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Financing the Philippines' Low Carbon Transition: Status and Prospects

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Abstract

We set out to understand the resource requirements of the Philippines' low carbon transition, the sources of low carbon finance, and the chances that supply of low carbon finance will be responsive to demand at scale. We find that the country will require an initial USD 94.2 billion for measures that are expected to contribute an emissions reduction of 990mmtCO2e out of a pledged 2505 mmtCO2e, or 39.5 percent of the country's Nationally Determined Contribution, and that private and public capital are expected to cover this amount in a 63 - 37% split. We determine that prospects are relatively high for an overwhelming 95.4% of the required amount, an assessment that rests on the positive market response to energy sector initiatives and management, and hinges critically on the government's ability to extract pre-requisite transmission investments from its privately-owned transmission service provider in a timely manner. For 1.8%, prospects are fair and involve technologies dependent on nascent markets or behavioral change, such as accepting Energy Efficiency as the "first fuel" in the energy mix and all that this implies. For the remaining 2.8%, prospects are low, hindered by governance dysfunctions that have long-undermined efficiency in the agriculture, waste and road-based public transport sectors. While representing just 2.8% of the required amount, these programs and measures account for 30% of the 990 mmtCO2e emissions reduction targeted and, more importantly, feed into or coincide with food and water security strategies prioritized under the country's climate change adaptation plan. Securing the 2.8% is not optional in other words. Thus, fixing institutions is the first and most important finance strategy moving forward.

JEL Classification: Q54, Q58, Q01, O20, O16, O53

Key words: low carbon transition, low carbon finance, green finance, Philippines' Nationally Determined Contribution (NDC), governance

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I. Introduction: Context, Objectives and Coverage

The objective of this paper is to discuss the status and prospects of green finance, or more specifically, *low carbon finance* in the Philippines in the context of the country's efforts to deliver on its ambition for mitigation under the Paris Agreement. That ambition is formally stated in its first Nationally Determined Contribution (NDC) submitted in April 2021, wherein the country committed to a GHG reduction and avoidance of 75% for the period 2020 to 2030, referencing a business-as-usual (BAU) cumulative economy-wide emissions of 3,340 mmtCO2e for the same period, or 2505 mmtCO2e. [2] The 75% reduction/avoidance covers five sectors, namely, energy, transport, agriculture, waste and industry, and is decomposed into an *unconditional* commitment of 2.71 percentage points and a *conditional* commitment of 72.29 percentage points. [3] The NDC also states that, "in line with its national security policy and its sustainable development aspirations and in solidarity with ASEAN member states", the Philippines shall "endeavour to peak its emissions by 2030…".

The country's unconditional mitigation commitment is tiny and is likely to be met. However, its conditional commitment has been described as "highly ambitious and is only likely to be met if net emissions are reduced to zero before 2030." (WB 2022) The government has not yet mandated a formal net-zero emissions target for the country, however. The Department of Energy (DOE) explains that the country "**does not commit to net-zero emission goals as it prioritizes energy security and reliability of energy supply**." (DOE, 2024a:106, emphasis original). The Climate Change Commission (CCC) also explains that while "a net-zero emissions approach remains part of a broader and flexible transformative climate agenda for the Philippines", the "issue of [a] net zero target … must be seen not only as a function of [a] national objective but also of [a] shared responsibility by the international community".[4] This is a position shared by other countries, such as the Like-Minded Group of Developing Countries LMDC), which have pushed openly against the net zero goal, calling it both "anti-equity and against climate justice." [5]

Available modelling for the Philippines suggests that net-zero GHG emissions may not be feasible by 2050, even under "accelerated" decarbonization assumptions, in any case. Economy-wide simulations by the World Bank (2022), indicates that even assuming a peaking coal power generation in 2025, a full energy transition in transport, and carbon prices in all sectors to meet emission targets of 60 percent

[2] Available at https://unfccc.int/sites/default/files/NDC/2022-06/Philippines%20-%20NDC.pdf.

[3] Unconditional refers to a reduction using nationally mobilized resources, while conditional is premised on obtaining the required Means of Implementation (MOI) and support from developed or Annex II parties under the Paris Agreement.

[4] Climate Change Commission, personal correspondence.

[5] LMDC asserts that the Paris Agreement refers to "achieving a balance between emissions and removals by sinks in the second half of this century as a *global* aspiration rather than as national targets for all countries" (https://pib.gov.in/PressReleasePage.aspx?PRID=1764805, emphasis added). They reiterate that national targets and efforts should "be guided by the UNFCCC and its Paris Agreement, and also by national circumstances and priorities", and propose that developed countries should, "leave the remaining atmospheric space for the developmental rights of the developing world and aim for their full decarbonization within this decade."

below baseline by 2050, the overall effect is to "stabilize emissions levels rather than lead them to net zero." (WB, 2022: 50) [6] In the "most realistic decarbonization scenario" - which assumed moderate climate damages, the implementation of adaptation measures and current state policies (e.g. peaking coal-power generation by 2030, carbon price in all sectors to meet emissions targets of 30 percent below baseline by 2050), the growth of emissions is slowed but not reduced.

However, a carbon neutral *power* sector by 2050 may be conceivable. Simulations for the power sector alone featured the share of RE in power generation reaching 83 percent by 2040. WB (2023) then suggests that continuing on this pathway, "with the help of new technologies that will become cost-effective (e.g., carbon capture and storage for gas-fired power plants), could lead to a carbon-neutral power sector by 2050." (WB, 2023: 53).

The Philippine Energy Plan (PEP) 2023-2050 suggests a similar trajectory. The plan, subtitled "Transitioning to Reliable, Clean, and Resilient Energy", describes two "aggressive" energy transition scenarios, called CES1 and CES2, where shares of RE in generation reach up to 70.7 percent. Consequently, projected annual emissions in 2050 remain below the sector's NDC BAU projected emissions for 2024 or 2022, for CES 1 and CES2 respectively (DOE, 2024a). [7] These results demonstrate how the pursuit of energy security and reliability can result in an energy transition which produces deep reductions in overall GHG emissions as a co-benefit.

According to the NDC Implementation Plan (NDCIP), adopted by the CCC in April 2024, the Philippines' NDC will require USD 72 billion in initial financing. It is initial because it corresponds to a partial list of policies and measures (also known as PAMs) that are costed and which correspond to a reduction of just 990 mmtCO2e, or 39.5%, of the 2,505 mmtCO2e pledged in the NDC. Of the USD 72 billion, the NDCIP indicates that a little more than half – about USD36.5 billion - is for RE-related investments consistent with the PEP 2023-2050 (CCC, 2024a). In turn, those RE-related investments are expected to contribute about 59.3% (587 mmtCO2e) of the projected 990 mmtCO2e in reduced emissions.

The full scope and cost of PEP 2023-2050 is much greater of course and when we adjust NDCIP estimates to incorporate updated PEP cost estimates, the requirement up to 2030 increases from USD 72 billion to USD 94.2 billion.[8] In fact, build costs up to 2050 for additional capacities in RE, battery energy storage systems (BESS), natural gas (as a transition fuel), and nuclear energy are estimated to be in the vicinity of USD 200.1 billion or USD 262.2 billion, depending on which scenario (CES1 or CES2) is chosen. [9] The exploration and development of indigenous energy, facilities for select downstream

[6] See WB (2022), Figure 5.9.
[7] See Table 31 of DOE (2024a). The PEP is discussed at length in Section 2 of this paper.
[8] To be presented in Section 3.
[9] These numbers differ from what is found in DOE (2024a), Table 1, which uses a different exchange rate (PHP 55:1USD). This paper adopts the exchange rate used in the NDCIP (PHP 56.8: 1USD). Cost estimates are further discussed in sections 2.2 and 2.3.

industries, and energy efficiency programs are estimated to require another USD 8.35 billion.[10]

The NDCIP and the PEP 2023-2050 will need public and private capital. Public capital refers to budget outlays from the domestic government, which includes international development funds, also known as Official Development Assistance (ODA). Private capital is expected to come through project finance (mobilized through public-private partnerships, or otherwise) or corporate finance (e.g. debt raised at the corporate level or foreign direct investments). Mobilizing private capital will require an expansion of the domestic financial sector's capacity, a "strategic imperative" recognized in the country's *Sustainable Finance Taxonomy Guidelines* published in February 2024. [11]

What are the chances that the funding required for the country's low carbon transition – otherwise known as "low carbon finance" - will materialize at scale and what can be done to improve those prospects? The paper aims to answer these questions. It adopts the UNEP framework that considers low carbon finance to be the subset of green finance that is dedicated to climate mitigation, including transition activities (Appendix 1). Climate change adaptation finance and finance for other environmental concerns are two other subsets and are not covered in this paper. Information on the Philippines' adaptation challenge, the more urgent national concern, will be provided for context however.

The paper is organized as follows. In the next section, the demand for low carbon finance by NDC sector is presented by way of more detail on planned decarbonization pathways, key programs, resource requirements and capacity constraints. In the third section, the various sources of supply of low carbon finance are described, including the status of green financial instruments and reported obstacles to the expansion of private green finance. The consolidated amount needed to fund the country's low carbon transition up to 2030 and an assessment of the prospects that supply of finance will be responsive to demand is discussed in the fourth section. The fifth section outlines priority actions moving forward.

II. The Philippines's low carbon transition plans and estimated resource requirements

2.1 Climate policy priorities

The Philippines is not a major contributor to global or regional GHG emissions. In 2023, it emitted 284.4 mmtCO2e, accounting for about 0.53 percent of global GHG emissions and about 7.1 percent of ASEAN emissions (Table 1, Figure 1). On a per capita basis, emissions of the country are a little more than 1/3rd the global average and 2/5th the ASEAN average. Although total emissions increased by 9.04% between 2000 and 2023 (from 260.8 to 284.4 mmtCO2e), CO2 intensity decreased by 27.9%, greater than the percentage decrease observed among lower middle-income countries and the rest of ASEAN (Table 2). The Philippines accounted for just 0.21 percent of global cumulative CO2 emissions between

[10] Ibid.

[11] Financial Sector Forum (2024), Sustainable Finance Taxonomy Guidelines. Version 1, February 2024. Pasay City, Philippines.

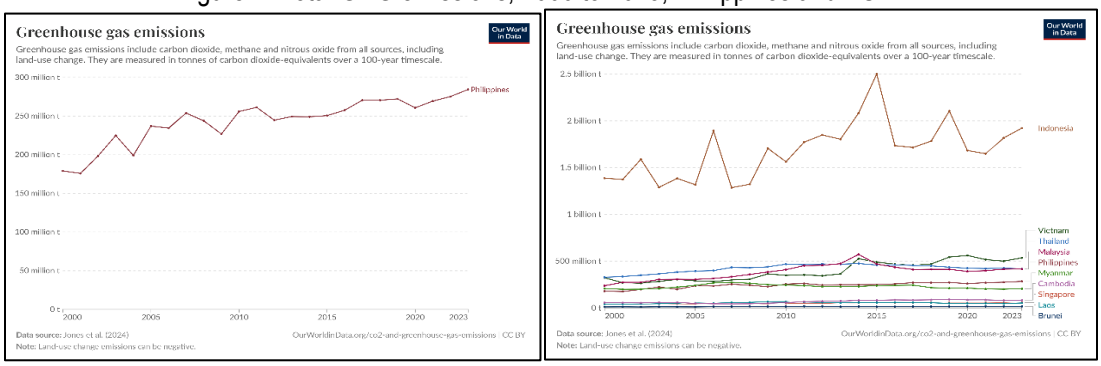
1750 and 2023 (Figure 2).

. Table 1. Total and per capita GHG emissions for PHL, ASEAN 10, and Selected Economies 2023

	PHL	*World*	*ASEAN 10*	*EU*	*USA*	*Au*
Total Emissions (MtCO2e)	284.4	53,816.8	3,990.2	3,105.2	5,894.9	581.0
% of global emissions	0.53	1.00	7.41	5.77	10.95	1.08
Population (in millions)	114.9	8091.7	688.7	450.7	343.5	26.4
Emissions per capita, (tCO2e/person)	2.48	6.65	5.79	6.89	17.16	21.96

Source: Jones et al. (2024) – with major processing by Our World in Data (last updated November 21, 2024)
Retrieved from: 'https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions'

Figure 1: Total GHG emissions, 2000 to 2023, Philippines and ASEAN



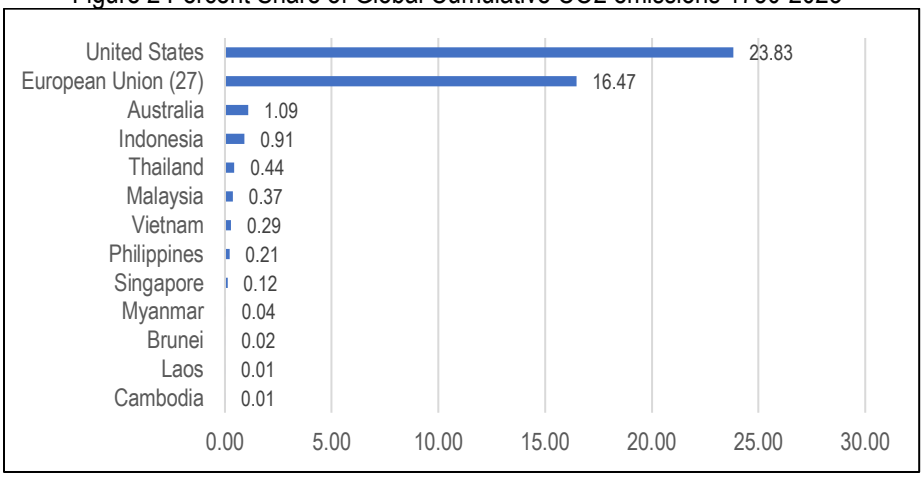
Source: Jones et al. (2024) – with major processing by Our World in Data (last updated November 21, 2024)

Table 2 Carbon intensity of GDP (kg CO2e per 2021 PPP $ of GDP)

	2000	*2023*	*Change*
World	0.316	0.228	-27.8
Lower Middle-Income Countries	0.243	0.188	-22.8
*ASEAN 9**	0.226	0.190	-15.8
Philippines	0.197	0.142	-27.9

Source: World Development Indicators. *Weighted average, weighted by GDP

Figure 2 Percent Share of Global Cumulative CO2 emissions 1750-2023*



Source: Global Carbon Budget (2024) – with major processing by Our World in Data. Last updated November 21, 2024.
*Total cumulative emissions of carbon dioxide (CO_2), excluding land-use change, since the first year of available data, measured as a percentage of global total cumulative emissions of CO_2.

