
of HWP (1000 tCO2e/y)			
Carbon sink potential - High - Increase trees	0	0	1,651
outside forests (1000 tCO2e/y)			
Carbon sink potential - High - Reforest cropland	0	0	2,230
(1000 tC02e/y)			
Carbon sink potential - High - Reforest pasture	0	0	6,496
(1000 tC02e/y)			
Carbon sink potential - High - Restore	0	0	4,219
productivity (1000 tCO2e/y)			
Carbon sink potential - Low - Accelerate	0	0	197
regeneration (1000 tCO2e/y)			
Carbon sink potential - Low - All (not counting	0	0	9,861
overlap) (1000 tCO2e/y)			
Carbon sink potential - Low - Avoid deforestation	0	0	351
(1000 tCO2e/y)			
Carbon sink potential - Low - Extend rotation	0	0	3,121
length (1000 tCO2e/y)			
Carbon sink potential - Low - Improve	0	0	464
plantations (1000 tCO2e/y)			

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

Table 23: E- scenario - PILLAR 6: Land sinks - Fo	rests (contin	иеај	
Item	2020	2025	2050
Carbon sink potential - Low - Increase retention	0	0	2,121
of HWP (1000 tCO2e/y)			
Carbon sink potential - Low - Increase trees	0	0	578
outside forests (1000 tCO2e/y)			
Carbon sink potential - Low - Reforest cropland	0	0	1,115
(1000 tC02e/y)			.,
Carbon sink potential - Low - Reforest pasture	0	0	492
(1000 tGO2e/y)		0	7/2
Carbon sink potential - Low - Restore	0	0	1,422
	0	0	1,422
productivity (1000 tC02e/y)			00/
Carbon sink potential - Mid - Accelerate	0	0	294
regeneration (1000 tC02e/y)			
Carbon sink potential - Mid - All (not counting	0	0	21,170
overlap) (1000 tCO2e/y)			
Carbon sink potential - Mid - Avoid deforestation	0	0	1,227
(1000 tCO2e/y)			
Carbon sink potential - Mid - Extend rotation	0	0	5,624
length (1000 tCO2e/y)			
Carbon sink potential - Mid - Improve plantations	0	0	680
(1000 tCO2e/y)			
Carbon sink potential - Mid - Increase retention	0	0	4,243
of HWP (1000 tCO2e/y)		0	4,243
	0	0	1 11 /
Carbon sink potential - Mid - Increase trees	0	0	1,114
outside forests (1000 tCO2e/y)		_	
Carbon sink potential - Mid - Reforest cropland	0	0	1,673
(1000 tC02e/y)			
Carbon sink potential - Mid - Reforest pasture	0	0	3,494
(1000 tCO2e/y)			
Carbon sink potential - Mid - Restore	0	0	2,820
productivity (1000 tCO2e/y)			
Land impacted for carbon sink potential - High -	0	0	64.2
Accelerate regeneration (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	285
Avoid deforestation (over 30 years) (1000		9	200
hectares)			
Land impacted for carbon sink potential - High -	0	0	4,144
	0	0	4,144
Extend rotation length (1000 hectares)			007
Land impacted for carbon sink potential - High -	0	0	336
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	157
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	147
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	185
Reforest pasture (1000 hectares)		9	100
Land impacted for carbon sink potential - High -	0	0	1,398
	0	0	1,370
Restore productivity (1000 hectares)			/ 71/
Land impacted for carbon sink potential - High -	0	0	6,716
Total impacted (over 30 years) (1000 hectares)		_	
Land impacted for carbon sink potential - Low -	0	0	32.1
Accelerate regeneration (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	267
Avoid deforestation (over 30 years) (1000			
hectares)			
Land impacted for carbon sink potential - Low -	0	0	1,588
Extend rotation length (1000 hectares)		-	.,555
Land impacted for carbon sink potential - Low -	0	0	168
Improve plantations (1000 hectares)	"	9	100
Land impacted for carbon sink potential - Low -	0	0	0
rano inidacted for cardon Sink Dolential - LOW -	ı U	0	U
Increase retention of HWP (1000 hectares)		1	

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

Table 25. L- Scendilo - FILLAN O. Luna sinks - 1 c			
Item	2020	2025	2050
Land impacted for carbon sink potential - Low -	0	0	82.5
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	73.7
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	32
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	846
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	3,089
Total impacted (over 30 years) (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	48.1
Accelerate regeneration (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	276
Avoid deforestation (over 30 years) (1000			
hectares)			
Land impacted for carbon sink potential - Mid -	0	0	2,866
Extend rotation length (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	253
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	120
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	111
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	231
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	1,704
Restore productivity (1000 hectares)			-
Land impacted for carbon sink potential - Mid -	0	0	5,608
Total impacted (over 30 years) (1000 hectares)			

Table 24: E- scenario - IMPACTS - Health

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal	0	458	0.376	0.366	0.321	0.224	0.013
(million 2019\$)							
Monetary damages from air pollution - Natural	0	126	66.4	27.2	12.7	5.01	3.96
Gas (million 2019\$)							
Monetary damages from air pollution -	0	1,066	1,081	1,057	957	766	529
Transportation (million 2019\$)							
Premature deaths from air pollution - Coal	0	51.4	0.042	0.041	0.036	0.025	0.001
(deaths)							
Premature deaths from air pollution - Natural	0	14.3	7.5	3.08	1.43	0.566	0.448
Gas (deaths)							
Premature deaths from air pollution -	0	120	122	119	108	86.2	59.5
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	3.31	4.14	0	0	0	0
Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric Resistance (%)	51.1	61.5	93.4	99.7	100	100	100
Sales of cooking units - Gas (%)	48.9	38.5	6.59	0.332	0	0	0
Sales of space heating units - Electric Heat Pump	3.66	8.85	32.5	79.5	89.5	90.4	90.3
(%)							
Sales of space heating units - Electric Resistance	13.4	18.8	15	6.74	4.9	4.78	4.99
(%)							
Sales of space heating units - Fossil (%)	9.47	16	12.3	6.05	4.79	4.67	4.5
Sales of space heating units - Gas (%)	73.5	56.3	40.2	7.71	0.776	0.203	0.19
Sales of water heating units - Electric Heat Pump	0	0.766	10.6	32.6	37.2	37.5	37.6
(%)							

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	24.6	40.6	46.1	59	62.1	62.3	62.3
(%)							
Sales of water heating units - Gas Furnace (%)	75.4	58.6	43.2	8.25	0.653	0.021	0
Sales of water heating units - Other (%)	0.053	0.114	0.115	0.114	0.112	0.112	0.113

