



# Investment Needs and Costs of FOLU Mitigation for a Net Zero Future

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# Paris Agreement Mandate

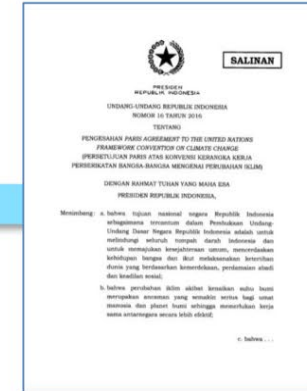
the First NDC, Updated NDC, LTS-LCCR 2050 ➡ Indonesia NZE is 2060 or Sooners



Presiden RI Joko Widodo  
COP21/CMP11, Paris-Perancis, 2015



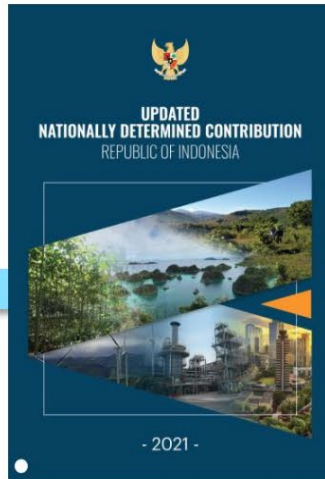
Menteri Lingkungan Hidup dan Kehutanan p  
ada acara *High-level Signature Ceremony of the Paris Agreement*, New York, USA, 2016



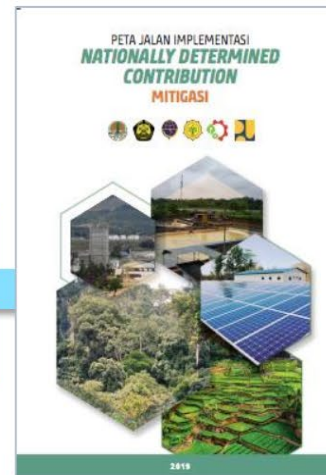
Ratifikasi Paris Agreement  
(UU No. 16/2016)



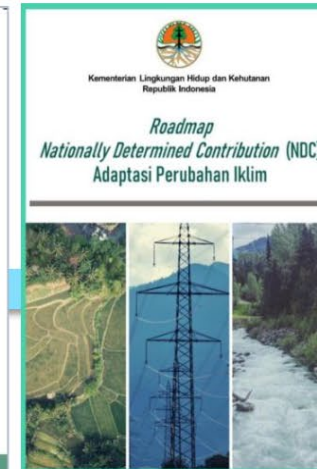
LTS-LCCR 2050 (Juli, 2021)



Updated NDC (Juli, 2021)



Peta Jalan NDC Mitigasi dan Adaptasi (2019, 2020)



NATIONALLY DETERMINED CONTRIBUTIONS  
(Updated 2021)