In contrast, the Philippines faces some of the highest levels of disaster risk in the world (WB and ADB, 2021). Along with Bangladesh and Japan, the Philippines is ranked 1st out of 191 countries by the Inform Risk Index as regards exposure to natural hazard, which incorporates risk due to climate-related hazard such as tropical cyclones (ranked 2nd, with Japan), coastal flooding (ranked 5th, with Bangladesh), epidemics (ranked 39th, with Myanmar and Kenya), river flooding (48th, with Cameroon and Mongolia), and drought (77th, with six others).[12] This has manifested itself, at least in part, in fatalities and direct economic losses from extreme weather events (such as storms, floods and heat waves), for which a Long-Term Climate Risk Index (LT-CRI) ranked the country 4th for the period from 2000 to 2019. [13] The LT-CRI does not include real impacts from slow-onset climate change-induced increases in temperature, sea levels, and rainfall variability of rainfall, however, yet these increases are expected to have severe impacts moving forward. For instance, climate change-induced variability of rainfall (e.g., change in number of days with heavy rainfall, decreasing total rainfall in some parts of the country while increasing in others, intensity of extreme events) is expected to have impacts even greater than temperature change per se, with major effects anticipated on freshwater resources, natural and managed terrestrial ecosystems, coastal systems, agricultural production, and human health (Cruz et al, 2017). [14] By 2050, under a "pessimistic" scenario, 5.15 million people will be annually exposed to river flooding (more than double the number from today), 1.63 million will be annually exposed to coastal

[12] Ranking is from the 2023 INFORM Risk Index for risk management (https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Risk/Results-and-data/moduleId/1782/id/453/controller/Admin/action/Results). Apart from cyclones, flooding, drought and epidemics, natural hazards include tsunamis (2nd to Japan) and earthquakes (2nd with Japan).

[13] 2000-2019 Long-Term Climate Risk Index of Germanwatch (https://www.germanwatch.org/en/19777). The CRI was not updated in 2022 or 2023 but the next edition is due in February 2025.

[14] Examples of major impacts on freshwater resources are lower streamflow, domestic water supply, irrigation, aquifer depth and recharge, and water quality due to saline intrusion (Pulhin and Tapia 2016). Examples of impacts are discussed at length in Cruz et al. (2021). Under RCP8.5, there could be about 41.55 climate-related deaths per million population linked to lack of food availability by 2050 (WB and ADB 2021).

flooding (more than triple the number from today), and the three-fourths of the projected population will be at risk of malaria or dengue (again, more than double the number from today) (Table 3). [15]

Table 3 Crisis Risk and Change in Absolute Number of People Exposed to Climate Hazards in 2050 vis 2022.

AMS	Baseline (2022) risk		Mid-century (≈2050) crisis risk		Change in absolute number of people exposed											
					River Flood			Coastal Flood			Drought			Epidemic (Malaria and Dengue)		
	score	rank	Pessimistic Scenario (P)	Optimistic Scenario (O)	Baseline (2022) exposure	Change in 2050 P	Change in 2050 O	Baseline (2022) exposure	Change in 2050 P	Change in 2050 O	Baseline (2022) exposure	Change in 2050 P	Change in 2050 O	Baseline (2022) exposure	Change in 2050 P	Change in 2050 O
Brunei	1.9	153	2.0	2.0	20,712	5,961	2,582	-	88	66	16,829	-2,589	-5,075	279,587	305,894	231,144
Cambodia	4.6	42	5.2	4.9	717,177	1,172,743	674,119	7,337	16,327	12,434	1,162,891	-44,010	-88,825	10,273,097	10,881,373	5,762,773
Indonesia	4.4	53	4.7	4.5	10,832,799	3,224,560	440,173	1,367,446	1,585,069	1,211,950	12,679,576	3,611,162	2,341,376	172,667,001	80,374,136	51,557,926
Lao PDR	4.0	70	4.0	3.9	409,749	-93,050	-170,078	-	0	0	552,423	64,608	-14,443	5,068,301	4,408,725	2,085,295
Malaysia	3.4	89	3.5	3.3	1,503,753	556,587	104,627	250,889	530,938	345,882	1,667,873	397,840	-115,217	16,556,890	19,784,212	13,848,994
Myanmar	6.2	15	6.3	6.3	1,651,744	1,031,946	332,117	280,844	471,058	263,427	3,418,408	-1,313,262	-1,557,553	40,312,312	12,262,471	2,940,976
Philippines*	5.3	26	5.4	5.4	2,406,160	2,748,948	1,769,879	514,180	1,114,612	697,893	3,740,783	-219,109	232,881	54,594,700	69,534,558	40,831,311
Singapore	0.6	191	0.7	0.7	12,243	22,685	19,297	556	1,717	1,860	-	0	0	968,198	31,281	92,269
Thailand	4.1	65	4.1	3.9	3,520,682	1,124,241	771,493	259,121	459,062	433,243	4,471,604	-907,468	213,526	53,606,969	17,317,497	11,996,624
Viet Nam	3.7	80	3.8	3.7	5,326,557	5,700,306	2,452,574	4,121,983	5,227,048	3,340,952	6,150,189	208,745	-858,770	67,546,934	32,994,629	20,291,659

legend	very high	high	medium	low	very low

Source: 2022 INFORM Climate Change
(https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Climate-Change/INFORM-Climate-Change-Tool)

Consequently, climate change policy in the Philippines's prioritizes adaptation over mitigation. This is explicit in the *National Framework Strategy on Climate Change* (NFSCC) as well as the *National Climate Change Action Plan 2011-2028* (NCCAP), which are policy instruments of Republic Act No. 9729, known as the *Climate Change Act of 2009*. [16] The NFSCC states that national priorities shall be adaptation and mitigation "with emphasis on adaptation as the anchor strategy"; that mitigation would be pursued "whenever applicable…. as a function of adaptation", and that adaptation is "meant to be translated to all levels of governance alongside coordinating national efforts towards integrated ecosystems-based management." The NCCAP, in turn, identifies two outcomes - (i) enhanced adaptive capacity of communities, resilience of natural ecosystems, and sustainability of built environment to climate change and (ii) a successful transition to climate-smart development – and several strategic priorities, led by Food Security and Water Sufficiency, all of which support adaptation, resilience and sustainability. [17]

Up to 2024, the NCCAP effectively functioned as the country's national adaptation plan, and was supported by Climate Change Expenditure Tagging (CCET) in the national appropriations act, designed to help agencies better align their programs and annual budgets with NCCAP priorities. However, NCCAP investment requirements were never actually estimated. Thus, while CCET items have

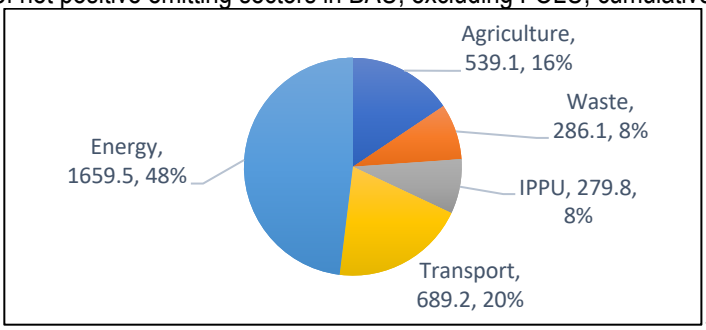
[15] Chapter 3, Table 3.3.2, of the NAP provides different estimates of social impacts for the Philippines. In this paper, INFORM Climate Change estimates are used in order to show comparative figures across the ASEAN.
[16] The NFSCC is expected to "evolve into a Long-term Strategy (LTS) that aligns with shifting climate priorities, especially after the completion of the NDC Implementation Plan (NDCIP) and the NAP." (CCC 2024b, p. 66)
[17] Other strategic priorities are Ecological and Environmental Stability, Human Security, Climate-Smart Industries and Services, Sustainable Energy, and Knowledge and Capacity.

reflected adaptation as the country's priority (more details in Section 3.1), it is difficult to gauge whether amounts appropriated annually have been sufficient.[18] This could change, however, with the new National Adaptation Plan (NAP), submitted to the UNFCCC in May 2024. The NAP promises a "national investment and financing plan" that can "quantify the funding gap and optimize allocation for priority adaptation solutions" to support it.[19]

2.2 Mitigation ambition and resource requirements: NDC and NDCIP

Relative to the urgency of the adaptation challenge, the country's NDC reflects a mitigation ambition that is remarkably high, even though it is almost totally (about 96.4% of it) conditioned on external support. [20] The country commits to a projected GHG reduction or avoidance of 75% for the period 2020-2030, covering the agriculture, waste, industry, transport and energy sectors, referenced against a projected BAU cumulative economy-wide emission of 3,340.3 MtCO2e (Appendix 2). The collective reduction includes a peaking of emissions by 2030, although a 75% reduction in cumulative emissions is conceivable only if annual net emissions reach zero well before that time (WB 2022).[21] Notably, the energy sector, which accounts for 48% of cumulative BAU emissions (Figure 3), committed to a reduction of only 45.9 MtCO2e , or 1.8% of the collective 2,505 mmtCO2e pledge and just 2.8% of its own BAU. [22]

Figure 3 Share of net positive emitting sectors in BAU, excluding FOLU, cumulative from 2020-2030



Note: Shares are computed relative to total cumulative emissions without FOLU, or 3453.7 mmtCO2e.

More clarity on NDC sectoral commitments and pathways have since been provided in the NDCIP (the

[18] Monsod (2024) points out that the national climate budget has not claimed anything greater that 10% in any one year since 2016, raising doubts about a "whole-of-government" approach to addressing climate change risks and impacts. The paper also observes that the national climate budget has not supported the strategic sequencing of the NCCAP, which is crucial to effective climate change adaptation.

[19] See CCC (2024b), p. 254.

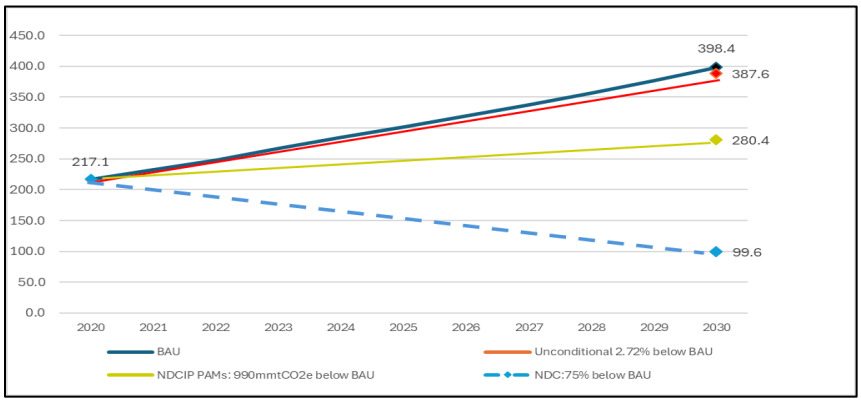
[20] Monsod, Ahmed and Hilario (2022) argue that the NDC could have better represented the country's adaptation priorities.

[21] Logically, the only ways to achieve a 75 percent reduction in a stock of emissions are for all emitting sectors to reduce flows by 75 percent in year one and keep it there, or for net flows to turn negative within the decade. The NDC also excludes FOLU and its potential removals, making a 75 percent reduction even more improbable.

[22] See DOE (2018), Figure 46, p. 47. DOE (2024c) p. 12 confirms the energy sector's NDC of 45.9 mmtCO2e, which includes both conditional and unconditional targets.

first iteration of the NDC implementation plan, earlier mentioned) as well as the Philippine Energy Plan (PEP) 2023-2050. The NDCIP contains a partial list of PAMs per sector that together account for a reduction/avoidance of 990 mmtCO2e, or 39.5% of the emissions pledged in the NDC, including all that was unconditionally committed (Figure 4). The 990 mmtCO2 is described as a conservative estimate, however, since not all PAMs per sector have been fully assessed for their mitigation potential. For instance, carbon sequestration measures, which are PAMs under the agriculture sector, are not yet assessed.

Figure 4 BAU, NDC, and NDCIP emissions lines



Source: Author's reconstruction of CCC (2024a), Figure 3, p. 13

The NDCIP states that energy sector PAMs are expected to contribute 587 mmtCO2e, or 59.3%, of the 990 mmtCO2e reduction, followed by agriculture (21.3%), transport (6.8%), waste (6.7%) and IPPU (6.0%) (Table 4). Investment requirements are also largest for the energy sector, at USD 36.5 billion, followed by the transport sector, at USD 32.8 billion; the energy and transport sectors account for 96% of the PHP 72 billion estimated for the NDCIP, a partial estimate. The energy sector is focused on energy security through a transition that raises the share of RE to 35% by 2030 and 50% by 2040 (detailed in section 2.3 below), while the transport sector is focused on a transition to sustainable mass transport, featuring railways and modernized public utility vehicles. Consistent with the privatization of the power industry in 2001, the energy sector will rely on the private capital for the delivery of its PAMs- "the private sector will be responsible for the delivery of most of the DoE's PAMs, including almost all investment in RE" (CCC 2024a, p.30) - while the transport sector will continue to rely primarily on public capital, both domestic and international.