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	1,089	2,796	4,523	6,855	7,457	7,112
(million \$2018)							
Public EV charging plugs - DC Fast (1000 units)	0.143	0	2.06	0	9	0	14.5
Public EV charging plugs - L2 (1000 units)	0.459	0	49.6	0	216	0	350
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 (%)	1.58	1.84	1.27	0.407	0.075	0.013	0
Vehicle sales - Light-duty - EV (%)	3.8	14.8	45.9	81.6	96.3	99.3	100
Vehicle sales - Light-duty - gasoline (%)	90.1	78.4	49.4	16.7	3.32	0.591	0
Vehicle sales - Light-duty - hybrid (%)	4.31	4.46	3.18	1.18	0.288	0.063	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.342	0.206	0.064	0.013	0.002	0
Vehicle sales - Light-duty - other (%)	0.103	0.099	0.065	0.023	0.004	0.001	0
Vehicle sales - Medium-duty - diesel (%)	64.7	59.7	42.3	14.4	2.59	0.384	0
Vehicle sales - Medium-duty - EV (%)	0.784	5.07	25.3	60.8	76.5	79.5	80
Vehicle sales - Medium-duty - gasoline (%)	33.7	33.3	25.5	9.32	1.77	0.277	0
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.402	0.341	0.14	0.03	0.005	0
Vehicle sales - Medium-duty - hydrogen 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)	194	191	184	171	157	146	140
Final energy use - Industry (PJ)	516	524	516	503	496	492	490
Final energy use - Residential (PJ)	247	230	215	188	157	132	115
Final energy use - Transportation (PJ)	508	474	413	338	271	230	212

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

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s -	0	19,303	21,086	0	0	0	0
Cumulative 5-yr (million \$2018)							
Sales of cooking units - Electric Resistance (%)	41	54.2	82.9	88.6	88.9	88.9	88.9
Sales of cooking units - Gas (%)	59	45.8	17.1	11.4	11.1	11.1	11.1
Sales of space heating units - Electric Heat Pump	0.938	6.01	29.4	77.8	88.2	89	89.1
(%)							
Sales of space heating units - Electric Resistance	3.03	3.48	5.44	9.73	10.5	10.6	10.6
(%)							
Sales of space heating units - Fossil (%)	5.62	2.66	0.503	0.021	0	0	0
Sales of space heating units - Gas Furnace (%)	90.4	87.9	64.6	12.4	1.3	0.384	0.356
Sales of water heating units - Electric Heat Pump	0.306	1.32	13.9	42.1	48.3	48.8	48.8
(%)							
Sales of water heating units - Electric Resistance	2.97	4.18	16.6	44.4	50.5	51	51
(%)							
Sales of water heating units - Gas Furnace (%)	96.6	94.3	69.4	13.2	1.05	0.035	0
Sales of water heating units - Other (%)	0.173	0.186	0.186	0.187	0.186	0.187	0.187

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

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -	0	3.38	3.48	6.55	7	5.91	6.17
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	0.207	0.28	0.969	0.509	7.33
Capital invested - Wind - Base (billion \$2018)	0	1.23	2.48	3.09	9.85	22.7	26.9

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	830	0	303	444	1,615	903	13,765
Solar - Constrained land use assumptions (GWh)	830	0	682	1,479	552	0	17,705
Wind - Base land use assumptions (GWh)	3,031	2,960	6,304	8,256	27,308	66,670	81,297
Wind - Constrained land use assumptions (GWh)	3,031	1,703	9,238	44,103	50,614	16,719	29,313

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

Table 32: E+RE+ Scenurio - PILLAR 6: Lunu Siliks	•		
Item	2020	2025	2050
Carbon sink potential - Aggressive deployment -	0	0	-1,228
Corn-ethanol to energy grasses (1000 tC02e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-4,557
Cropland measures (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-189
Permanent conservation cover (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-5,975
Total (1000 tC02e/y)			
Carbon sink potential - Moderate deployment -	0	0	-1,228
Corn-ethanol to energy grasses (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment -	0	0	-2,397
Cropland measures (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment -	0	0	-94.6
Permanent conservation cover (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment -	0	0	-3,720
Total (1000 tC02e/y)			
Land impacted for carbon sink - Aggressive	0	0	479
deployment - Corn-ethanol to energy grasses			
(1000 hectares)			
Land impacted for carbon sink - Aggressive	0	0	3,259
deployment - Cropland measures (1000			
hectares)			
Land impacted for carbon sink - Aggressive	0	0	344
deployment - Permanent conservation cover			
(1000 hectares)			
Land impacted for carbon sink - Aggressive	0	0	4,082
deployment - Total (1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	479
deployment - Corn-ethanol to energy grasses			
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	1,716
deployment - Cropland measures (1000			
hectares)			
Land impacted for carbon sink - Moderate	0	0	172
deployment - Permanent conservation cover		-	
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	2,367
deployment - Total (1000 hectares)		-	_,

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

Table 33: E+RE+ scenario - PILLAR 6: Land sinks	s - Forests		
Item	2020	2025	2050
Carbon sink potential - High - Accelerate	0	0	392
regeneration (1000 tC02e/y)			
Carbon sink potential - High - All (not counting	0	0	32,495
overlap) (1000 tC02e/y)			- ,
Carbon sink potential - High - Avoid deforestation	0	0	2,104
(1000 tC02e/y)			2,10 1
Carbon sink potential - High - Extend rotation	0	0	8,126
length (1000 tC02e/y)		0	0,120
Carbon sink potential - High - Improve	0	0	912
	0	U	912
plantations (1000 tCO2e/y)			(0 ()
Carbon sink potential - High - Increase retention	0	0	6,364
of HWP (1000 tCO2e/y)			
Carbon sink potential - High - Increase trees	0	0	1,651
outside forests (1000 tCO2e/y)			
Carbon sink potential - High - Reforest cropland	0	0	2,230
(1000 tCO2e/y)			
Carbon sink potential - High - Reforest pasture	0	0	6,496
(1000 tCO2e/y)			
Carbon sink potential - High - Restore	0	0	4,219
productivity (1000 tCO2e/y)			.,,
Carbon sink potential - Low - Accelerate	0	0	197
regeneration (1000 tC02e/y)	0	0	171
	0	0	0.071
Carbon sink potential - Low - All (not counting	0	0	9,861
overlap) (1000 tCO2e/y)			
Carbon sink potential - Low - Avoid deforestation	0	0	351
(1000 tC02e/y)			
Carbon sink potential - Low - Extend rotation	0	0	3,121
length (1000 tCO2e/y)			
Carbon sink potential - Low - Improve	0	0	464
plantations (1000 tCO2e/y)			
Carbon sink potential - Low - Increase retention	0	0	2,121
of HWP (1000 tC02e/y)			,
Carbon sink potential - Low - Increase trees	0	0	578
outside forests (1000 tCO2e/y)			0.0
Carbon sink potential - Low - Reforest cropland	0	0	1,115
(1000 tCO2e/y)		0	1,113
	0	0	4.00
Carbon sink potential - Low - Reforest pasture	0	0	492
(1000 tC02e/y)			4 / 00
Carbon sink potential - Low - Restore	0	0	1,422
productivity (1000 tCO2e/y)			
Carbon sink potential - Mid - Accelerate	0	0	294
regeneration (1000 tCO2e/y)			
Carbon sink potential - Mid - All (not counting	0	0	21,170
overlap) (1000 tCO2e/y)			
Carbon sink potential - Mid - Avoid deforestation	0	0	1,227
(1000 tC02e/y)			•
Carbon sink potential - Mid - Extend rotation	0	0	5,624
length (1000 tC02e/y)		•	0,024
Carbon sink potential - Mid - Improve plantations	0	0	680
		0	000
(1000 tC02e/y)			
Carbon sink potential - Mid - Increase retention	0	0	4,243
of HWP (1000 tC02e/y)			
Carbon sink potential - Mid - Increase trees	0	0	1,114
outside forests (1000 tCO2e/y)			
Carbon sink potential - Mid - Reforest cropland	0	0	1,673
(1000 tC02e/y)			
Carbon sink potential - Mid - Reforest pasture	0	0	3,494
(1000 tC02e/y)		"	5, 1, 1
Carbon sink potential - Mid - Restore	0	0	2,820
productivity (1000 tC02e/y)		١	2,020
	0	0	41.0
Land impacted for carbon sink potential - High -	0	0	64.2
Accelerate regeneration (1000 hectares)			