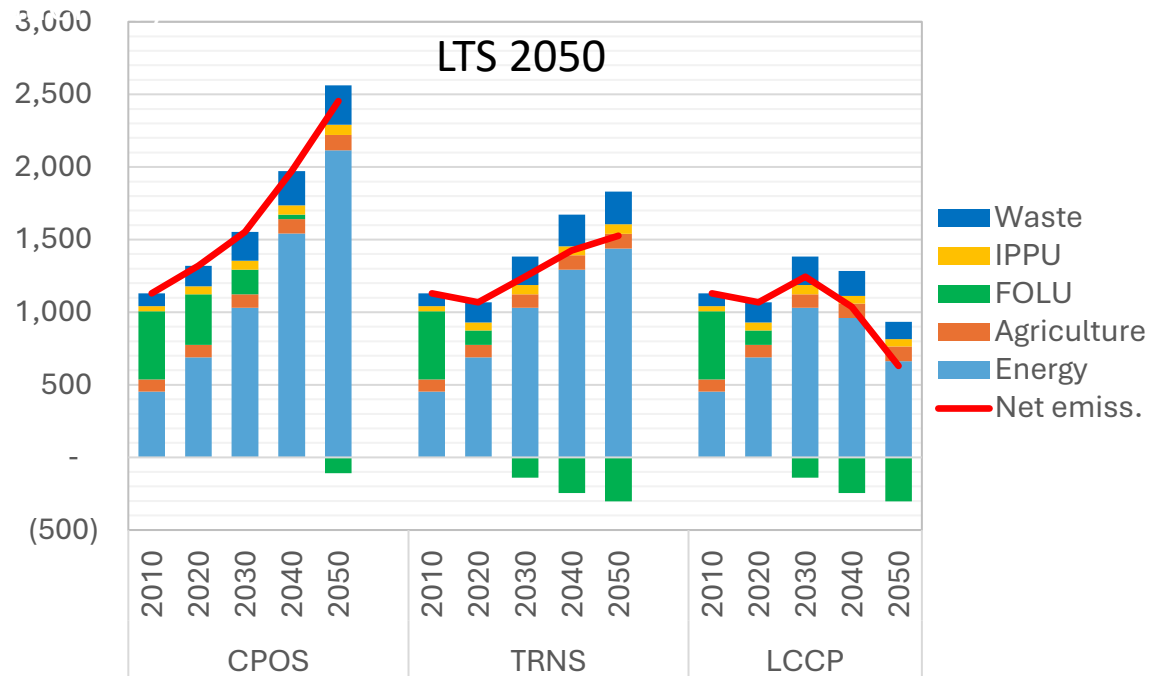
First NDC (Nov, 2016)

Second NDC  
NZE 2060  
Zero Waste  
2050

Enhanced NDC (2022) & Road Map

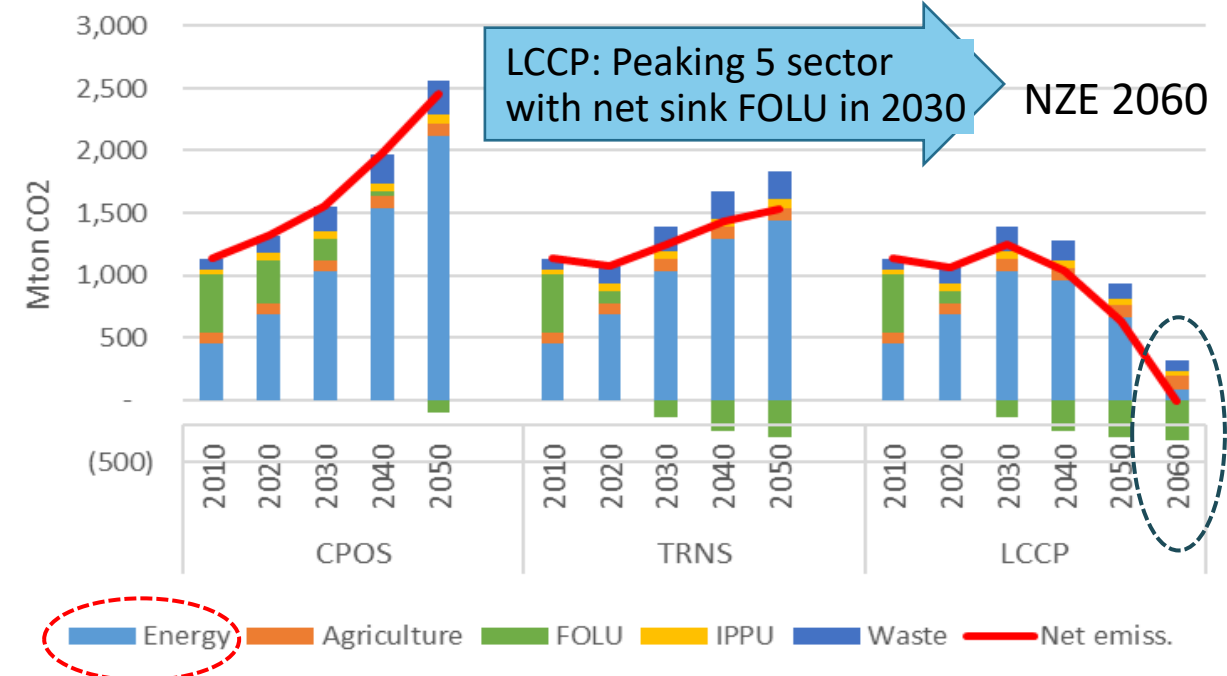
## LTS LCCR 2050

(Long Term Strategy for Low Carbon and Climate)