The IPPU, waste, and agriculture sectors account for the remaining 4% of the NDCIP budget, although they account for 34% of the promised 990 mmtCO2e emissions reduction. The IPPU sector is focused on clinker substitution in cement manufacturing, which accounts for nearly 71% of emissions in the sector [23] and is expected to rely on private capital to deliver its PAMs. The waste sector, which is focused

[23] The mineral industry subsector – cement, lime, and glass production – accounts for approximately 73% total IPPU sector emissions, of which more than 97% were from cement manufacturing industry. The transition to low-carbon blended cement involves the replacement of *clinker* in cement production. Clinker production is energy- and carbon-intensive and its replacement can lead to deep cuts in CO2 emissions, among other benefits. See CCC 2024, pp. 122 and 129

on waste water treatment and discharge and solid waste disposal will require both public and private capital. The agriculture sector is expected to rely on public capital, both domestic and international.

Table 4 NDCIP Contribution and Cost, and Contribution and Cost of Key PAMs, by Sector

Sector	*Agriculture*	*Energy*	*IPPU*	*Transport*	*Waste*	*Total*
Contribution, in mmtCO2e [Unconditional commitment under the PDP 2023-2028]	210.51 [0.0]	587 [3.4]	59.24 [3.06]	66.86 [26.04]	65.8 [5.4]	989.4 [37.9]
Cost in mUSD at P56.8: 1USD	1,027	36,455	194	32,471*	1,575	71,722
Key PAM (identified by cost and/or contribution to emissions reduction)	(i) Use of AWD, cropland mgmt., and RE for flood control and water mgmt. in paddy rice cultivation; (ii) Adoption of small-scale RE tech	Raising RE to 35% by 2030	(i) Substitution of clinker in cement production; (ii) installation of WHR facilities	(i) Rail projects; (ii) Public utility vehicle modernization program (PUVMP)	(i) Sewerage and septic tank treatment facilities in HUCs; (ii) Composting	
Cost of Key PAM, in mUSD [Contribution, in mmtCO2e]	528 [62.8]; 77 [102.9]	35,298.7 [105.4]	0** [20.6]; 164 [1.71]	28,085 [28.21]; 39 [21.25]	600 [17.05]; 540 [12.52]	65,332
Share of key PAM in sector total	0.59	0.97	0.85	0.87	0.72	0.91
Primary source of financing	Public, domestic and international	Private	Private	Public, domestic and international; PPP	Private (solid-waste PAMs); private-public (wastewater PAMs)	
PAMs w/o cost estimates	3 out of 10, including carbon sequestration	4 out of 6	5 out of 9	2 out of 6 (i.e. maritime, aviation)	3 out of 10	
Note: Main capacity building requirements	Formulate, appraise, prioritize, and implement additional PAMs	MRV; knowledge management; FS for key projects	MRV; green procurement in government	GHG baselines for aviation and maritime; developing sector/subsector master plans; FS for key projects	NG-LGU-WD coordination; Management of wastewater treatment facilities by LGU/WD; data collection & aggregation	

Source: Author's compilation from CCC 2024a, Tables 2 and 5 to 9, and Technical Sector Appendices. Note: * Total of items in Table A26, NDCIP. It should be noted that the NDCIP states that "the imperative PUVMP requires an investment of $7.3 billion by 2030" (p.143), but only indicates 38.72 (~) mUSD for PUVMP in Tables A26 and 8. **Clinker replacement material is half as costly as clinker, resulting in a negative cost estimate. See Table A19. Acronyms: AWD, Alternate Wet-Drying; FS, Feasibility Studies; HUC, Highly Urban Cities; LGU, Local Government Units; NG, National Government; PDP, Philippine Development Plan; PPP, Public-Private-Partnership; WD, water districts; WHR, Waste Heat Recovery

The table also includes key capacity building requirements as discussed in the NDCIP. [24] Specifically, the Department of Agriculture (DA) requires support in formulating, appraising and implementing additional PAMs (with domestic and international finance), while the DOE requires monitoring, reporting and verification (MRV) support, support for knowledge management (e.g. modelling), and technical assistance (e.g. feasibility studies). The IPPU sector also requires MRV but capacity in green public procurement is particularly important. The transport sector requires more capacity in establishing GHG baselines for the maritime and aviation sectors, developing subsector and sector master plans, and supporting feasibility studies of key projects. For the waste sector, better coordination across levels of government -- national or central government (NG) and local government units (LGUs) – and with local Water Districts, technical capacity in wastewater treatment facility management, and data collection and aggregation are key concerns.

Institutional bottlenecks

Interestingly, institutional bottlenecks and long-standing governance issues are not clearly highlighted as a class of risk factors in the NDCIP. On the transport front, for instance, the transition to modern public utility vehicles (primarily, jeepneys) under the PUVMP, a PAM that promises the second largest emissions reduction in the sector, hinges critically on the ability of transport cooperatives to access private debt financing for replacement vehicles, which in turn depends on whether and how fast local public transportation route plans (LPTRP) designed by local authorities are approved by the Land Transportation Franchise Regulatory Board (LTFRB), a central government agency. That a central government agency has the sole authority to approve LTPRPs from 1575 different provinces (76), highly urbanized and independent cities (22), cities (105) and municipalities (1372) is a bottleneck; since 2018, less than 1 out of 5 LPTRPs submitted have been approved. Without approved LPTRPs, long-term service contracts from local governments to transport cooperatives are not possible; long-term service contracts are key to cooperatives' ability to access private debt financing (Sunio and Mendejar 2022).

For IPPU, accelerating the transition to the use of low-carbon (and more economical) blended cement in construction hinges on its acceptance and use in public infrastructure projects. This is because public sector projects account for half of the country's demand for cement. [25] However, the DPWH's use of "differing standards on blended cement" vis the updated Philippine National Standards (PNS) have limited the use of blended cement in public sector projects. Why standards are not aligned is unclear. But blended cement produced locally is already "highly accepted" by the private sector (CCC 2024a: 131)

[24] This draws heavily from the Chapter 3, Section E of the NDCIP.

[25] Transition to low-carbon blended cement involves the replacement of *clinker,* or a portion of it, in the production of cement. Clinker production itself is energy- and carbon-intensive, thus replacing it in cement production can lead to deep cuts in CO2 emissions, among other benefits. See CCC 2024, p. 129.

For the waste sector, performance will be contingent on a sharp improvement in the enforcement and compliance with laws, not only on the part of LGUs, to which waste sector functions are largely devolved, but also, and arguably more fundamentally, by the NG. This is suggested by a performance audit by the Commission on Audit in 2023 which found that twenty years after the enactment of the Ecological Solid Waste Management (ESWM) Act (in 2001), there were still no sufficient waste facilities and landfills to service the LGUs and barangays across the country [26], a Solid Waste Management Fund (SWMF) from central government to support approved solid waste management plans of LGUs had yet to be established, a National Ecology Center (NEC) for the education and training of LGUs on ecological waste management had only just been established in 2021, and "important interventions to generate reliable and accurate data and ensure proper operationalization" had not materialized (COA 2023).[27] In effect, the NG seems to have reneged on implementing the ESWM for two decades. Government procurement rules which require the annual rebidding or renewal of recurring services (such as waste collection and disposal) may have also impeded progress, discouraging long -term investments by, and commercial project-based loans to, private providers. The Department of Environment and Natural Resources (DENR) chairs the National Solid Waste Management Council (NSWMC).

Likewise for wastewater management, where it took six years from when the Clean Water Act was passed in 2004, for the national government to approve and launch a National Sewerage and Septage Management Program (NSSMP) that had just 10 years remaining on the clock. Under the NSSMP, all LGU's and highly urbanized cities (HUCs) are expected to develop a septage management system and sewerage system, respectively, by 2020, with an offer of NG counterpart funding amounting to 40% of sewerage project costs in HUCs, expanded to include septage projects, up to 50% of project costs, all LGUs, and 100% of feasibility study costs in 2017.[28] As of the writing of the NDCIP however, only 4 applications had been received and only one had been implemented (CCC 2024a: 154). A key issue is that local Water Districts (WD), which are government-owned and operated corporations that operate and maintain local water supply and wastewater management systems for more than half of the population, [29] cannot apply for the NG cost share (ibid). However, as LGUs may operate their own utilities, this may be symptomatic of a larger governance problem, described as "institutional fragmentation and disjointed efforts in the absence of an overarching framework and master plan." (Domingo and Manejar, 2021b). The Department of Public Works and Highways (DPWH) administers the NSSMP.

[26] As of 2021, only 39 percent of barangays were serviced by material recovery facilities and waste facilities and just 29 percent of LGUs were serviced by sanitary landfills (COA 2023, p. 1).

[27] Thus, little is known about the methods of landfill gas management employed in the 245 operational sanitary landfills nor about the status of industrial wastewater treatment (CCC 2024a: 152-153.)

[28] Domingo and Manejar (2021b) and "Take the Lead Let's Build", presentation on the NSSMP by DPWH Undersecretary Maria Catalina E. Cabral, February 2015. (https://ppp.gov.ph/wp-content/uploads/2015/03/DPWH-Natl-Sewerage-Septage-Mgmt-Program.pdf)

[29] NEDA (2021), Table 10, p. 39.

Finally, public sector governance in the agriculture sector has long been problematic. Briones (2021) discusses how the low average decadal growth in agriculture (i.e. from 4.2% and 3.6% in the 1960s and 1970s to 2% in the 2010s) relates to issues which only "deep governance reforms" can change (among others, the misallocation of high and rising public budgets for agriculture on private good provision rather than public goods and the high level of protection afforded to producers.) The sector's rather confused NDC and NDCIP reflects this poor governance. On the one hand, it is stated that the sector's focus is adaptation, with emissions reductions arising as a co-benefit of adaptation efforts, i.e. "mitigation efforts are considered co-benefits of the adaptation activities." (CCC 2024a:99). Examples are alternate wetting and drying practices (AWD), which is a "climate-smart" adaptation response to slow-onset climate change impacts on water flows, which can negatively affect yields and growing areas of many crops, that can also reduce emissions (WB 2022: xvi-xvii), and carbon sequestration measures, described as a "quintessential adaptation measure that also yields mitigation co-benefits." (CCC 2024a: 98) On the other hand, the PAMs of agriculture, including AWD and carbon sequestration measures, are all *conditional*, i.e., premised on obtaining external support rather on nationally mobilized resources, suggesting that the government's resolve to address slow onset climate change threats to food production and farm and coastal household livelihoods is also conditional. In fact, the NDCIP does not provide cost estimates for carbon sequestration measures, notwithstanding the fact the "rehabilitation and expansion of mangrove areas", among other related activities, have long been national concerns.

The NDCIP admits to the "high risk of severe under-delivery" in the agriculture sector (CCC 2024a, p. 27). But in our view policy incoherence and internal incapacity are likely to weigh more heavily in undermining climate actions than financing shortfalls *per se*. The NDCIP also attributes implementation challenges to "the participation of 11.5 million smallholder farmers, who are essential for delivering the bulk of emissions reductions." (ibid: 105). However, the fact of millions of smallholder farmers across a highly varied agricultural terrain was, to a large degree, the reason why agriculture support and extension services were devolved to local governments in 1991. That devolution has remained incomplete however, i.e., in large part, agriculture services at the local level continue to be directly funded and controlled by the Department of Agriculture, which is, again, a governance issue.[30]

2.3 Deeper dive: PEP 2023-2050 energy transition requirements

The contribution of the energy sector in the NDCIP, projected at a 587 mmtCO2e reduction in cumulative emissions, is updated in the PEP 2023-2050, which was published after the NDCIP. The PEP 2023-2050 is described as a "comprehensive roadmap" and "priority energy blueprint" for the country's energy transition, which sets "ambitious clean energy targets" that are "strategic decisions rooted in our nation's developmental requirements for a secure energy supply in support of inclusive

[30] This is discussed at length in Juco, et al. (2024).

economic growth and societal advancement…" [31]

The PEP 2023-2050 basically reconsiders the NDC's clean energy scenario vis the goal of energy security, and scales it up to become a *new* reference scenario (REF), defined by current policies, which targets a 35% RE share in generation by 2030 and a 50% RE share by 2050. The *new* clean energy scenarios of the PEP 2023-2050 – CES1 and CES2 – then targets "35% of power generation mix by 2030, 50% by 2040, and more than 50% by 2050" (Table 5). The higher RE shares follow from a planned deployment of off-shore wind (19 GW under CES1; 50 GW under CES 2) and nuclear energy (1,200 MW by 2032, 2,400 MW by 2035, and 4,800 MW by 2050), as well as the voluntary early retirement and repurposing of coal-fired power plants (CFPPs), among other supply-side strategies. Demand side targets are also upgraded: CES1 and CES2 increases the target energy efficiency and conservation (EEC) rates of oil products and electricity use from 5% to 10%; the EV penetration rates by 2040 from 10% to 50%, and the mandated biodiesel blend from 2 to 5% starting in 2025.