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	285
Avoid deforestation (over 30 years) (1000			
hectares)			
Land impacted for carbon sink potential - High -	0	0	4,144
Extend rotation length (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	336
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	157
Increase trees outside forests (1000 hectares)		-	-
Land impacted for carbon sink potential - High -	0	0	147
Reforest cropland (1000 hectares)	-	-	
Land impacted for carbon sink potential - High -	0	0	185
Reforest pasture (1000 hectares)	<u> </u>	-	.55
Land impacted for carbon sink potential - High -	0	0	1,398
Restore productivity (1000 hectares)	5	0	1,070
Land impacted for carbon sink potential - High -	0	0	6,716
Total impacted (over 30 years) (1000 hectares)	U	U	0,110
Land impacted for carbon sink potential - Low -	0	0	32.1
	U	U	3Z.I
Accelerate regeneration (1000 hectares)			0/7
Land impacted for carbon sink potential - Low -	0	0	267
Avoid deforestation (over 30 years) (1000			
hectares)	_		
Land impacted for carbon sink potential - Low -	0	0	1,588
Extend rotation length (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	168
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	82.5
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	73.7
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	32
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	846
Restore productivity (1000 hectares)	-	-	
Land impacted for carbon sink potential - Low -	0	0	3,089
Total impacted (over 30 years) (1000 hectares)	Ğ	·	5,567
Land impacted for carbon sink potential - Mid -	0	0	48.1
Accelerate regeneration (1000 hectares)	o	U	40.1
Land impacted for carbon sink potential - Mid -	0	0	276
	U	υ	210
Avoid deforestation (over 30 years) (1000			
hectares)			0.077
Land impacted for carbon sink potential - Mid -	0	0	2,866
Extend rotation length (1000 hectares)	_		
Land impacted for carbon sink potential - Mid -	0	0	253
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	120
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	111
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	231
Reforest pasture (1000 hectares)	-	-	-
Land impacted for carbon sink potential - Mid -	0	0	1,704
Restore productivity (1000 hectares)	ŭ		.,. 0-
Land impacted for carbon sink potential - Mid -	0	0	5,608
Total impacted (over 30 years) (1000 hectares)	5	0	5,500
Total hillpacted (over 50 years) (1000 liestal 65)			

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal	0	458	0.376	0.366	0.321	0.224	0.013
(million 2019\$)							
Monetary damages from air pollution - Natural	0	120	71.9	35	23.8	9.59	3.96
Gas (million 2019\$)							
Monetary damages from air pollution -	0	1,048	981	749	435	201	81.6
Transportation (million 2019\$)							
Premature deaths from air pollution - Coal	0	51.4	0.042	0.041	0.036	0.025	0.001
(deaths)							
Premature deaths from air pollution - Natural	0	13.5	8.12	3.95	2.69	1.08	0.447
Gas (deaths)							
Premature deaths from air pollution -	0	118	110	84.2	49	22.6	9.18
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	3.31	4.14	0	0	0	0
Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric Resistance (%)	51.1	61.5	93.4	99.7	100	100	100
Sales of cooking units - Gas (%)	48.9	38.5	6.59	0.332	0	0	0
Sales of space heating units - Electric Heat Pump	3.66	8.85	32.5	79.5	89.5	90.4	90.3
(%)							
Sales of space heating units - Electric Resistance	13.4	18.8	15	6.74	4.9	4.78	4.99
(%)							
Sales of space heating units - Fossil (%)	9.47	16	12.3	6.05	4.79	4.67	4.5
Sales of space heating units - Gas (%)	73.5	56.3	40.2	7.71	0.776	0.203	0.19
Sales of water heating units - Electric Heat Pump	0	0.766	10.6	32.6	37.2	37.5	37.6
(%)							
Sales of water heating units - Electric Resistance	24.6	40.6	46.1	59	62.1	62.3	62.3
(%)							
Sales of water heating units - Gas Furnace (%)	75.4	58.6	43.2	8.25	0.653	0.021	0
Sales of water heating units - Other (%)	0.053	0.114	0.115	0.114	0.112	0.112	0.113

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	1,089	2,796	4,523	6,855	7,457	7,112
(million \$2018)							
Public EV charging plugs - DC Fast (1000 units)	0.143	0	2.06	0	9	0	14.5
Public EV charging plugs - L2 (1000 units)	0.459	0	49.6	0	216	0	350
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 (%)	1.58	1.84	1.27	0.407	0.075	0.013	0
Vehicle sales - Light-duty - EV (%)	3.8	14.8	45.9	81.6	96.3	99.3	100
Vehicle sales - Light-duty - gasoline (%)	90.1	78.4	49.4	16.7	3.32	0.591	0
Vehicle sales - Light-duty - hybrid (%)	4.31	4.46	3.18	1.18	0.288	0.063	0
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.342	0.206	0.064	0.013	0.002	0
Vehicle sales - Light-duty - other (%)	0.103	0.099	0.065	0.023	0.004	0.001	0
Vehicle sales - Medium-duty - diesel (%)	64.7	59.7	42.3	14.4	2.59	0.384	0
Vehicle sales - Medium-duty - EV (%)	0.784	5.07	25.3	60.8	76.5	79.5	80
Vehicle sales - Medium-duty - gasoline (%)	33.7	33.3	25.5	9.32	1.77	0.277	0
Vehicle sales - Medium-duty - hybrid (%)	0.363	0.402	0.341	0.14	0.03	0.005	0
Vehicle sales - Medium-duty - hydrogen 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)	194	191	184	171	157	146	140
Final energy use - Industry (PJ)	516	524	516	503	496	492	490
Final energy use - Residential (PJ)	247	230	215	188	157	132	115
Final energy use - Transportation (PJ)	508	474	413	338	271	230	212