## NZE 2060

(Net Zero Emissions)

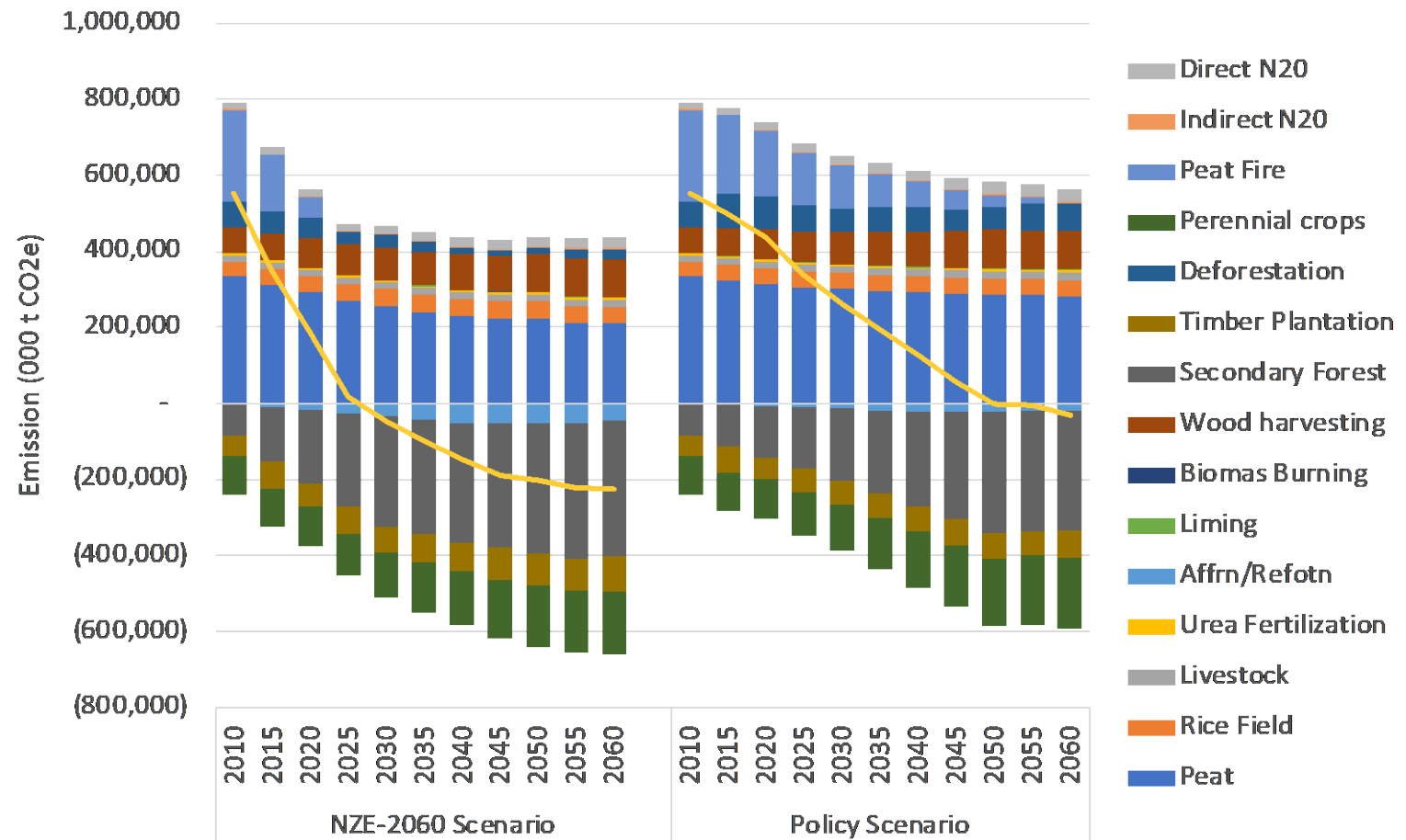


Sumber: LTS LCCR Indonesia, KLHK (2021)