The new scenarios improve energy security: under CES1 and CES2, energy self-sufficiency is projected to increase from 49.2 in 2022 to either 52.8 percent and 54.7 percent by 2050.[32] Moreover, the supply and demand-side targets result in significantly lower actual and projected emissions vis estimates in the previous NDC-BAU and NDC (Table 6, Figure 5). Cumulative emissions projected to 2030 are now expected to reflect a reduction of about 468.96 mmtCO2e (REF) to 580.23 mmtCO2e (CES2), exceeding the sector's original NDC (i.e., 45.9 mmtCO2e) 10-fold.[33] Projecting further to 2050, annual emissions are expected to at least stabilize under CES1 and CES2, with levels kept below the 2024 and 2022 BAU levels, respectively (Figure 6).

[31] DOE 2024a, p. ii

[32] DOE 2024a, p. 24, Table 1.

[33] An actual reduction of 52.88 mmtCO2e in cumulative emissions from 2020 to 2022, already exceeded the energy sectors' NDC of 45.9 mmtCO2e for the decade.

Table 5 PEP 2018-2040 vs. PEP 2023-2050 Scenarios

Scenarios	Assumptions PEP 2018-2040		PEP 2023-2050		
	Reference Scenario (NDC BAU)	**Clean Energy Scenario (NDC target)**	**Adjusted Reference Scenario (REF)**	**CES 1**	**CES 2**
Energy Demand	- Requirements of the "Build, Build, Build" program and *AmBisyon Natin* 2040. · Maintain B2 and E10 biofuels blending until 2040.	BAU, plus: ✓ 10.0% EV penetration rate by 2040; ✓ increase in aggregate natural gas demand between 2018 and 2040; and, ✓ 5% energy savings from oil and electricity by 2040.	Reduction in economy-wide energy intensity consistent with regional targets ✓ 10% EV penetration rate by 2040 ✓ B2 and E10 biofuels blending ✓ EEC efforts sustained at 5%	Higher reduction in economy-wide energy intensity ✓ 50% EV penetration rate by 2040 ✓ B5 and E10 biofuels blending by 2026 ✓ EEC rate on oil products and electricity use improve by 10% in 2040-2050	
Energy Supply	Present development trends and strategies continue. · Consider the aspirational target of 35% share of RE in generation mix by 2030. · Adopt 25% reserve margin. · Assume 70% load factor for the total Philippines.	· BAU, plus: ✓ Highly-efficient power technologies; ✓ 10,000 MW additional RE capacity by 2040; and, ✓ 1,200 MW from other emerging technologies by 2035.	Present development trends and strategies; Existing plants and committed power projects and WESM-registered capacities as of May 2023 ✓ 35% RE by 2030; 50% by 2050 ✓ Indigenous production targets in 2023 ✓ LNG imports in 2023	✓ Capacity targets under NREP ✓ **50% RE by 2040, more than 50% by 2050** ✓ **19 GW of OSW** ✓ **40-year technical life for coal plants** ✓ **Nuclear capacity of 1,200 MW by 2032, 2,400 MW by 2035, and 4,800 MW by 2050**	**CES1, w/ 50 GW of OSW**

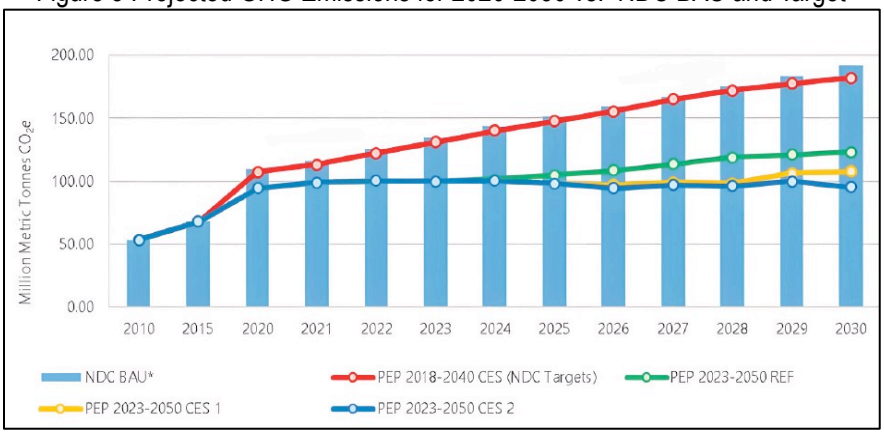
Source: Author's compilation from DOE 2018, Table 9, and DOE 2024a, p. 11

Table 6 PEP 2023-2050 Projected GHG Emissions for 2020-2030 vs NDC BAU

		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Cumulative 2020-2030	*Note: 2050*
A	**NDC BAU projected**	109.9	116.6	125.5	134.4	143.4	151.5	159.4	167.4	175.5	183.8	192.4	1659.6	
B	**2023-2050 PEP Scenarios**													
	REF	99.9	99.0	100.3	99.8	101.5	104.8	108.6	113.6	118.9	121.1	123.3	1190.7	*197.0*
	CES1	99.9	99.0	100.3	99.6	100.1	98.0	96.9	99.2	98.1	106.6	107.8	1105.3	*140.5*
	CES2	99.9	99.0	100.3	99.6	100.1	98.2	94.5	96.8	96.0	99.7	95.3	1079.4	*126.9*
C.	**GHG Reduction from BAU**													
	REF	10.0	17.6	25.2	34.6	41.9	46.7	50.8	53.8	56.6	62.7	69.1	469.0	
	CES1	10.0	17.6	25.2	34.8	43.3	53.6	62.5	68.2	77.4	77.2	84.6	554.4	
	CES2	10.0	17.6	25.2	34.8	43.3	53.3	64.9	70.5	79.4	84.1	97.1	580.2	

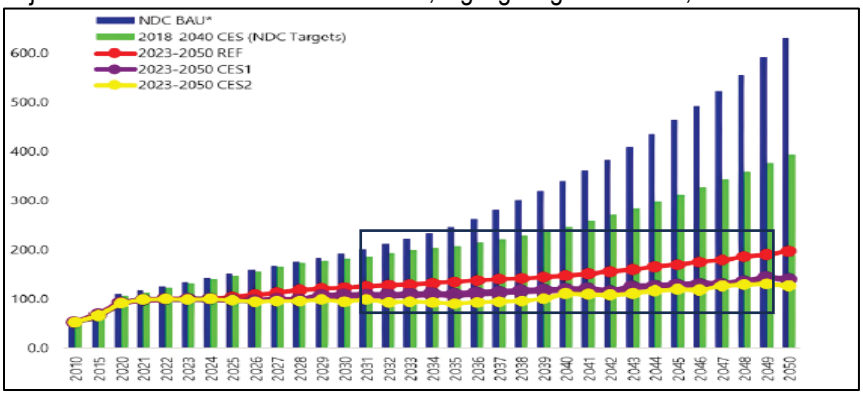
Source: DOE 2024c, Table 4.

Figure 5 Projected GHG Emissions for 2020-2030 vs. NDC BAU and Target



Source: DOE 2024c, Figure 8

Figure 6 Projected GHG Emissions for 2020-2050, highlighting 2031-2050, vs. NDC BAU and Target



Source: DOE 2024a, Figure 12

CES 1 and 2 require an infusion of USD 200.1 billion or USD 262.2 billion investments, respectively, to build additional RE capacities, nuclear energy, natural gas (as a transition fuel in place of decommissioned CFPPs), and BESS (Table 7). About 11% to 15% of these amounts are planned for the period 2023 to 2028, while 85% to 89% are timed for 2029 to 2050 (Appendix Table 3.1). Another USD 8.35 billion will be required for other investments, specifically, development of indigenous energy resources, downstream investments in bioethanol and electric vehicle charging stations (EVCS) and EEC programs. A 50% re-fleeting of vehicle fleets with EV is expected to require USD 225.2 billion. (Appendix Table 3.2)

Table 7 Build costs of additional RE capacities, nuclear energy, natural gas and BESS (PHP billion in 2022 prices): PEP 2023-2050 Scenarios

	Capacity Additions, in MW			*Investment Costs (PhP billion, 2022 prices) **		
	REF	**CES1**	**CES2**	**REF**	**CES1**	**CES2**
Nat gas	21,881	5,989	8,857	1700.5	1230.7	1455.3
Nuclear	-	4,800	4,800	0.00	1738.6	1738.6
Renewables	98,502	106,568	106,952	6454.4	7589.5	10733.5
biomass	*92*	*138*	*138*	*7.6*	*25.2*	*25.2*
geothermal	*1,355*	*1,005*	*1,005*	*415.5*	*316.2*	*312.7*
solar	*54,948*	*53,165*	*34,121*	*2,291.5*	*2,175.0*	*1,441.6*
hydro	*10,265*	*6,800*	*6,180*	*1,514.9*	*960.7*	*870.9*
onshore wind	*25,042*	*25,960*	*15,408*	*1,260.1*	*1,299.8*	*829.6*
offshore wind	*6,800*	*19,500*	*50,100*	*964.8*	*2,812.6*	*7,253.4*
BESS	3,624	21,859	24,506	120.0	807.6	963.5
TOTAL	124,007	149,216	155,115	8,275	11,366	14,891
in USD b (P56:8)				***145.7***	***200.1***	***262.2***
Note: Coal	*2,305*	*2,305*	*2,305*	*350.6*	*334.4*	*334.4*
Oil-based	*20*	*20*	*20*	*2.2*	*2.2*	*2.2*

Source: DOE 2024b, Annexes 8-11 (converted by author at P56.8: USD1)

Critically, transmission investments are not included in the costing of the PEP, although a reliable transmission infrastructure will have to be in place *before* the implementation of RE targets; "without accessible transmission infrastructures, RE facilities will remain as stranded capacities." (DOE 2024a, p.19) That is, the success of the energy transition is contingent on the performance of the country's transmission infrastructure, making the "development, deployment, and operation of a modern transmission infrastructure" a top-tier national priority (Ibid, p. 23). The complication is that investments in transmission are the purview of the National Grid Corporation of the Philippines (NGCP), the privately owned concessionaire/transmission service provider up to 2034, which has had a record of significant underperformance and project delays. [34] This track record is expected to change with the government's acquisition of two seats on the NGCP Board, that will allow it to have "better traction with NGCP in prioritizing transmission projects to enable RE to inject in the grid, and also help the systems operator transition to a smart and green grid." [35]

Another critical pre-requisite is the upgrading of selected ports to support off-shore wind development, which is also not costed in the PEP. Ports are government-owned and are managed by the Philippine Ports Authority (PPA). Market interest seems to be present; pre-feasibility studies of 10 candidate ports have been ongoing since early 2024 with support from the Asian Development Bank (ADB), and with the DOE and Department of Transportation (DOTr) as co-executing agencies.

[34] As reported, only 29 percent of 258 targeted projects for 2016-2022 were completed; just 10 percent of allocated capital expenditures were utilized (https://www.pna.gov.ph/articles/1242494). Some delays have been recorded to exceed 9 years (https://www.gmanetwork.com/news/money/companies/928179/erc-slaps-p12-3-m-fine-vs-ngcp-over-27-delayed-projects/story/).

[35] DOE, personal correspondence. On 27 January 2025, the government, through the Maharlika Investment Corporation (MIC), signed an agreement to purchase a 20% stake in the Synergy Grid of the Philippines (SGP), which holds a 40.2 percent effective ownership interest in NGCP. The purchase would give the government 2 seats each on the boards of SGP and NGCP.

The private sector is expected to deliver most of the energy sector's PAMs. [36] In turn, the government is expected to provide the policies (e.g. smart and green grid plan, program to facilitate the voluntary decommission/repurposing of CFPPs) and regulatory environment (credible enforcement) to facilitate private investments, as well as investment facilitation and other initiatives to reduce the cost of doing business. As it is, programs have been receiving strong market support: in August 2024, existing and committed RE capacity was enough to achieve a 38% share of generation by 2030, exceeding the PEP target of 35%, and 92 OSW contracts had been awarded with total potential capacity of 66.1 GW (out of an estimated 178 GW in OSW potential); by December, new RE investments were at Php 1.38 trillion, 40% higher than in 2023. The 2024 Climatescope Report ranked the Philippines 2nd most attractive emerging market for RE investments, up from 4th place in 2023, and 20th place in 2021.

III. Sources of low carbon finance

The national government has long been proactive in its efforts to mobilize funds for climate change action. It has mechanisms to mobilize climate-aligned investments from government instrumentalities, as well as mechanisms to grow green finance. The private sector has likewise been proactive; the first labelled green bond issuance, a nearly US$300 million geothermal transaction in 2016, preceded the implementation of the ASEAN Green Bond Standards. [37] Unlike other emerging green markets where sovereign borrowers have played the first mover role, the growth of the Philippines' green bond market is led primarily by the private sector (ADB 2020).