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

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s -	0	19,303	21,086	0	0	0	0
Cumulative 5-yr (million \$2018)							
Sales of cooking units - Electric Resistance (%)	41	54.2	82.9	88.6	88.9	88.9	88.9
Sales of cooking units - Gas (%)	59	45.8	17.1	11.4	11.1	11.1	11.1
Sales of space heating units - Electric Heat Pump	0.938	6.01	29.4	77.8	88.2	89	89.1
(%)							
Sales of space heating units - Electric Resistance	3.03	3.48	5.44	9.73	10.5	10.6	10.6
(%)							
Sales of space heating units - Fossil (%)	5.62	2.66	0.503	0.021	0	0	0
Sales of space heating units - Gas Furnace (%)	90.4	87.9	64.6	12.4	1.3	0.384	0.356
Sales of water heating units - Electric Heat Pump	0.306	1.32	13.9	42.1	48.3	48.8	48.8
(%)							
Sales of water heating units - Electric Resistance	2.97	4.18	16.6	44.4	50.5	51	51
(%)							
Sales of water heating units - Gas Furnace (%)	96.6	94.3	69.4	13.2	1.05	0.035	0
Sales of water heating units - Other (%)	0.173	0.186	0.186	0.187	0.186	0.187	0.187

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

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -	0	3.38	3.48	6.55	7	5.91	6.17
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	0	0	0	0	0.075	0
Capital invested - Solar PV - Constrained (billion \$2018)	0	0	0	0.095	0.11	0.273	0
Capital invested - Wind - Base (billion \$2018)	0	1.09	0.945	0.889	1.06	1.88	0.039
Capital invested - Wind - Constrained (billion \$2018)	0	0.324	0.812	2.3	3.78	11.6	0.156

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

Item	2020	2025	2030	2035	2040	2045	2050
Solar - Base land use assumptions (GWh)	830	0	0	0	0	132	0
Solar - Constrained land use assumptions (GWh)	830	0	0	152	184	480	0
Wind - Base land use assumptions (GWh)	3,031	2,650	2,425	2,449	3,011	5,538	118
Wind - Constrained land use assumptions (GWh)	3,031	753	1,998	6,053	10,535	34,013	483

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

Item	2020	2025	2050
Carbon sink potential - Aggressive deployment -	0	0	-1,228
Corn-ethanol to energy grasses (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-4,557
Cropland measures (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-189
Permanent conservation cover (1000 tCO2e/y)			
Carbon sink potential - Aggressive deployment -	0	0	-5,975
Total (1000 tC02e/y)			
Carbon sink potential - Moderate deployment -	0	0	-1,228
Corn-ethanol to energy grasses (1000 tCO2e/y)			

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

Table 42. LTNE Scenario Tillar O. Lana Sinks	rigilicalta	i c (continue	Juj
Item	2020	2025	2050
Carbon sink potential - Moderate deployment -	0	0	-2,397
Cropland measures (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment -	0	0	-94.6
Permanent conservation cover (1000 tCO2e/y)			
Carbon sink potential - Moderate deployment -	0	0	-3,720
Total (1000 tC02e/y)			
Land impacted for carbon sink - Aggressive	0	0	479
deployment - Corn-ethanol to energy grasses			
(1000 hectares)			
Land impacted for carbon sink - Aggressive	0	0	3,259
deployment - Cropland measures (1000			
hectares)			
Land impacted for carbon sink - Aggressive	0	0	344
deployment - Permanent conservation cover			
(1000 hectares)			
Land impacted for carbon sink - Aggressive	0	0	4,082
deployment - Total (1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	479
deployment - Corn-ethanol to energy grasses			
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	1,716
deployment - Cropland measures (1000			
hectares)			
Land impacted for carbon sink - Moderate	0	0	172
deployment - Permanent conservation cover			
(1000 hectares)			
Land impacted for carbon sink - Moderate	0	0	2,367
deployment - Total (1000 hectares)			

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

Table 1812 1 NE 888 NATION TELEVINO PARTIES	. 0. 0010		
Item	2020	2025	2050
Carbon sink potential - High - Accelerate	0	0	392
regeneration (1000 tCO2e/y)			
Carbon sink potential - High - All (not counting	0	0	32,495
overlap) (1000 tCO2e/y)			
Carbon sink potential - High - Avoid deforestation	0	0	2,104
(1000 tCO2e/y)			
Carbon sink potential - High - Extend rotation	0	0	8,126
length (1000 tCO2e/y)			
Carbon sink potential - High - Improve	0	0	912
plantations (1000 tCO2e/y)			
Carbon sink potential - High - Increase retention	0	0	6,364
of HWP (1000 tCO2e/y)			•
Carbon sink potential - High - Increase trees	0	0	1,651
outside forests (1000 tCO2e/y)			•
Carbon sink potential - High - Reforest cropland	0	0	2,230
(1000 tC02e/y)			•
Carbon sink potential - High - Reforest pasture	0	0	6,496
(1000 tC02e/y)			•
Carbon sink potential - High - Restore	0	0	4,219
productivity (1000 tCO2e/y)			•
Carbon sink potential - Low - Accelerate	0	0	197
regeneration (1000 tCO2e/y)			
Carbon sink potential - Low - All (not counting	0	0	9,861
overlap) (1000 tCO2e/y)			•
Carbon sink potential - Low - Avoid deforestation	0	0	351
(1000 tCO2e/y)			
Carbon sink potential - Low - Extend rotation	0	0	3,121
length (1000 tCO2e/y)			-7:
Carbon sink potential - Low - Improve	0	0	464
plantations (1000 tCO2e/y)		1	
Carbon sink potential - Low - Increase retention	0	0	2,121
of HWP (1000 tCO2e/y)	5	"	-,1
3 (.330 (3020/1)			