- **CPOS** (Current Policy)
- **TRNS** (Transition)
- **LCCP** (Low Carbon Scenario Compatible with Paris Agreement Target)

# Emission Pathway toward NZE

- Key Activities
  - Accelerating peat restoration & enforcing improved peat water management practices in concessions
  - Enhancing forest regeneration through enrichment planting in concessions
  - Minimizing/Stopping deforestation
  - Accelerating mangrove restoration
  - Accelerating establishment of timber plantation and land rehabilitation
- Key Policies:
  - Forest Multi-bussines (>30 Mha), Social Forestry (12 M ha)
  - Carbon pricing (carbon tax, RBP, carbon trading - emission trading and offset emission)



# Target area for Mitigation in LTS (Cumulative)

Mitigation Action	Scenario	2030	2035	2040	2045	2050
Forest saved from deforestation Mineral (000 ha)*	CPOS	7,023	8,321	9,133	9,022	8,057
	LCCP	10,357	12,477	14,349	15,290	15,422
Forest saved from deforestation peat (000 ha)*	CPOS	447	529	581	574	512
	LCCP	659	793	912	972	981
Forest saved from degradation-mineral (000 ha)*	CPOS	3,902	4,622	5,072	5,012	4,480
	LCCP	5,654	6,800	7,806	8,295	8,334
Forest saved from degradation-Peat (1000 ha)*	CPOS	248	294	323	319	285
	LCCP	360	432	496	527	530
SFM-SILIN (000 ha)	CPOS	189	241	296	352	411
	LCCP	340	358	376	395	415
SFM-RIL C (000 ha)	CPOS	116	148	181	216	252
	LCCP	209	219	230	242	255
Enrichment Planting (000 ha)	CPOS	731	899	1,094	1,324	1,577
	LCCP	1,658	2,520	3,831	5,823	8,793
Timber Plantation (000 ha)	CPOS	4,800	6,000	7,200	8,400	9,600
	LCCP	6,400	8,000	9,600	11,200	12,800
Reforestation with rotation (000 ha)	CPOS	2,303	2,878	3,454	4,030	4,606
	LCCP	2,788	3,485	4,182	4,879	5,576
Reforestation without rotation (000 ha)	CPOS	2,015	2,519	3,022	3,526	4,030
	LCCP	2,509	3,136	3,764	4,391	5,018
Improvement of peat water management (000 ha)	CPOS	857	968	1,035	1,035	1,035
	LCCP	946	1,035	1,035	1,035	1,035
Peat restoration (000 ha)	CPOS	1,031	1,239	1,440	1,604	1,773
	LCCP	2,725	3,312	3,874	4,205	4,224

\* Total area of forest saved from deforestation or degradation relative to the baseline

# Cost Components

- Direct Cost: cost for production (e.g. planting and maintenance)
- Indirect Cost: administration cost for policy compliance
- Transaction cost: an expense incurred beyond the production cost or all of the costs arising from the exchange (business) with other parties

Time	Indirect Cost	Transaction Cost
Once for the lifetime project	<ul style="list-style-type: none"> <li>• Retribution cost for IUPHHK (PBPH)</li> </ul>	<ul style="list-style-type: none"> <li>• Feasibility study and environmental impact assessment</li> <li>• Defining the boundary of the concession area</li> </ul>
Per cycle	<ul style="list-style-type: none"> <li>• Pre-Harvesting,</li> <li>• Inventory (PHI) survey,</li> <li>• Development of the working area,</li> <li>• Wood Leakage,</li> <li>• Assessment (WLA) or monitoring cost,</li> <li>• Development of a work plan</li> </ul>	
Annual Cost	<ul style="list-style-type: none"> <li>• Annual work plan,</li> <li>• Medical and insurance,</li> <li>• Corporate Social,</li> <li>• Responsibility (CSR),</li> <li>• Education and training,</li> <li>• The tax of property (PBB) and income tax</li> </ul>	<ul style="list-style-type: none"> <li>• Forest security</li> </ul>