3.1 General appropriations

A Climate Change Expenditure Tagging (CCET) system was instituted in 2015 to "provide line and oversight agencies with the means to plan, prioritize and monitor the national climate change response allocation and performance." CCET was motivated by a Climate Public Expenditure and Institutional Review which found that the government's development plans were only "partially" aligned with the NCCAP, and that unless this and other gaps in the institutional framework were addressed, the country's climate reform agenda could not be properly executed nor realized (WB 2013). Basically, the CCET requires government agencies to actively identify which expenditure items in their proposed annual budgets are intended for climate change adaption or mitigation; agencies tag their programs/activities/projects using a positive list of 247 activities relevant to the NCCAP. By tagging, agencies are expected to better align their plans with climate priorities, strengthening and accelerating the implementation of the agenda across sectors and levels of government. Collectively, CCET items

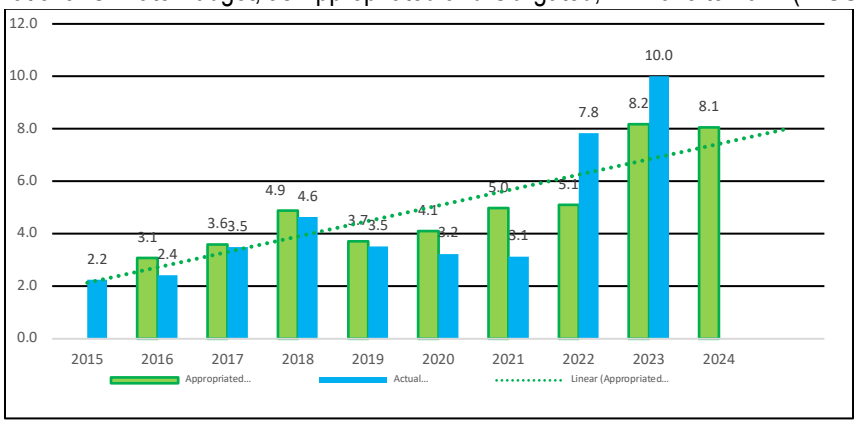
[36] Republic Act No. 9136, or the Electric Power Industry Reform Act (EPIRA) of 2001, introduced pro-market reforms into the industry, with the end in view of achieving reliable and competitively priced electricity (Brucal and Ancheta 2018). Generation is now privatized and competitive; transmission and systems operations are privatized and regulated, i.e. subject to the rate making power of the Energy Regulatory Commission (ERC); distribution is privatized and regulated; and supply is competitive.

[37] The issuance was certified by the Climate Bonds Initiative (ADB 2020).

are reported as the National Climate Budget (NCB).

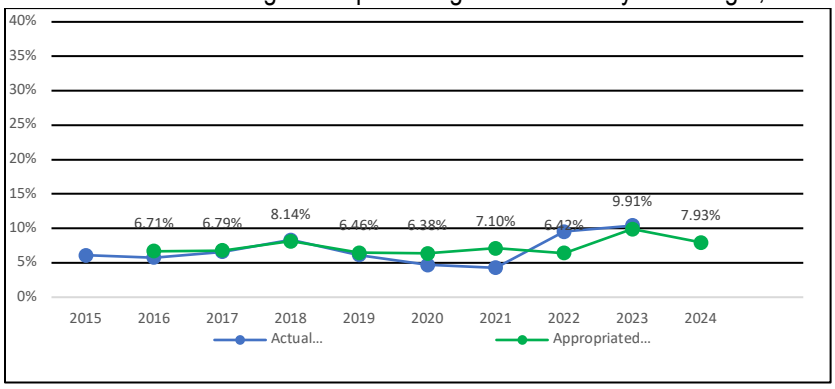
Between 2016 and 2024, NCB appropriations grew from USD 3.1 billion in 2016 to 8.1 billion in 2024, or by 161%, with a sharp increase of 60.3% occurring between 2022 and 2023 (Figure 7). Actual obligations (i.e. considered 'spent') grew more, from 2.4 billion in 2016 to 10 billion in 2023; appropriations in 2022 and 2023 were overutilized. The share of the NCB in the total primary NG budget has ranged from 6.4% to 9.9% over the period, or 7.3% on average, as appropriated (Figure 8). It is possible that CCETs items include regulation setting, capacity building, and enforcement, which may not be costed in NDCIP PAMs estimates.

Figure 7. National Climate Budget, as Appropriated and Obligated, FY 2015 to 2024 (in USD billions)



Source: Monsod 2024, Figure 2, converted to USD at Php 56.8: USD1.

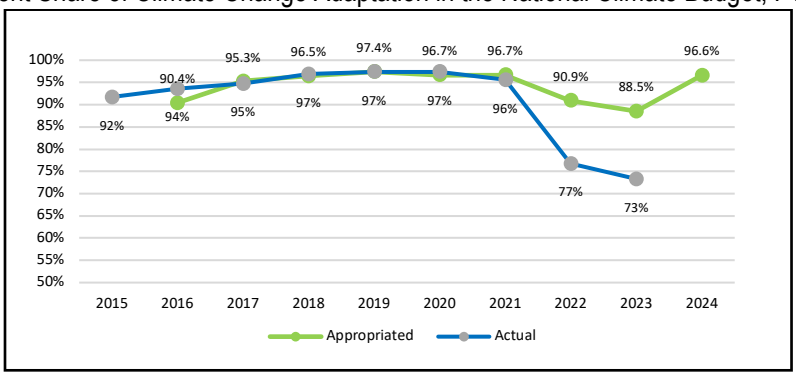
Figure 8. The National Climate Budget as a percentage of the Primary NG Budget, FY 2015 to 2024



Source: Monsod 2024, Figure 3

Consistent with state policy, adaptation is favoured in the NCB, demonstrated by a 94% to 6% split with mitigation, on average. This is implied in Figure 9, which shows the annual share of adaptation in the NCB, as appropriated and obligated, for the period.

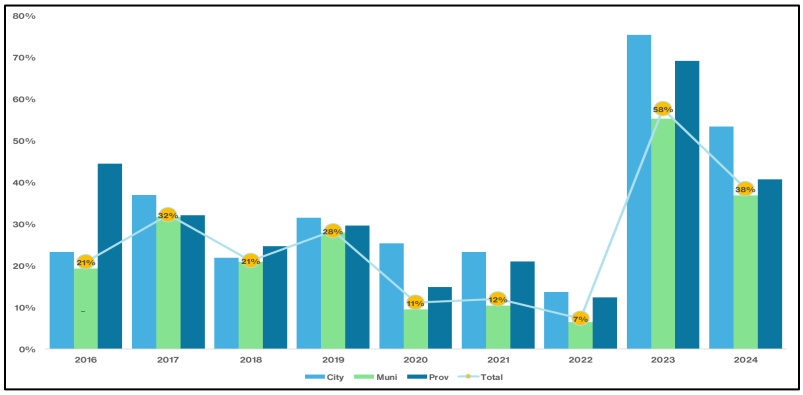
Figure 9. Percent Share of Climate Change Adaptation in the National Climate Budget, FY 2015 to 2024



Source: Monsod 2024, Figure 6

As agencies have been slow to implement the CCET in full, however, there could have been more spent on climate change action over the period. In an extreme case, DOTr, the lead agency for the transport NDC, began tagging only in 2022. Also, the NCB does not capture tagged items in the annual investment plans of subnational governments, comprising provinces (82), cities (149), and municipalities (1,493). A compilation of local CCET data is not made publicly available but a sampling of submissions for the period 2016-2020 indicated that 24% of the USD 38.7 billion investments programmed for local development programs were tagged, with 21% (or USD 8.1 billion) for climate adaptation, and 3% (or 1.2 billion) for climate mitigation (CCC 2022). Compliance with local CCET guidelines has also been growing (Figure 10).

Figure 10 Local CCET Compliance Monitoring for FY 2017-2024



Source: CCC 2022, Figure 2

3.2 Official Development Assistance (ODA)

The NCB is financed by what finances the General Appropriations Act (GAA) itself. Specifically, tax and non-tax revenues (e.g., foreign grants), domestic and foreign borrowings (e.g., program/project loans from multilateral or bilateral institutions, sovereign bond offerings, and the like), and available

cash balances. [38] This means that proceeds from ODA grants and loans which support climate action are (or should be) already accounted for in the NCB. Put another way, ODA flows do not constitute amounts on top of the NCB.

In December 2023, ODA flows for climate change adaptation, mitigation and disaster risk resilience amounted to USD 4.1 billion - USD 3.88 billion in loans, USD 0.22 billion in grants - or about 11% of the total active ODA portfolio of USD 37.29 billion received by the Philippine government in 2023. The portfolio was comprised of components from 73 active programs and projects, including a newly approved USD 26.3 million grant from the Global Climate Fund (GCF) to be implemented from 2024 to 2031.[39] The Philippines is also part of 8 multi-country projects funded by the GCF. [40]The country's potential share in funding from those GCF-financed projects is estimated at USD 134.8 million.[41]

Rail transport NDCs are largely funded by ODA. Two of the largest ongoing ODA-funded projects are rail projects listed in the NDCIP (i.e., North-South Commuter Railway System and Metro Manila Subway Project Phase I), accounting for a combined loan of USD10.79 billion. Bus rapid transport (BRT) projects are also ODA-financed. ODA is also leveraged within PPPs for transport, as in the case of one NDC rail project (i.e., LRT 1 Extension), although transport projects can also be strictly PPP funded (i.e., MRT 7)

By far, ODA is the primary funding source for new government investments (NEDA 2024). Of 87 ICC-approved projects from 2014 to 2023, totalling USD 54 billion, 70 were ODA-funded, totalling USD 35.9 billion, or 66%. [42]

3.3 Public-Private Partnerships

PPPs are the second most important funding source for new government investments, with 8 projects costing USD 17.1 billion, or 32% of the total ICC-approved projects. PPPs are contractual agreements

[38] Department of Budget and Management's "Financing of National Government Expenditures", available at https://www.dbm.gov.ph/wp-content/uploads/2012/03/PGB-B5.pdf . Tax revenues are from income taxes, property taxes, taxes on domestic goods and services, international trade taxes, and others. Non-tax revenues arise from dividends, fees and charges, investments, foreign grants, and other sources. Domestic borrowings are funds obtained from sources within the country and are usually made through the auction of treasury bills, notes and bonds to the public. Foreign borrowings are from sources outside the country and include loans secured from foreign financial institutions or through the flotation of government securities in the international market.

[39] This project is funded through the Food and Agriculture Organization.

[40] As well as 5 GEF-funded project readiness activities (USD 2.2M)

[41] https://www.greenclimate.fund/countries/philippines. USD 134.8 is computed by subtracting USD 26.3M and USD 10M from the "Total GCF Financing" estimate of USD 171.1 million for the Philippines. The explanatory note on the GCF website reads: "the amount of GCF funding allocated to each country is an estimate based on the best information available to the Secretariat. Unless allocation information for projects is provided, funding amounts are evenly distributed to each targeted country…"

[42] NEDA 2024, Table 2.1 (Annex 2-C).

between private firms and government targeted towards "financing, designing, implementing and operating infrastructure facilities and services that were traditionally provided by the public sector." Counterpart public sector agency outlays for PPP-funded projects, if any, are included in the GAA.

It is not yet known whether the PPP modality incrementally increases funding for climate change action, however. This said, PPPs are poised to be harnessed more deliberately for climate with a new PPP Code, legislated in December 2023, which requires the State to ensure "the integration of climate resilience, sustainability, and gender and development policies and programs in the planning, design, and implementation of PPP Projects." [43] The Philippines is "among the first nations to require ESG standards… across all PPPs." [44]

3.4 Carbon pricing: taxes, trading systems, credits

Carbon pricing refers to charging those who emit carbon dioxide (CO2) for their emissions, and may be direct or indirect. Direct carbon pricing instruments include carbon taxes, emissions trading systems (ETS), and carbon crediting, and provide "a clear price signal with the aim of reducing GHG emissions" (WB 2023). [45] In contrast, indirect carbon pricing instruments, such as fuel excise taxes, provide a carbon price signal but are not usually or necessarily implemented to achieve climate outcomes (ibid). For instance, the Philippines has fuel excise taxes which are imposed for fiscal and local environmental reasons rather than for climate mitigation (thus, the lack of alignment between tax rates and the volume of emissions per fuel). It also has a motor vehicle's user tax (MVUT), described as a "privilege tax for the use of public roads and highways", which proceeds have, since 2019, been reserved solely for the construction, upgrading, repair, and rehabilitation of roads, bridges, and road drainage, with no share to air pollution control.

As of this writing, the Philippine does not consider a carbon tax or emissions trading system a priority.[46] Efforts to formalize a domestic carbon credit system proceed however, with legislation proposed, the DENR working with the private sector and academe to develop a carbon credit program focused on reforestation, and the CCC working with the private sector to create a national registry that will allow the country to sell sovereign carbon credits in the global market. [47] A research mission by a nonprofit exploration group, OceanX, is also being undertaken to help the country understand the state of its

[43] Republic Act 11966, An Act Providing for the Public-Private Partnership (PPP) Code of the Philippines.
[44] https://www.pna.gov.ph/articles/1238001
[45] As discussed in WB (2023), Boxes 1 and 7, carbon taxes put a price on the economic and social costs of emissions produced; ETS limit emissions from covered entities by issuing tradable emission units that entities can use to meet their compliance obligation, and a carbon crediting mechanism generates tradable certificates representing emission reductions; each carbon credit represents 1 metric ton of carbon dioxide equivalent reduced or removed.
[46] https://businessmirror.com.ph/2025/03/19/dof-deferral-of-carbon-tax-plan-clouds-esg-compliance/
[47] https://business.inquirer.net/385981/marubeni-to-help-develop-ph-reforestation-carbon-credit-program, https://www.pna.gov.ph/articles/1214300, https://www.fairatmos.com/blog/philippines-opens-its-carbon-market-the-time-for-action-is-now.

fishery sector and apply for blue carbon credits.[48]

3.5 Green bonds and other green finance mechanisms

There have been significant efforts to establish and grow the green finance in the Philippines over the last 8 years. The Philippines' Securities and Exchange Commission (SEC) played a key role in the development of the Association of Southeast Asian Nations (ASEAN) Green Bond Standards, ASEAN Social Bond Standards, and ASEAN Sustainable Bond Standards, and in 2018 and 2019, provided enabling policies for the greening the local market, by issuing sustainability reporting guidelines for listed companies and complementary guidelines for the issuance of green, social and sustainability bonds under ASEAN standards. [49] The Bangko Sentral ng Pilipinas (BSP) also actively engaged in international efforts to green the financial system, issued a "Sustainable Finance Framework" in 2020, setting out expectations on the integration of sustainability principles in the corporate governance and risk management frameworks as well as the strategic objectives and operations of Philippine banks; banks were given three years to transition. [50] This was followed by several circulars to integrate sustainability considerations in banks' operations.[51] Banks represent 80% of the country's financial system.