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

Table 43: E+RE- scenario - PILLAR 6: Land sinks	- Forests (co	intinued)	
Item	2020	2025	2050
Carbon sink potential - Low - Increase trees	0	0	578
outside forests (1000 tCO2e/y)			
Carbon sink potential - Low - Reforest cropland	0	0	1,115
(1000 tC02e/y)			•
Carbon sink potential - Low - Reforest pasture	0	0	492
(1000 tC02e/y)			.,_
Carbon sink potential - Low - Restore	0	0	1,422
productivity (1000 tCO2e/y)	9	<u> </u>	1,722
Carbon sink potential - Mid - Accelerate	0	0	294
regeneration (1000 tCO2e/y)	o	0	274
Carbon sink potential - Mid - All (not counting	0	0	21,170
	U	U	21,170
overlap) (1000 tC02e/y)	0		1.007
Carbon sink potential - Mid - Avoid deforestation	0	0	1,227
(1000 tC02e/y)			
Carbon sink potential - Mid - Extend rotation	0	0	5,624
length (1000 tCO2e/y)			
Carbon sink potential - Mid - Improve plantations	0	0	680
(1000 tCO2e/y)			
Carbon sink potential - Mid - Increase retention	0	0	4,243
of HWP (1000 tCO2e/y)			
Carbon sink potential - Mid - Increase trees	0	0	1,114
outside forests (1000 tCO2e/y)			
Carbon sink potential - Mid - Reforest cropland	0	0	1,673
(1000 tC02e/y)			,
Carbon sink potential - Mid - Reforest pasture	0	0	3,494
(1000 tC02e/y)	o		0, 17 1
Carbon sink potential - Mid - Restore	0	0	2,820
productivity (1000 tCO2e/y)	0	0	2,020
Land impacted for carbon sink potential - High -	0	0	64.2
Accelerate regeneration (1000 hectares)	U	0	04.2
Land impacted for carbon sink potential - High -	0	0	285
	0	0	260
Avoid deforestation (over 30 years) (1000			
hectares)			/ 1/ /
Land impacted for carbon sink potential - High -	0	0	4,144
Extend rotation length (1000 hectares)	_	_	
Land impacted for carbon sink potential - High -	0	0	336
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	157
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	147
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	185
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	1,398
Restore productivity (1000 hectares)	0	<u> </u>	1,070
Land impacted for carbon sink potential - High -	0	0	6,716
Total impacted (over 30 years) (1000 hectares)	o	0	0,110
	0	0	001
Land impacted for carbon sink potential - Low -	0	0	32.1
Accelerate regeneration (1000 hectares)			0/7
Land impacted for carbon sink potential - Low -	0	0	267
Avoid deforestation (over 30 years) (1000			
hectares)			
Land impacted for carbon sink potential - Low -	0	0	1,588
Extend rotation length (1000 hectares)			
	0	0	168
Land impacted for carbon sink potential - Low -			
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)			
Improve plantations (1000 hectares)	0	0	0
Improve plantations (1000 hectares) Land impacted for carbon sink potential - Low -	0	0	U
Improve plantations (1000 hectares)	0	0	82.5

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

Item	2020	2025	2050
Land impacted for carbon sink potential - Low -	0	0	73.7
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	32
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	846
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	3,089
Total impacted (over 30 years) (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	48.1
Accelerate regeneration (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	276
Avoid deforestation (over 30 years) (1000			
hectares)			
Land impacted for carbon sink potential - Mid -	0	0	2,866
Extend rotation length (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	253
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	120
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	111
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	231
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	1,704
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	5,608
Total impacted (over 30 years) (1000 hectares)			

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

Item	2020	2025	2030	2035	2040	2045	2050
Monetary damages from air pollution - Coal	0	458	0.376	0.366	0.321	0.224	0.013
(million 2019\$)							
Monetary damages from air pollution - Natural	0	139	97.1	147	108	38.6	14.8
Gas (million 2019\$)							
Monetary damages from air pollution -	0	1,048	981	749	435	201	81.6
Transportation (million 2019\$)							
Premature deaths from air pollution - Coal	0	51.4	0.042	0.041	0.036	0.025	0.001
(deaths)							
Premature deaths from air pollution - Natural	0	15.7	11	16.6	12.2	4.36	1.67
Gas (deaths)							
Premature deaths from air pollution -	0	118	110	84.2	49	22.6	9.18
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	3.29	4.06	0	0	0	0
Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric Resistance (%)	50.9	52.2	56.7	68.5	85	95.2	98.7
Sales of cooking units - Gas (%)	49.1	47.8	43.3	31.5	15	4.84	1.3
Sales of space heating units - Electric Heat Pump	3.66	7.03	8.43	13	23.5	36.7	44.5
(%)							
Sales of space heating units - Electric Resistance	13.4	19	18.7	17.9	16	13.7	12.5
(%)							
Sales of space heating units - Fossil (%)	9.47	16.4	16.3	15.5	14	12.3	11.1
Sales of space heating units - Gas (%)	73.5	57.5	56.6	53.6	46.4	37.4	31.9
Sales of water heating units - Electric Heat Pump	0	0.205	0.783	2.7	7.35	13.3	17
(%)							
Sales of water heating units - Electric Resistance	24.6	40.2	40.4	41.4	44.2	47.7	49.9
(%)							

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 (%)	75.4	59.4	58.7	55.8	48.3	38.9	33
Sales of water heating units - Other (%)	0.053	0.114	0.115	0.115	0.115	0.115	0.115

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	177	370	1,251	3,933	5,731
(million \$2018)							
Public EV charging plugs - DC Fast (1000 units)	0.143	0	0.646	0	3.34	0	9.32
Public EV charging plugs - L2 (1000 units)	0.459	0	15.5	0	80.4	0	224
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 (%)	1.6	2	2.06	1.64	1.05	0.542	0.232
Vehicle sales - Light-duty - EV (%)	1.85	4.59	11.7	25.6	48.1	71.8	87.5
Vehicle sales - Light-duty - gasoline (%)	91.9	87.6	79.9	67	46.6	25.1	11
Vehicle sales - Light-duty - hybrid (%)	4.47	5.28	5.94	5.42	4.08	2.42	1.18
Vehicle sales - Light-duty - hydrogen FC (%)	0.113	0.381	0.328	0.251	0.179	0.099	0.046
Vehicle sales - Light-duty - other (%)	0.104	0.108	0.098	0.086	0.062	0.034	0.016
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)	194	191	186	183	179	175	171
Final energy use - Industry (PJ)	516	524	517	508	504	500	498
Final energy use - Residential (PJ)	247	230	218	208	197	184	171
Final energy use - Transportation (PJ)	509	478	433	396	369	336	297