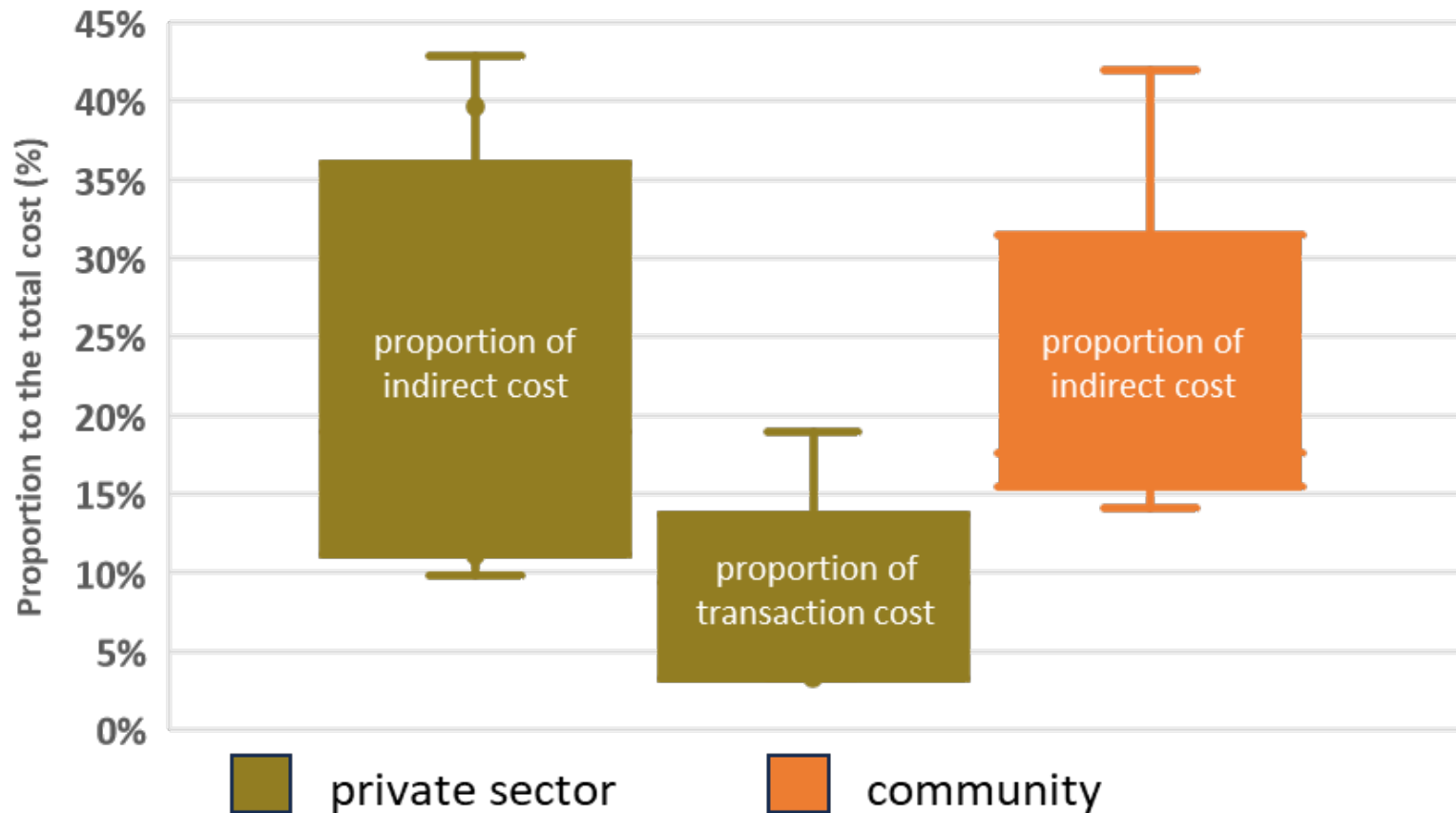
Source: Rositta and Boer (2025), submitted to Carbon-Balance Management (CBM) – under review