With the release of the *Philippine Sustainable Finance Roadm*ap ("Roadmap") and *Sustainable Finance Guiding Principles* ("Guiding Principles") in February 2022, a whole-of-government approach to sustainable and green financing has been in play. [52] The transition to a low carbon economy is the focus of the Roadmap, intended to be a first phase of a more comprehensive roadmap. The Inter-agency Task Force on Sustainable Finance (or "Green Force"), chaired by the Department of Finance (DOF) and the Climate Change Commission (CCC), is tasked to "develop a framework for determining the country's sustainable investment needs and carry out strategies to mobilize funding from public and private sector sources (BSP 2024).

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[48]https://www.bworldonline.com/the-nation/2024/12/08/639954/oceanx-to-help-philippines-understand-fishery-sector-apply-for-blue-carbon-credits/

[49] *Guidelines on the Issuance of Green Bonds under the ASEAN Green Bonds Standard*s, or SEC MC No. 12, s. 2018; *Sustainability Reporting Guidelines for Publicly-Listed Companies*, or SEC MC No. 04, s.2019; *Guidelines on the Issuance of Sustainability Bonds Under the ASEAN Sustainability Bond Standards (SUS)*, or SEC MC No. 08, s. 2019; and *Guidelines on the Issuance of Social Bonds under the Association of Southeast Asian Nations (ASEAN) Social Bond Standards (SBS)*, or SEC MC No. 09, s.2019. All are downloadable at https://www.sec.gov.ph/sec-issuances/memorandum-circulars/#gsc.tab=0

[50] BSP Circular No. 1085, series of 2020.

[51] Circular No. 1128, s. 2021 (Environmental and Social Risk Management Framework), Circular No. 1149, s. 2022 (Guidelines on the Integration of Sustainability Principles in Investment Activities of Banks), and Memorandum No. M-2022-042 (Guidance on the Implementation of the Environmental and Social Risk Management (ESRM) System).

[52] The Roadmap is available at https://www.dof.gov.ph/wp-content/uploads/2021/10/ALCEP-Roadmap.pdf. Guiding Principles are available at https://www.bsp.gov.ph/Media_And_Research/Media%20Releases/2021_10/Sustainable%20Finance%20Guiding%20Principles.pdf,

For example, a number of policies and incentives have been issued to unlock sustainability financing. BSP Circulars 1159 (s. 2022) and 1174 (s. 2023), recognized sustainable finance as one of the eligible modes of compliance with the mandatory credit prescribed in Republic Act 11901, or the Agriculture, Fisheries and Rural Development (AFRD) Financing Enhancement Act of 2022, and provided for the capture of information on loans or investments to finance sustainable projects as well as sustainable finance instruments issued. BSP Circular No. 1185, s. 2023 grants a temporary increase in the single borrower's limit of banks by 15% for financing eligible projects and a gradual reduction of the reserve requirement rate against sustainable bonds to zero percent. SEC Memorandum Circular No. 15, s. 2023, provides guidelines for blue bonds.

The principle-based *Philippine Sustainable Finance Taxonomy Guidelines* (SFTG), a critical component of the Roadmap, was published in February 2024, formulated by the BSP, SEC, and the Insurance Commission (IC), under the auspices of the Financial Sector Forum.[53] The SFTG draws on version 2 of the ASEAN Taxonomy's Foundation Framework and, for this initial release, focuses on climate change mitigation and climate change adaptation as objectives. [54] Apart from aiming to "channel and amplify capital" toward these goals, the SFTG seeks to foster "transparency and reliability by reducing the likelihood of greenwashing." [55] BSP Circular No. 1187 s. 2024 require banks to use the SFTG when extending credit, making investment decisions, and designing sustainable finance products, among others. SEC MC No. 5, s. 2024 directs regulated entities "to deepen understanding and familiarity with the SFTG" and encouraged them to consider its provisions and standards.

The above policies and regulations have provided support to an already pro-active **private sector.** The Philippines is currently the second leading issuer of **Green, Social, Sustainability and Sustainability-Linked** (GSS+) bonds in the ASEAN green bond market. As of 31 December 2024, Philippine ASEAN-labelled GSS+ bonds amounted to USD 15.30 billion, or 27% of the total USD 56.57 billion issued in the region (Figure 11). Issuers are from a wide array of industries including banking (8 universal banks, 1 thrift bank), real estate (3), renewable energy (2), water utilities (2), electric utilities (2), consumer services (1), supranational (IFC), and the National Government (Figure 12). The National Government executed four transactions, in a much-awarded maiden issue of Sovereign Sustainability Bonds in 2022 and 2023, which totalled USD 3.55 billion, including a JPY 70.1 billion issuance (ROP 2024). As reported in its *Sustainable Bond Allocation and Impact Report*, proceeds were utilized to refinance and finance eligible expenditures aligned with the country's Sustainable Finance Framework in a 95%-5% split, respectively, and were allocated to both social expenditures (53.5%) and green expenditures

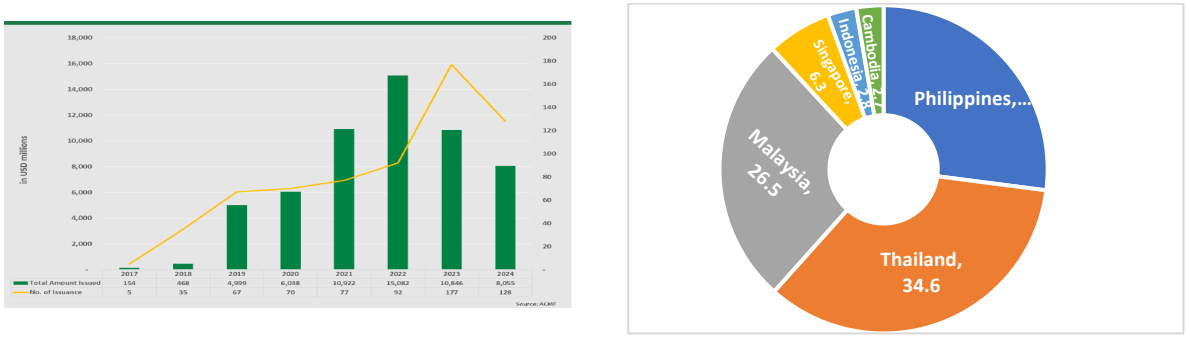
[53] The central-bank led Financial Sector Forum is a voluntary endeavor of four regulators - BSP, SEC, IC and the Philippine Deposit Insurance Corporation (PDIC) - to create a structured framework to coordinate and regulate the financial system.

[54] Ecosystems, biodiversity and the circular economy, as well as potential social objectives, are anticipated in future iterations. The SFTG is available at https://www.bsp.gov.ph/Regulations/Issuances/2024/1187.pdf .

[55] Section 2.2, SFTG. Greenwashing refers to the deceptive marketing used to persuade the public that an organization's products, aims, and policies are environmentally friendly.

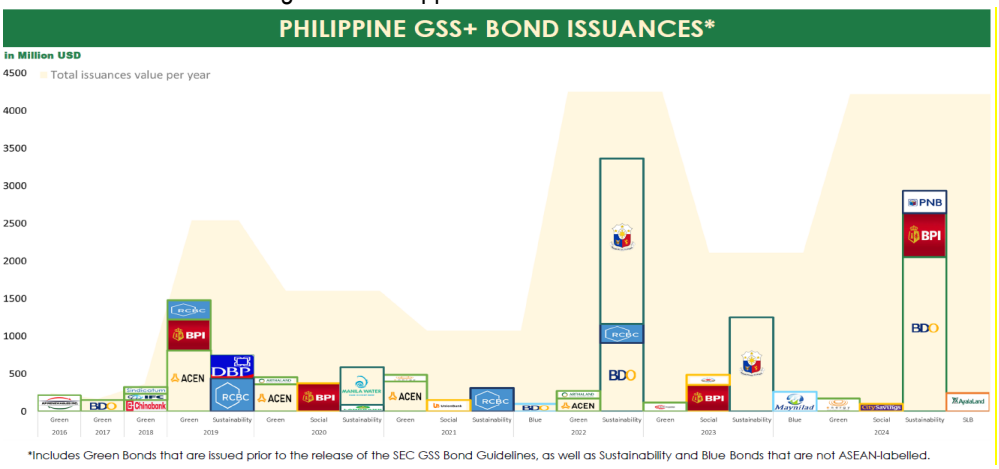
(46.5%). Green expenditures included renewable energy (0.14 ppts), the national greening program (5.15 ppts), and climate change adaptation - specifically, flood control (41.24 ppts).

Figure 11 Total ASEAN-Labelled GSS+ Bonds, and Share of Total by AMS



Source: Sustainable Finance Market Update, December 2024
(https://www.sec.gov.ph/cm-sustainable-2024/sustainable-finance-market-update-as-of-october-2024-2/#gsc.tab=0)

Figure 12. Philippine GSS+ Bond Issuances



Source: Sustainable Finance Market Update, December 2024

The Philippines also leads in the implementation of **market-based energy transition mechanisms** (ETMs).[56] In particular, pioneering initiatives have been taken by ACEN [57], which successfully closed "the world's first market-based Energy Transition Mechanism" in 2022, involving the divestment and early retirement of the 246 MW South Luzon Thermal Energy Corporation (SLTEC) coal plant and its transition to cleaner technology by 2040, when the SLTEC plant completes 25-years of operation. [58] The mechanism was underpinned by debt financing from local private banks and equity financing from

[56] ETM is a concept developed by the Asian Development Bank (ADB). which aims to leverage public and private investments towards early retirement of coal power assets.

[57] ACEN is the listed energy company of the Ayala group. Refer to https://www.acenrenewables.com/

[58] https://www.reuters.com/plus/acumen-stories/cop-28/acen; https://www.acenrenewables.com/2022/11/acen-completes-worlds-first-energy-transition-mechanism-etm-transaction-246-mw-sltec-coal-plant/;

the Government Service Insurance System (GSIS), Insular Life Assurance Company, Ltd., and a third private company, with a total transaction value of USD 310 million. The mechanism is expected to avoid or reduce up to 50 mmtCO2 cumulative emissions.

ACEN is now involved in a second pioneering initiative, in partnership with the Rockefeller Foundation's Coal to Clean Credit Initiative (CCCI) and the Monetary Authority of Singapore (MAS), to pilot the world's first **Transition Credit** (TC), whereby carbon finance is leveraged to accelerate the close of a CFPP and its replacement with clean power. [59] "Transition credits can help crowd-in catalytic financing for coal-to-clean energy initiatives", [60] paving the way for more of the region's relatively young CFPPs to be retired and replaced; the CCCI methodology also supports just transition initiatives for affected workers. An assessment confirmed the eligibility of SLTEC for carbon financing in April 2024, thus ACEN, GenZero (the decarbonization-focused arm of Temasek) and Keppel Ltd. (Keppel) are now studying the utilization of TCs to facilitate the retirement of the SLTEC plant by 2030, 10 years earlier its planned retirement in 2040.

3.6 Obstacles to the expansion of low-carbon private finance

There is much more liquidity in the system that can be harnessed for the country's low-carbon (and climate-resilient) ambitions. As of September 2024, there were 44 universal & commercial banks (U/KBs) which account for about 94% of the banking system's total assets), 41 thrift banks (TBs), and 100 rural and cooperative banks (RCBs) under the supervision of the BSP. Of these, nine U/KBs and one TB have issued ASEAN-labelled GSS+ bonds. [61] An informal survey of U/KBs in August 2022 indicated that 75% of respondents financed or approved loans to green/sustainable projects, amounting to a loan portfolio of USD 14.6 billion. This represented just about 7% of the banking system's total loan portfolio as of end-June 2022.[62]

There also seems to be a growing appetite for low-carbon projects. The 2023 Banking Sector Outlook Survey (BSOS) of 147 banks (out of 173 sampled) revealed that the interest to finance sustainable projects in the next two years had risen to 90.3% in 2023, from 79.3% in 2021 and 30% in 2019– a three-fold increase - and that banks are looking to issue green, social, and sustainability bonds, as well

[59] https://www.rockefellerfoundation.org/news/coal-to-clean-credit-cop28/ ; https://www.rockefellerfoundation.org/news/acen-and-rockefeller-foundation-pilot-could-avoid-up-to-19-million-tons-of-co2-via-carbon-financing/ ; https://www.sec.gov.ph/cm-sustainable-2024/sustainable-finance-market-update-as-of-august-2024/#gsc.tab=0

[60] Quoting Frederick Teo, CEO of GenZero, found here: https://www.business-news-asia.com/354-acen-keppel-and-genzero-partner-to-accelerate-coal-plant-retirement-in-the-philippines/

[61] https://www.bsp.gov.ph/Statistics/Financial%20Statements/Commercial/assets.aspx ; https://www.bsp.gov.ph/Statistics/Financial%20Statements/Rural/assets.aspx https://www.bsp.gov.ph/Statistics/Financial%20Statements/Thrift/assets.aspx

[62] BSP (2023), p. 14. USD 14.6 billion is the sum of PHP 829.7 billion (converted at 56:1) and USD 14.35 million. The top green/sustainable activities or projects supported were RE (89.0%), sustainable water and wastewater management (56%), and energy efficiency and green buildings (both at 50%).

as grant sustainable loans, for this purpose (BSP 2024). [63] Moreover, respondents expressed interest to finance projects in agriculture, renewable energy (solar power, hydropower, bioenergy), energy efficiency, and sustainable water and wastewater management (ibid). All are NDC sectors.