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

Item	2020	2025	2030	2035	2040	2045	2050
Commercial HVAC investment in 2020s -	0	19,301	21,085	0	0	0	0
Cumulative 5-yr (million \$2018)							
Sales of cooking units - Electric Resistance (%)	41	45.8	49.8	60.5	75.4	84.5	87.7
Sales of cooking units - Gas (%)	59	54.2	50.2	39.5	24.6	15.5	12.3
Sales of space heating units - Electric Heat Pump	0.938	4.33	5.66	9.99	20.2	33.1	40.9
(%)							
Sales of space heating units - Electric Resistance	3.03	3.36	3.47	3.84	4.75	5.92	6.59
(%)							
Sales of space heating units - Fossil (%)	5.62	3.12	3.01	2.66	2.19	1.88	1.77
Sales of space heating units - Gas Furnace (%)	90.4	89.2	87.9	83.5	72.8	59.1	50.7
Sales of water heating units - Electric Heat Pump	0.306	0.605	1.35	3.8	9.77	17.5	22.2
(%)							
Sales of water heating units - Electric Resistance	2.97	3.47	4.17	6.6	12.5	20.1	24.7
(%)							
Sales of water heating units - Gas Furnace (%)	96.6	95.7	94.3	89.4	77.6	62.3	52.9
Sales of water heating units - Other (%)	0.173	0.186	0.186	0.187	0.186	0.187	0.187

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

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -	0	2.66	2.66	3.62	3.74	5.53	5.85
Cumulative 5-yr (billion \$2018)							

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

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

Table 51: E-B+ scenario - PILLAR 2: Clean Electricity - Generation

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

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

•	Ο,						
Item	2020	2025	2030	2035	2040	2045	2050
Biomass purchases (million \$2018/year)	0	0	0	0	0	2,034	3,688
Conversion capital investment - Cumulative 5-yr	0	0	0	0	0	21,604	18,471
(million \$2018)							
Number of facilities - Allam power w ccu	0	0	0	0	0	0	0
(quantity)							
Number of facilities - Beccs hydrogen (quantity)	0	0	0	0	0	25	28
Number of facilities - Diesel (quantity)	0	0	0	0	0	0	0
Number of facilities - Diesel ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Power (quantity)	0	0	0	0	0	0	0
Number of facilities - Power ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Pyrolysis (quantity)	0	0	0	0	0	0	16
Number of facilities - Pyrolysis ccu (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng (quantity)	0	0	0	0	0	0	0
Number of facilities - Sng ccu (quantity)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
Annual - All (MMT)	0	0	0	0	0	27.8	31.1
Annual - BECCS (MMT)	0	0	0	0	0	27.8	31.1
Annual - Cement and lime (MMT)	0	0	0	0	0	0	0
Annual - NGCC (MMT)	0	0	0	0	0	0	0
Cumulative - All (MMT)	0	0	0	0	0	27.8	58.9
Cumulative - BECCS (MMT)	0	0	0	0	0	27.8	58.9
Cumulative - Cement and lime (MMT)	0	0	0	0	0	0	0
Cumulative - NGCC (MMT)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
CO2 storage (MMT)	0	0	0	0	0	0	0
Injection wells (wells)	0	0	0	0	0	0	0
Resource characterization, appraisal, permitting costs (million \$2020)	0	0	0	0	0	0	0
Wells and facilities construction costs (million \$2020)	0	0	0	0	0	0	0

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

Item	2020	2025	2030	2035	2040	2045	2050
All (km)	0	0	0	0	0	583	380
Cumulative investment - All (million \$2018)	0	0	0	0	0	928	788
Cumulative investment - Spur (million \$2018)	0	0	0	0	0	928	788
Cumulative investment - Trunk (million \$2018)	0	0	0	0	0	0	0
Spur (km)	0	0	0	0	0	583	380
Trunk (km)	0	0	0	0	0	0	0

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

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

Table 57: E-B+ scenario - PILLAR 6: Land sinks	- Forests		
Item	2020	2025	2050
Carbon sink potential - High - Accelerate	0	0	392
regeneration (1000 tCO2e/y)			
Carbon sink potential - High - All (not counting	0	0	32,495
overlap) (1000 tCO2e/y)			
Carbon sink potential - High - Avoid deforestation	0	0	2,104
(1000 tCO2e/y)			
Carbon sink potential - High - Extend rotation	0	0	8,126
length (1000 tCO2e/y)			
Carbon sink potential - High - Improve	0	0	912
plantations (1000 tCO2e/y)			
Carbon sink potential - High - Increase retention	0	0	6,364
of HWP (1000 tCO2e/y)			
Carbon sink potential - High - Increase trees	0	0	1,651
outside forests (1000 tCO2e/y)			
Carbon sink potential - High - Reforest cropland	0	0	2,230
(1000 tC02e/y)			,
Carbon sink potential - High - Reforest pasture	0	0	6,496
(1000 tC02e/y)		-	-,
Carbon sink potential - High - Restore	0	0	4,219
productivity (1000 tCO2e/y)		o	7,217
Carbon sink potential - Low - Accelerate	0	0	197
regeneration (1000 tCO2e/y)		0	171
Carbon sink potential - Low - All (not counting	0	0	9,861
overlap) (1000 tC02e/y)		0	2,001
Carbon sink potential - Low - Avoid deforestation	0	0	351
(1000 tCO2e/y)	0	U	331
	0	0	3,121
Carbon sink potential - Low - Extend rotation	U	U	3,121
length (1000 tC02e/y)	0	0	1.71
Carbon sink potential - Low - Improve	0	0	464
plantations (1000 tC02e/y)	0	0	0.101
Carbon sink potential - Low - Increase retention	0	0	2,121
of HWP (1000 tC02e/y)			570
Carbon sink potential - Low - Increase trees	0	0	578
outside forests (1000 tC02e/y)			4445
Carbon sink potential - Low - Reforest cropland	0	0	1,115
(1000 tC02e/y)			
Carbon sink potential - Low - Reforest pasture	0	0	492
(1000 tC02e/y)		_	
Carbon sink potential - Low - Restore	0	0	1,422
productivity (1000 tCO2e/y)			
Carbon sink potential - Mid - Accelerate	0	0	294
regeneration (1000 tCO2e/y)			
Carbon sink potential - Mid - All (not counting	0	0	21,170
overlap) (1000 tC02e/y)			
Carbon sink potential - Mid - Avoid deforestation	0	0	1,227
(1000 tC02e/y)			
Carbon sink potential - Mid - Extend rotation	0	0	5,624
length (1000 tCO2e/y)			
Carbon sink potential - Mid - Improve plantations	0	0	680
(1000 tCO2e/y)			
Carbon sink potential - Mid - Increase retention	0	0	4,243
of HWP (1000 tCO2e/y)			
Carbon sink potential - Mid - Increase trees	0	0	1,114
outside forests (1000 tCO2e/y)			•
Carbon sink potential - Mid - Reforest cropland	0	0	1,673
(1000 tC02e/y)			.,0.0
Carbon sink potential - Mid - Reforest pasture	0	0	3,494
(1000 tCO2e/y)		0	0,774
Carbon sink potential - Mid - Restore	0	0	2,820
productivity (1000 tC02e/y)		0	2,020
Land impacted for carbon sink potential - High -	1		
	n	Λ	61. O
Accelerate regeneration (1000 hectares)	0	0	64.2