# Direct, Indirect and Transaction Cost (USD/ha)

Mitigation	Direct	Indirect	Transaction	Total
Forest saved from deforestation Mineral	817	-	-	817
Forest saved from deforestation peat	1,047	-	-	1,047
Forest saved from degradation-mineral	772	-	-	772
Forest saved from degradation-Peat	1,019	-	-	1,019
SFM-SILIN	3,243	1,282	101	4,625
SFM-RIL C	133	-	-	133
Enrichment Planting	336	70	-	406
Timber Plantation	1,698	1,282	101	3,081
Reforestation with rotation	253	90	-	343
Reforestation without rotation	533	138	105	776
Improvement of peat water management	37	-	-	37
Peat restoration	471	66	69	606

Recalculated from Rossita and Boer (2025) based on UGM (2013) dan Communication with YKAN (the Nature Conservancy)

# Proportion of indirect cost and transaction cost for one life cycle cost



- High share of transaction costs for the private sector, which will eventually make land-based mitigation schemes less attractive to them
- There are still uncaptured informal transaction costs (i.e., costs to resolve land conflict, bribery costs) remain uncovered.

# Total Cost for Mitigation Toward NZE (000 USD)

		2030	2035	2040	2045	2050
Forest saved from deforestation Mineral	CPOS	5,740,099	6,800,765	7,464,874	7,373,563	6,585,029
	LCCP	8,465,481	10,197,421	11,728,113	12,497,357	12,604,813
Forest saved from deforestation peat	CPOS	467,464	553,843	607,927	600,491	536,274
	LCCP	689,415	830,461	955,118	1,017,764	1,026,515
Forest saved from degradation-mineral	CPOS	3,014,429	3,570,053	3,917,962	3,871,486	3,460,742
	LCCP	4,367,557	5,252,584	6,029,762	6,407,651	6,437,802
Forest saved from degradation-Peat	CPOS	252,962	299,588	328,784	324,883	290,415
	LCCP	366,512	440,781	505,999	537,711	540,241
SFM-SILIN	CPOS	1,166,408	1,487,146	1,820,833	2,168,176	2,529,914
	LCCP	2,097,617	2,204,617	2,317,074	2,435,268	2,559,491
SFM-RIL C	CPOS	15,469	19,723	24,149	28,755	33,553
	LCCP	27,819	29,239	30,730	32,298	33,945
Enrichment Planting	CPOS	296,491	364,771	443,967	537,397	639,803
	LCCP	672,799	1,022,706	1,554,707	2,363,079	3,568,071
Timber Plantation	CPOS	14,788,330	18,485,412	22,182,494	25,879,577	29,576,659
	LCCP	19,717,773	24,647,216	29,576,659	34,506,102	39,435,546
Reforestation with rotation	CPOS	3,910,575	4,888,219	5,865,863	6,843,507	7,821,150
	LCCP	4,734,288	5,917,861	7,101,433	8,285,005	9,468,577
Reforestation without rotation	CPOS	1,563,062	1,953,828	2,344,593	2,735,359	3,126,124
	LCCP	1,946,367	2,432,959	2,919,551	3,406,143	3,892,734
Improvement of peat water management	CPOS	32,085	36,262	38,768	38,768	38,768
	LCCP	35,427	38,768	38,768	38,768	38,768
Peat restoration	CPOS	597,210	717,678	833,599	928,620	1,026,897
	LCCP	1,577,767	1,917,842	2,242,960	2,434,715	2,445,978
Total	CPOS	31,844,585	39,177,288	45,873,814	51,330,582	55,665,329
	LCCP	44,698,823	54,932,455	65,000,875	73,961,862	82,052,482

# Epilogue

- Up to 2030, total cost required to implement mitigation of FOLU sector (life cycle cost) under the CPOS will reach around 32 billion USD.
- This is higher than what has been reported in the 3<sup>rd</sup> BUR (22 billion USD). Higher mitigation cost estimate compared to the previous findings, as this study only includes formal transaction costs
- By 2050, the total cost under the CPOS will reach 55 billion USD
- To meet the NZE target, the total cost required will reach 45 billion USD by 2030 and 82 billion USD by 2050. Thus, additional costs from international support to achieve the NZE by 2030 and 2050 are 13 and 27 billion USD respectively