Converting interest in low-carbon initiatives into actual loans and investments is no simple matter however. As a new business stream, undertaking green loans and investments will likely require a dedicated unit within a bank armed with a reasonable amount of knowledge and skills in what is still an emerging field. Technical knowledge is key; offering free technical consultations to potential clients is, in fact, the "value proposition" of the Bank Philippines' Islands (BPI), recognized as the Best Sustainable Bank in the Philippines by the International Business Magazine for three years running since 2022.[64] BPI's Sustainable Development Finance (SDF) program features technical experts who can help potential SME clients identify opportunities for energy savings, RE generation, or climate change preparedness; understand technical options and potential cost savings and/or income; and evaluate project feasibility studies, validating savings and production projections; if the business case for greening their business is weak, BPI experts have bene known to advise SMEs not to proceed. BPI's experts have grown with the program since 2008, when the BPI launched the first Sustainable Energy Finance (SEF) program in the Philippines, in partnership with the International Finance Corporation.

Indeed, **lack of necessary expertise or skill** in green finance among banks is the primary obstacle to expanding sustainable financing on the supply side. When respondent banks for the 2023 BSOS were asked how they identify projects and activities contributing to climate change mitigation or adaptation or positive social outcomes, a large portion - 39% - said they are still in the process of "learning more" to identify appropriate criteria.[65] RCBs, in particular, consider sustainable finance initiatives as the most challenging area of compliance. [66] U/KBs ranked sustainable finance as the second most challenging area of compliance, as did subsidiary TBs. [67] To address this challenge, RCBs (as well as TBs and digital banks) seek guidance, capacity building and training. [68] U/KBs suggest incentives.

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[63] The BSOS gathers the outlook of presidents, chief executive officers, and country managers of Philippine banks over a two-year horizon and covers all U/KBs, all TBs, 80 RCBs, and five digital banks. The response rate for the 2023 round was 85 percent out of 173 sampled, with respondent banks accounting for 97.7 percent of the total assets of the Philippine banking system as of December 2023.

[64] https://intlbm.com/2024/04/03/bpi-recognized-as-the-philippines-best-sustainable-bank-for-the-3rd-straight-year/ The rest of this paragraph is drawn from "*Financing Sustainability Initiatives*", presentation of Patricia Anika D. Haxton, Head of BPI Sustainable Development Finance, September 5, 2024, and personal correspondence.

[65] BSP (2023), p. 21. The report does not provide detail on what respondents need to learn. However, the report was undertaken before the SFTG was circulated (BSP Circular No. 1187 s. 2024); the SFTG provides more operational clarity for banks regarding what criteria to use. In the meantime, it was reported that 42% of respondents have employed specific or defined criteria and 16% have criteria that will be ready in 12 months.

[66] BSP 2024, p. 22. RCBs ranked credit risk management second.

[67] UKBs considered anti-money laundering regulations the most challenging; TBs considered the implementation of new mandatory AFRD financing as most challenging.

[68] BSP 2024, p. 22.

Respondent banks also identified **lack of demand** as an important obstacle. It is possible that this has to do with a lack of awareness of NDC-relevant investable projects on both sides of the market, i.e., among banks and potential project sponsors. For instance, energy efficiency, wastewater treatment, pollution control and the like, are relatively new endeavours, even for banking industry leaders, whose portfolios before the pandemic were primarily populated by green building and solar power projects. This is why a database of sustainable projects and products is needed, which the Roadmap discusses. Such a database can improve knowledge as well as reduce search costs.

On the other hand, demand may be **weak** (notional but not effective) because commercial lending terms are unavailable or prohibitive. This is the case of energy efficiency projects for SMEs which banks tend to deem as too small and risky (Ablaza et al., 2020). Commercial lending for industrial process improvement may also be unavailable or prohibitive for small- and medium-scale manufacturers, owing to high capital costs of required facilities, e.g. waste heat recovery facilities for cement manufacturing.

Finally, the institutional bottlenecks within and across public sector programs and agencies could be playing a part in the weak demand for, or utilization of, low carbon private finance in some sectors. As discussed in section 2.2, access to commercial project-based loans by transport cooperatives is impeded by the absence of long-term service contracts from local governments, which are in turn contingent on the approval of local route plans by the central government regulator. A fuller and quicker transition in cement manufacturing is impeded by misaligned DPWH blended cement standards. The participation of private finance in waste management services at the local level could be impeded by the short-term (annual) nature of service contracts. Restrictive rules on who can avail of national government subsidies for local wastewater projects and their feasibility studies helps explain why, despite the offer of NG counterpart funding, wastewater investments at the local level have not materialized.

IV. Consolidation: Projected demand for low carbon finance and Prospects for supply

We combine the investment estimates from the NDCIP with the updated cost estimates provided by the PEP 2023-2050 to get a rough picture of the consolidated amount needed to start the country's low carbon transition in earnest. This is presented in Table 8, which also includes an assessment of the "prospects" that estimated amounts will be forthcoming. Recall that measures in the NDCIP account for just 39.5 percent (or two-fifths) of the emissions reduction pledged in the country's NDC and that not all have been costed. All figures are in 2022 prices. [69]

[69] Cost estimates were undertaken in 2022, more or less, using current prices, with no adjustments made for possible increases in real prices for years up to 2030 or 2050. The PEP 2023-2050 assumed a 3% inflation rate per year. Only the energy sector has available estimates for 2029 up to 2050, which turns out to be more than 6 times greater than what the sector requires for 2023 to 2028. See Appendix 4.

We find that at least USD 94.2 billion investments will be required up to 2030. Of this amount, 63% (or USD 59 billion) are expected from private sector stakeholders and 37% (or USD 35 billion) from public sector sources. We also find that for a whopping 95.4% of the USD 94.2 billion, prospects are high that financing will be forthcoming but that for 2.8%, prospects are low; ***good governance drives the former while problematic governance drives the latter.*** Prospects are fair for the balance of 1.8% and relate to programs involving nascent markets or behavioural change. (Table 9)

In particular, prospects are high for the upgrading of strategic ports; RE pre-development; build costs for additional RE, BESS, and natural gas; investments in bioethanol production, and EVs, all under the energy sector, as well as two under the transport sector, i.e., rail and BRT/AT. The 'high' assessment reflects the positive market interest in and response to energy sector initiatives as well as the ODA and PPP funding that rail, mass transport and active transport projects have already secured. However, it also reflects the government's recent acquisition of two seats on the NGCP Board which is expected to be a game changer with regard to the timely delivery of transmission projects required for the energy transition. Without this leverage, and without the market confidence generated by the energy department thus far, prospects for energy initiatives would be lower, or maybe even low. For transport projects, investments could be delayed by the complex coordination that will be involved in rolling out these projects.

Prospects are fair for 3 others under energy - voluntary decommissioning/repurposing of CFPPs, EVCS, and EEC programs - and the IPPU PAMs. Financing prospects for the energy items are assessed as fair and not high, despite the positive market response to energy sector initiatives, because they are dependent on nascent markets and behavioural change. For one, financing the decommissioning/repurposing of CFPPs will depend on the financial viability of market-based energy transition mechanisms and Transition Credits now being piloted, and, critically, on sustained private corporate commitment to net zero goals. There is also the roll-out and financing of EVCS which could be challenged not only by tedious documentary requirements [70] but also by issues that typically undermine consumer confidence in public EVCS. [71] The fact that there were only about 900 charging stations across the country as of the end of 2024, or less than 2% of the 66,500 targeted by 2028, [72] suggests that the complexity involved in installing and maintaining a widespread EVCS network may be underestimated. "The EV charging industry is trying to do in two decades what the gas fuel industry has done for more than 100 years."[73]

[70] https://mb.com.ph/2023/9/2/doe-logs-slow-investment-pace-for-ev-charging-stations

[71] In other jurisdictions these issues include, among others, "charger and EV incompatibility, a rush to install chargers without planning for proper maintenance, and a lack of experienced personnel to fix broken chargers." (https://www.motortrend.com/features/public-ev-charging-stations-issues-problems-concerns.)

[72] "Update on the Implementation of EVIDA and CREVI", presentation by the DOE, January 22, 2025.

[73] Ibid. John Smart, director of national charging experience for the ChargeX consortium.

Table 8 Low carbon Finance Requirements, Proponents, Prospects and Key Challenges, 2023 – 2030

Sector	Programs/Projects	Estimated requirement, in mUSD			Prospects	Key challenge	*Opportunity*
		Private	Public [a]	Proponent			
Energy (PEP 2023-2028, CES1)	(i) Transmission investments in expansion, modernization	No data available		Transmission concessionaire	No data available	Significant delays in the delivery of capex projects by NGCP	NG acquisition of two seats on the NGCP Board
	(ii) Upgrading of strategic ports for OSW	TBD	TBD	PPA, DOTr, DOE	High	Project planning and design	Market interest, with FS now underway
	(iii) RE pre-development [b]	125.5		Generation companies	High	Pre-requisite transmission investments and ports	See preceding
	(iv) Build costs: additional RE, BESS, natural gas	26,659.9		Generation companies	High	Pre-requisite transmission investments and ports; RE offtake; Regional competition	See preceding
	(v) Voluntary decommissioning and/or repurposing of CFPPs	TBD		CFPP, DOE	Fair	Viability of transition credits; Corporate buy-in to net zero goals	Pilot projects, with international support, ongoing
	(vi) Bioethanol production	416.4		Producers, Service providers	High	--	--
	(vii) EVCS	1,169.2		Producers, Service providers	Fair	Take-up slower than expected, indicating issues involving the reliability and usability of public EVCS	Growing demand for EVs
	(viii) EV (cars, motorcycles, tricycles, buses)	30,234.3		Vehicle owners	High	Consumer concerns for the availability of EVCS	Proactive DOE
	(ix) EEC programs [b]	312.3	2.8	all	Fair	EE not yet considered "infrastructure" and mainstreamed in energy mix as first fuel	EEC law (RA 11285)
NDCIP (2023-2030) Transport	(x) Rail		28,085.0	NG	High	Delays due to complex coord among multiple agencies	--
	(xi) PUVMP [b]	[c]	38.7	NG; transport cooperatives; banks	Low	Suspension of 'service contracting' between LGUs and Transport coops; Centralized authority over local route plans	Power to delegate authority over route plans to provincial governments

	(xii) Mass transit (BRT) and Active transport (AT), e.g. Greenways		*4,347.0*	*NG, LGU*	*High*	*Integration of AT into transport systems at all levels*	*Local government interest*
IPPU	(xiii) Cement	164.0		Manufacturers	Fair	Differing DPWH standards on blended cement vis PNS; Steep capital costs for small/med manufacturers	Leading companies pursuing their own net zero targets; Alignment of DPWH standards with PNS; Availability of JCM for small/med producers
	(xiv) Refrigerant/air-conditioning (RAC)	30.0		Industry	Fair	A shift to low-Global Warming Potential (GWP) refrigerants is not yet a priority	Engagement with industry players to commence
Waste	(xv) Solid waste and Waste water management		1575.0	DPWH, DENR, LGU, WD	Low	Weak enforcement of laws; fragmented and weak NG-LGU-WD arrangements	Build pipeline of feasible projects in the short term
Agriculture	(xvi) Various		1027.0	NG, LGU	Low	Policy incoherence	Build pipeline of feasible projects in the short term;
TOTAL		**59,116.1**	**35,075.5**				
Shares		**0.63**	**0.37**				

Source: Author's own consolidation. [a] May exclude cost of regulation setting, capacity building and enforcement; [b] non-infrastructure; [c] There should be an entry here since replacement vehicles receive an equity subsidy from government of just 11% on average. Thus, if the 38.7 mUSD represents government equity subsidies, then private sector capital should amount to 313.3 mUSD. Acronyms: BESS, Battery Energy Storage Systems; BRT Bus Rapid Transit; CFPP, Coal Fired Power Plants; EEC, Energy Efficiency and Conservation; EV/EVCS Electric Vehicle//EV Charging Stations; JCM: Joint Crediting Mechanism; MSME: Micro/Small/Medium Enterprises; OSW, Off-shore Wind; PNS: Philippine National Standards; PUVMP, Public Utility Vehicle Modernization Program

Table 9: Programs and Prospects by Size of Funding, Type of Funding and Share in Total

	High prospects	***Fair prospects***	***Low prospects***
Share in *USD 94.2* B required	95.4%	1.8%	2.8%
High funding (>USD 2B)	Private: Build costs of additional RE, BESS, Natural Gas; EVs Public: Rail, BRT/AT		
Low funding (<USD 2B)	Private: RE pre-development; Bioethanol production	Private: EVCS; EEC; IPPU PAMs	Public, Private: PUVMP; Public: Waste PAMs; Agriculture PAMS
Note: to be estimated	Public, Private: Upgrading of Strategic Ports	Private: Decommissioning/ Repurposing CFPPs	

Source: Table 10

Financing prospects are also fair on the EEC front because effective demand for EE is still quite weak despite the Energy Efficiency and Conservation Act of 2019. The issue could be one of mindset and/or bureaucratic inertia: while the law obliges all private and public establishments consuming at least 500,000 kwh/yr to undertake EE project investments and provides a framework to flow concessional funds and fiscal incentives toward EE adoption, EE is still not treated as "infrastructure" in the Philippines, as it is in other jurisdictions, the same way renewable energy and other energy investments are. [74] Put another way, the operational implications of EE as the country's first fuel - "the fuel you do not have to use"[75] – may not yet be fully appreciated. Yet EE is said to be the "cheapest, fastest and most untapped energy resource that can be quickly deployed to bridge short-, medium- and long-term energy security gaps as well as comply with Paris climate agreement obligations." [76]

Financing for IPPU initiatives also appears to depend on public sector agency behavioural change. For one, action by DPWH to align its standards for blended cement with Philippine National Standards, removing limitations to its use in public construction. For the RAC industry, a program to support the shift to low global warming potential refrigerants is about to commence.