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

Table 57: E-B+ scenario - PILLAR 6: Land sinks -	- Forests (cor	ntinued)	
Item	2020	2025	2050
Land impacted for carbon sink potential - High -	0	0	285
Avoid deforestation (over 30 years) (1000			
hectares)			
Land impacted for carbon sink potential - High -	0	0	4,144
Extend rotation length (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	336
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	157
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - High -	0	0	147
Reforest cropland (1000 hectares)		•	
Land impacted for carbon sink potential - High -	0	0	185
Reforest pasture (1000 hectares)		Ŭ	100
Land impacted for carbon sink potential - High -	0	0	1,398
Restore productivity (1000 hectares)		0	1,370
Land impacted for carbon sink potential - High -	0	0	6,716
	0	0	0,710
Total impacted (over 30 years) (1000 hectares)	0	0	001
Land impacted for carbon sink potential - Low -	0	0	32.1
Accelerate regeneration (1000 hectares)		-	0/7
Land impacted for carbon sink potential - Low -	0	0	267
Avoid deforestation (over 30 years) (1000			
hectares)			
Land impacted for carbon sink potential - Low -	0	0	1,588
Extend rotation length (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	168
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	82.5
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	73.7
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	32
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	846
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - Low -	0	0	3,089
Total impacted (over 30 years) (1000 hectares)			0,007
Land impacted for carbon sink potential - Mid -	0	0	48.1
Accelerate regeneration (1000 hectares)		0	70.1
Land impacted for carbon sink potential - Mid -	0	0	276
Avoid deforestation (over 30 years) (1000		0	210
hectares)			
Land impacted for carbon sink potential - Mid -	0	0	2,866
	0	0	2,000
Extend rotation length (1000 hectares)	0	0	0.50
Land impacted for carbon sink potential - Mid -	0	0	253
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	120
Increase trees outside forests (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	111
Reforest cropland (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	231
Reforest pasture (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	1,704
Restore productivity (1000 hectares)			
Land impacted for carbon sink potential - Mid -	0	0	5,608
Total impacted (over 30 years) (1000 hectares)			
, , , , , , , , , , , , , , , , , , , ,	1		

Table 58: RFF scenario -	DILLAD 1. Efficience	v/Electrification	Dooidontial
Table 58' RFF Scenorio -	PILLAR I. FAICIBUC	V/FIRCTRITICATION :	- Kesinentini

Item	2020	2025	2030	2035	2040	2045	2050
Residential HVAC investment in 2020s vs. REF -	0	3.19	3.37	0	0	0	0
Cumulative 5-yr (billion \$2018)							
Sales of cooking units - Electric Resistance (%)	50.5	50.5	50.5	50.5	50.5	50.5	50.5
Sales of cooking units - Gas (%)	49.5	49.5	49.5	49.5	49.5	49.5	49.5
Sales of space heating units - Electric Heat Pump	2.81	10.6	10.9	11.5	12	12.6	13.4
(%)							
Sales of space heating units - Electric Resistance	13.5	18.3	18.1	17.9	17.4	16.8	16.1
(%)							
Sales of space heating units - Fossil (%)	9.72	15.4	14.9	14.5	14.5	14.6	14.5
Sales of space heating units - Gas (%)	74	55.7	56	56.1	56	56.1	56
Sales of water heating units - Electric Heat Pump	0	0	0	0	0	0	0
(%)							
Sales of water heating units - Electric Resistance	24.6	40.1	39.9	39.8	39.9	39.7	39.7
(%)							
Sales of water heating units - Gas Furnace (%)	75.4	59.8	60	60	60	60.1	60.2
Sales of water heating units - Other (%)	0.053	0.114	0.115	0.116	0.115	0.116	0.116

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 (%)	1.59	2	2.19	2.04	1.84	1.71	1.63
Vehicle sales - Light-duty - EV (%)	3.45	5.45	6.22	7.64	9.32	10.8	12
Vehicle sales - Light-duty - gasoline (%)	90.4	86.9	84.8	83	80.9	79	77.4
Vehicle sales - Light-duty - hybrid (%)	4.33	5.18	6.35	6.92	7.49	8.09	8.56
Vehicle sales - Light-duty - hydrogen FC (%)	0.111	0.378	0.348	0.309	0.307	0.308	0.318
Vehicle sales - Light-duty - other (%)	0.104	0.107	0.104	0.104	0.104	0.103	0.105
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)	193	194	192	189	185	185	190
Final energy use - Industry (PJ)	516	542	554	566	585	606	631
Final energy use - Residential (PJ)	247	231	221	214	209	206	203
Final energy use - Transportation (PJ)	508	478	436	411	410	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	19,095	19,795	0	0	0	0
Cumulative 5-yr (million \$2018)							
Sales of cooking units - Electric Resistance (%)	41	44.2	44.3	44.3	44.3	44.4	44.5
Sales of cooking units - Gas (%)	59	55.8	55.7	55.7	55.7	55.6	55.5
Sales of space heating units - Electric Heat Pump	0.938	11.3	43.3	70.2	74.9	75.5	75.5
(%)							
Sales of space heating units - Electric Resistance	3.03	4.33	9.16	17.5	23.2	24.1	24.1
(%)							
Sales of space heating units - Fossil (%)	5.62	2.84	1.46	0.267	0.031	0.001	0
Sales of space heating units - Gas Furnace (%)	90.4	81.6	46.1	12	1.88	0.453	0.355
Sales of water heating units - Electric Heat Pump	0.306	0.343	0.347	0.346	0.34	0.342	0.342
(%)							

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	2.97	3.21	3.18	3.19	3.17	3.16	3.16
(%)							
Sales of water heating units - Gas Furnace (%)	96.6	96.3	96.3	96.3	96.3	96.3	96.3
Sales of water heating units - Other (%)	0.173	0.186	0.186	0.187	0.186	0.187	0.187