Rather than inertia or behavioural issues *per se*, however, the **low** prospects for the transport sector's PUVMP, waste sector PAMs, and agriculture sector PAMs, have to do with institutional dysfunctions that have long-undermined efficiency in these sectors (as earlier discussed in section 2.2). Both private and donor finance are likely to be hindered by these governance issues. In the waste sector, for instance, the NDCIP reports that there is no incoming international finance. It also cites the fact that only 4 out

[74] Personal correspondence with Alexander Ablaza, President of the Philippine Energy Efficiency Alliance.
[75] https://www.iea.org/commentaries/energy-efficiency-is-the-first-fuel-and-demand-for-it-needs-to-grow
[76] Personal correspondence with Alexander Ablaza and Power Podcast Episode 6, viewed at https://youtu.be/6ilD1SeSTX4

of 30 Clean Development Mechanism (CDM) waste sector projects have credits issued. [77]

It is important to note that while low-prospect PAMs account for just 2.8% of the total estimated NDCIP-PEP investment requirement, they are expected to contribute about 30% of the 990 mmtCO2e emissions reduction targeted in the NDCIP (Table 10). Furthermore, key agriculture and waste sector PAMs feed into or coincide with urgent measures listed under the food and water security components the country's climate change adaptation plan.[78] Implementing the 2.8% is not optional in other words. Thus, even if a project-by-project approach can be employed to bypass institutional dysfunctions and secure some low carbon financing in the short term, a transition that can anchor pathways toward climate-risk -resilience and sustainable development will require implementing deeper governance reforms.

Table 10: Relative Cost and Impact: By Program and Prospect

Prospects	*Sector/program*	*Cost: Share in USD 94.2 B investment costs (%)*	*Impact: Share in 990 mmtCO2e emissions reduced (%)*
High			
	Energy, all including EVCS, EEC *	62.56	59.33
	Transport: Rail, BRT/AT	34.43	4.61
Fair	IPPU	0.21	5.99
Low			
	Agri	1.09	21.28
	Waste	1.67	6.65
	Transport: PUVMP	0.04	2.15

Source: Author's consolidation using data from Tables 4 and 10.

Note: * EVCS and EEC, which have 'fair' prospects, are lumped here because their impacts are not separately listed in the NDCIP or PEP.

V. Priority actions moving forward

The challenge moving forward will be to make sure that momentum is preserved for high-prospect PAMs and that chances for financing are improved for low- and fair- prospect PAMs. Actions to ensure a supportive governance environment underpin both.

Preserving the momentum for high-prospect PAMs is straightforward and will require sustaining market confidence in energy sector governance, leveraging the government's newly acquired seats on the NGCP board to ensure the timely delivery of critical transmission investments, and anticipating

[77] The CDM is a carbon offset scheme allowing countries to fund greenhouse gas emissions-reducing projects in other countries and claim the saved emissions as part of their own efforts to meet international emissions targets.

[78] "Securing food supply" and "Secure and sanitary water for all" are the top two themes in the National Adaptation Plan. Key strategies in the short term include, among others, the promotion of efficient irrigation techniques and the expansion of wastewater treatment and distribution systems. See sections 4.2.1 and 4.2.2 of CCA 2024b.

and averting potential coordination issues in the implementation of big-ticket transport projects. These actions are clear priorities as they underpin 95.4% of investments required by the NDCIP and PEP up to 2030.

Improving the chances of financing for low- and fair-prospect PAMs is more involved and will include Executive actions to 'fix' institutional bottlenecks in the short term, while working on deeper governance reforms; facilitating the expansion of low carbon private finance into unfamiliar sectors, and maximizing Energy Efficiency as first fuel.

Priority fixes include compelling the harmonization of DPWH blended cement standards with Philippine National Standards; delivering fully on the funding and staffing needed for a functional and proactive NSWMC, National Ecology Center, and the implementation of solid waste management policy more generally; amending NSSMP subsidy rules to allow Water Districts to directly access NG counterpart funding for sewerage and septage projects; and delegating the approval of municipal and city public transportation route plans to provincial governments who demonstrate the capacity for it. The last two are not meant to substitute for a more complete redesign of functional assignments in transport governance, including a reconsideration of the LTFRB model (Angeles et al. [2024], Sunio et al. [2019]), nor for a consolidation and rationalization of institutions involved in water and wastewater governance (NEDA [2021], Domingo and Manejar [2021b]).

A project-by-project approach in the waste and agriculture sectors could also be adopted in order to potentially bypass systemic failures and relax constraints on financing flows in the short term. Pilot projects can, at the same time, permit banks and private investors familiarize themselves with the low carbon transition measures in these sectors. Organizing a pipeline of feasible and shovel-ready projects - wastewater and solid waste disposal, carbon sequestration and AWD, among others -would be essential to this approach. Affordable low carbon financing will flow into projects that make financial sense.

More broadly, the creation of a database of NDC- investable projects would enable financing flows. The database would, as a priority, feature Energy Efficiency, agriculture, and waste sector projects, and be a subset of the database contemplated under the Roadmap. [79] Also important is the formulation and implementation of a plan to address the self-reported 'lack of expertise' in green finance among banks. This could include the issuance of more detailed guidance as well as training on the evaluation of climate change mitigation and adaptation investments. The point is to help banks identify projects and activities that can quality for low carbon and green finance, lower search costs and build expertise, thereby expanding the supply of private finance to well beyond green buildings and solar power projects.

[79] Pillar C (the "Investment Pillar") of the Philippine Sustainable Financing Roadmap describes establishing a sustainable pipeline database of public and private sector projects, that would also be linked to Sustainable Development Goals, PDP targets, and NDC targets.

Finally, a stronger policy push for Energy Efficiency. This means recognizing EE as a fuel that "is abundantly available and cheap to extract"; placing EE in the PEP energy mix alongside coal, oil and all other fuels; and maximizing EE's potential as infrastructure with net economic benefits that will likely include savings in build costs of additional capacities of other fuels. Maximizing EE means growing demand for first fuel and "that's where policy action matters the most."[80]

In the Philippines, sources of low carbon finance are on hand. But finance will flow only to well-structured projects in a supportive governance environment. Protecting good institutions and fixing problematic ones are therefore the first best and most important finance strategies.

[80] https://www.iea.org/commentaries/energy-efficiency-is-the-first-fuel-and-demand-for-it-needs-to-grow

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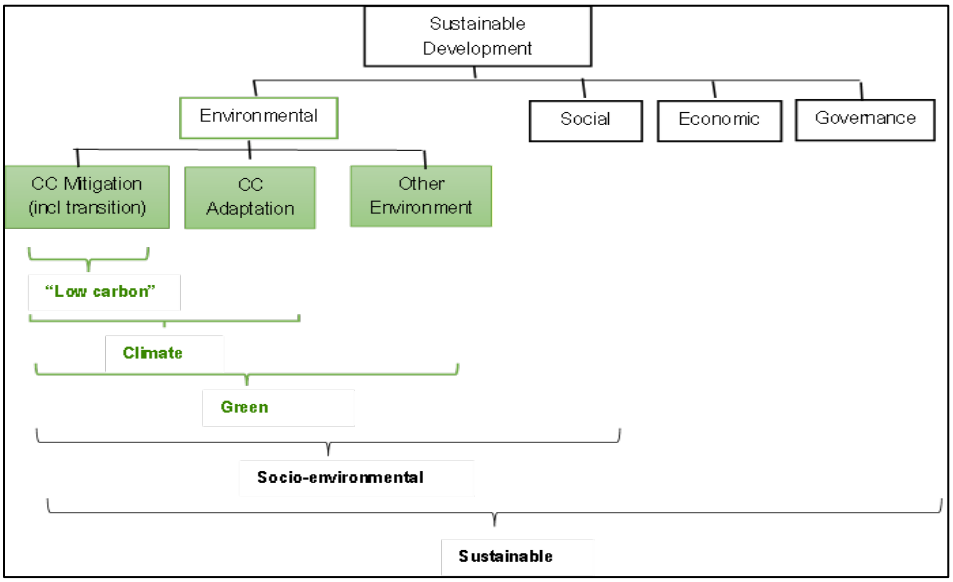
Appendix 1 Green and Low Carbon Finance



Source: Forstater and Zhang, 2016, Figure 1
(https://wedocs.unep.org/bitstream/handle/20.500.11822/10603/definitions_concept.pdf?sequence=1&amp%3BisAllowed=)

Appendix 2 GHG Emissions: 2010 Inventory and Business-As-Usual Projections 2020 to 2030 (MtCO2e)

SECTOR	2010 GHG Inventory	Projected Business-As-Usual (BAU) GHG Emissions											
		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Cumulative 2020-2030
Agriculture	43.2	49.5	49.5	49.4	49.4	49.3	49.1	49.0	48.8	48.6	48.4	48.2	539.1
Waste	15.6	23.3	23.9	24.4	24.9	25.5	26.0	26.5	27.1	27.6	28.2	28.7	286.1
IPPU	8.4	15.8	18.0	18.5	20.7	22.4	24.4	26.6	29.0	31.6	34.7	38.1	279.8
Transport	24.2	42.9	45.9	49.1	53.1	57.2	61.1	65.4	70.3	75.6	81.2	87.4	689.2
FOLU	-37.0	-24.4	-21.6	-18.8	-15.9	-13.1	-10.3	-7.5	-4.7	-1.9	0.9	3.8	**-113.4**
Energy	53.1	109.9	116.6	125.5	134.4	143.4	151.5	159.4	167.4	175.5	183.8	192.3	1659.5
TOTAL	107.3	217.1	232.3	248.2	266.5	284.7	301.8	319.3	337.8	357.0	377.2	398.4	3340.3*

Source: Climate Change Commission (as of 21 May 2021). The 3,340 mmtCO2e baseline assumes "growth, development and sector changes as envisioned in the Philippine Development Plan (PDP) of 2017-2022" as well as a long-term vision for 2040 known as AmBisyon Natin 2040. (CCC and DENR 2023, p. 9). Note: * Without FOLU, the total is 3453.7 mmtCO2e.

Appendix 3

Appendix Table 3.1 Breakdown of build costs of additional RE capacities, nuclear energy, natural gas and BESS: 2023-2028 and 2029-2050 (PHP billion in 2022 prices):

	2023-2028			*2029-2050*		
	REF	**CES1**	**CES2**	**REF**	**CES1**	**CES2**
Nat gas	253.4	253.4	253.4	1447.0	977.3	1201.9
Nuclear	0.0	0.0		0.0	1738.6	1738.6
Renewables	928.1	1197.3	1291.7	5526.2	6392.2	9441.8
biomass	*5.3*	*20.4*	*20.4*	*2.3*	*4.9*	*4.9*
geothermal	*143.6*	*143.6*	*143.6*	*271.9*	*172.6*	*169.1*
solar	*500.8*	*340.6*	*340.6*	*1790.7*	*1834.4*	*1101.1*
hydro	*41.8*	*111.1*	*111.1*	*1473.1*	*849.7*	*759.9*
onshore wind	*236.6*	*252.3*	*346.7*	*1023.5*	*1047.5*	*482.9*
offshore wind	*0.0*	*329.4*	*329.4*	*964.8*	*2483.2*	*6924.1*
BESS	63.6	63.6	63.6	56.4	744.1	899.9
TOTAL	1245.2	1514.3	1608.7	7029.6	9852.2	13282.2
in USD b (P56:8)	***21.9***	***26.7***	***28.3***	***123.8***	***173.5***	***233.8***
Note: Coal	*350.55*	*334.38*	*334.38*	*0*	*0*	*0*
Oil-based	*2.18*	*2.18*	*2.18*	*0*	*0*	*0*

Source: Source: DOE 2024b, Annexes 8-11 (converted by author at P56.8: USD1)

Appendix Table 3.2 Other investment requirements: PEP 2023-2050 (USD billion in 2022 prices)

	2023-2028			**2029-2050**			**2023-2050**
	REF	**CES1**	**CES2**	**REF**	**CES1**	**CES2**	**CES1**
RE pre-development	0.11	0.13	0.13	0.51	0.38	0.39	0.50
Downstream (excluding EV, oil depot/terminal)	0.83	1.59	1.59	33.05	5.38	5.44	6.96
EEC	0.32	0.32	0.32	0.56	0.56	0.56	0.88
EV	5.23	30.23	30.23	102.63	194.94	194.94	225.2

Source: DOE 2024b, Annexes 8-11 (converted by author at P56.8: USD1)

Appendix 4: Estimates for 2029-2050 (energy only)

Programs/projects	Estimate (in mUSD)		remarks
	Private	Public	
Transmission investment: expansion, modernization	No data		
Upgrading of strategic ports for OSW	TBD	TBD	
RE pre-development	377.5		
Additional RE capacities, BESS, natural gas	173,454.2		Nuclear included; large incremental investments in solar, wind, bess
Voluntary decommissioning and/or repurposing of CFPPs	TBD		
Bioethanol production	345.8		
EVCS	5,084.9		
EV (cars, motorcycles, tricycles, buses)	194,939.4		
EEC programs	556.9	7.0	
TOTAL*	**374,708.0**	**7.0**	