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

Item	2020	2025	2030	2035	2040	2045	2050
Electricity distribution capital invested -	0	3.26	3.34	4.1	4.26	3.93	4.03
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)	-24.8	0	-14.9	-13.3
Business-as-usual carbon sink - Retained in Hardwood Products (Mt CO2e/y)	-1.73	0	-3.12	-3.24
Business-as-usual carbon sink - Total (Mt CO2e/y)	-26.6	0	-18	-16.5
Carbon sink potential - High - Accelerate	0	0	0	392
regeneration (1000 tCO2e/y)				
Carbon sink potential - High - All (not counting overlap) (1000 tC02e/y)	0	0	0	32,495
Carbon sink potential - High - Avoid deforestation (1000 tCO2e/y)	0	0	0	2,104
Carbon sink potential - High - Extend rotation length (1000 tCO2e/y)	0	0	0	8,126
Carbon sink potential - High - Improve plantations (1000 tCO2e/y)	0	0	0	912
Carbon sink potential - High - Increase retention of HWP (1000 tC02e/y)	0	0	0	6,364
Carbon sink potential - High - Increase trees outside forests (1000 tCO2e/y)	0	0	0	1,651
Carbon sink potential - High - Reforest cropland (1000 tC02e/y)	0	0	0	2,230
Carbon sink potential - High - Reforest pasture (1000 tC02e/y)	0	0	0	6,496
Carbon sink potential - High - Restore productivity (1000 tC02e/y)	0	0	0	4,219
Carbon sink potential - Low - Accelerate regeneration (1000 tC02e/y)	0	0	0	197
Carbon sink potential - Low - All (not counting overlap) (1000 tC02e/y)	0	0	0	9,861
Carbon sink potential - Low - Avoid deforestation (1000 tC02e/y)	0	0	0	351
Carbon sink potential - Low - Extend rotation length (1000 tCO2e/y)	0	0	0	3,121
Carbon sink potential - Low - Improve	0	0	0	464
plantations (1000 tC02e/y) Carbon sink potential - Low - Increase retention	0	0	0	2,121
of HWP (1000 tC02e/y) Carbon sink potential - Low - Increase trees	0	0	0	578
outside forests (1000 tCO2e/y) Carbon sink potential - Low - Reforest cropland	0	0	0	1,115
(1000 tCO2e/y) Carbon sink potential - Low - Reforest pasture	0	0	0	492
(1000 tCO2e/y) Carbon sink potential - Low - Restore	0	0	0	1,422
productivity (1000 tCO2e/y) Carbon sink potential - Mid - Accelerate	0	0	0	294
regeneration (1000 tC02e/y) Carbon sink potential - Mid - All (not counting	0	0	0	21,170
overlap) (1000 tCO2e/y)				

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

Table 63: REF scenario - PILLAR 6: Land sinks - I	Forests (coi	ntinued)		
Item	2020	2025	2030	2050
Carbon sink potential - Mid - Avoid deforestation	0	0	0	1,227
(1000 tC02e/y) Carbon sink potential - Mid - Extend rotation	0	0	0	5,624
length (1000 tCO2e/y) Carbon sink potential - Mid - Improve plantations	0	0	0	680
(1000 tC02e/y) Carbon sink potential - Mid - Increase retention	0	0	0	4,243
of HWP (1000 tCO2e/y)			_	
Carbon sink potential - Mid - Increase trees outside forests (1000 tCO2e/y)	0	0	0	1,114
Carbon sink potential - Mid - Reforest cropland (1000 tCO2e/y)	0	0	0	1,673
Carbon sink potential - Mid - Reforest pasture (1000 tCO2e/y)	0	0	0	3,494
Carbon sink potential - Mid - Restore	0	0	0	2,820
productivity (1000 tCO2e/y) Land impacted for carbon sink potential - High -	0	0	0	64.2
Accelerate regeneration (1000 hectares) Land impacted for carbon sink potential - High -	0	0	0	285
Avoid deforestation (over 30 years) (1000		J		200
hectares) Land impacted for carbon sink potential - High -	0	0	0	4,144
Extend rotation length (1000 hectares) Land impacted for carbon sink potential - High -	0	0	0	336
Improve plantations (1000 hectares)			_	
Land impacted for carbon sink potential - High - Increase retention of HWP (1000 hectares)	0	0	0	0
Land impacted for carbon sink potential - High - Increase trees outside forests (1000 hectares)	0	0	0	157
Land impacted for carbon sink potential - High - Reforest cropland (1000 hectares)	0	0	0	147
Land impacted for carbon sink potential - High -	0	0	0	185
Reforest pasture (1000 hectares) Land impacted for carbon sink potential - High -	0	0	0	1,398
Restore productivity (1000 hectares) Land impacted for carbon sink potential - High -	0	0	0	6,716
Total impacted (over 30 years) (1000 hectares) Land impacted for carbon sink potential - Low -	0	0	0	32.1
Accelerate regeneration (1000 hectares)				
Land impacted for carbon sink potential - Low - Avoid deforestation (over 30 years) (1000 hectares)	0	0	0	267
Land impacted for carbon sink potential - Low - Extend rotation length (1000 hectares)	0	0	0	1,588
Land impacted for carbon sink potential - Low - Improve plantations (1000 hectares)	0	0	0	168
Land impacted for carbon sink potential - Low -	0	0	0	0
Increase retention of HWP (1000 hectares) Land impacted for carbon sink potential - Low -	0	0	0	82.5
Increase trees outside forests (1000 hectares) Land impacted for carbon sink potential - Low -	0	0	0	73.7
Reforest cropland (1000 hectares)			0	32
Land impacted for carbon sink potential - Low - Reforest pasture (1000 hectares)	0	0		
Land impacted for carbon sink potential - Low - Restore productivity (1000 hectares)	0	0	0	846
Land impacted for carbon sink potential - Low - Total impacted (over 30 years) (1000 hectares)	0	0	0	3,089
Land impacted for carbon sink potential - Mid - Accelerate regeneration (1000 hectares)	0	0	0	48.1
Land impacted for carbon sink potential - Mid - Avoid deforestation (over 30 years) (1000	0	0	0	276
hectares)				

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

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Item	2020	2025	2030	2050
Land impacted for carbon sink potential - Mid -	0	0	0	2,866
Extend rotation length (1000 hectares)				
Land impacted for carbon sink potential - Mid -	0	0	0	253
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	120
Increase trees outside forests (1000 hectares)				
Land impacted for carbon sink potential - Mid -	0	0	0	111
Reforest cropland (1000 hectares)				
Land impacted for carbon sink potential - Mid -	0	0	0	231
Reforest pasture (1000 hectares)				
Land impacted for carbon sink potential - Mid -	0	0	0	1,704
Restore productivity (1000 hectares)				
Land impacted for carbon sink potential - Mid -	0	0	0	5,608
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	1,523	882	599	491	442	430
Monetary damages from air pollution - Natural Gas (million 2019\$)	0	145	141	186	144	123	110
Monetary damages from air pollution - Transportation (million 2019\$)	0	1,065	1,095	1,126	1,163	1,201	1,239
Premature deaths from air pollution - Coal (deaths)	0	171	99	67.2	55.1	49.6	48.2
Premature deaths from air pollution - Natural Gas (deaths)	0	16.4	15.9	21.1	16.2	13.9	12.5
Premature deaths from air pollution - Transportation (deaths)	0	120	123	127	131	135	139