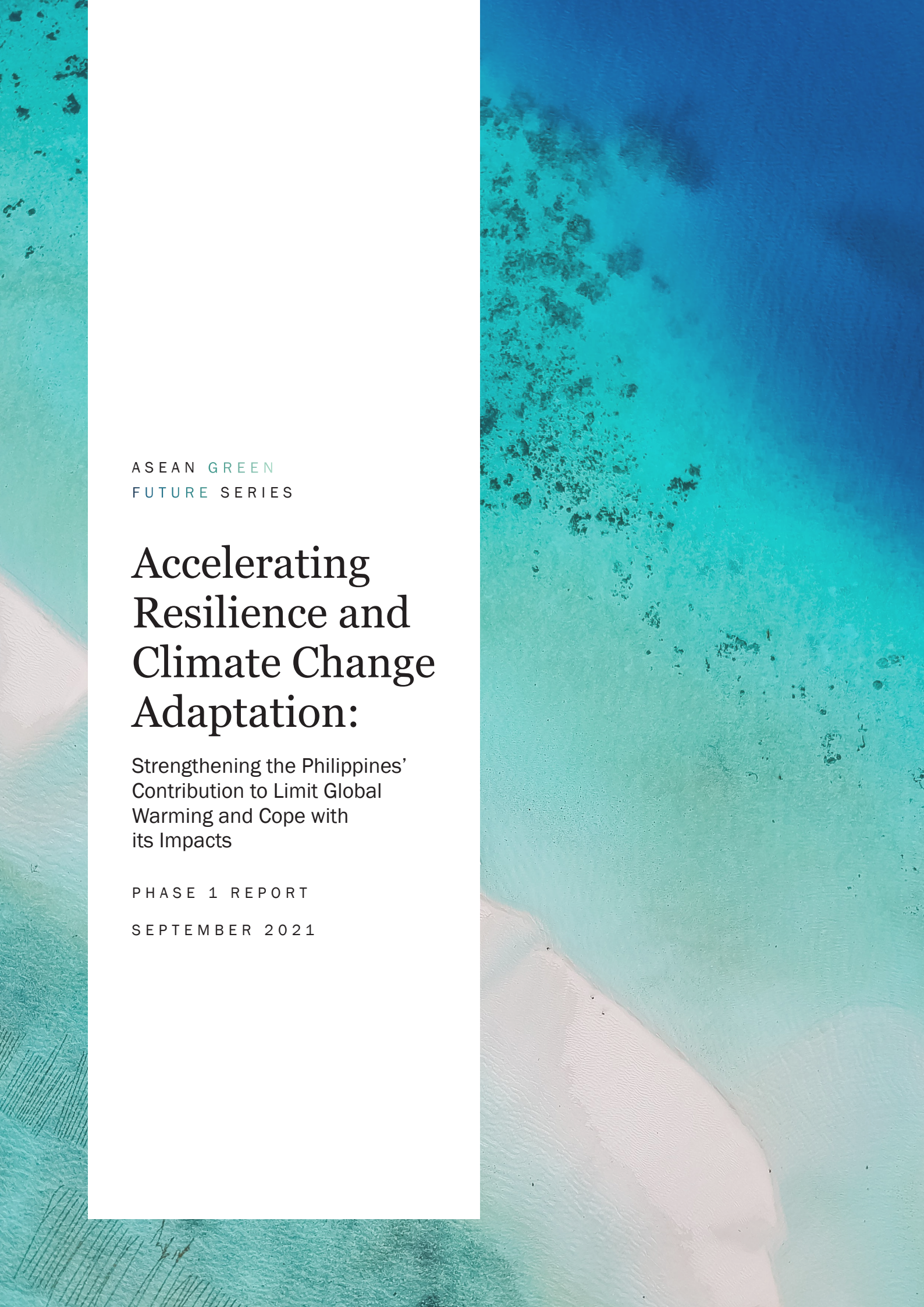

ASEAN GREEN
FUTURE SERIES

Accelerating Resilience and Climate Change Adaptation:

Strengthening the Philippines' Contribution to Limit Global Warming and Cope with its Impacts

PHASE 1 REPORT

SEPTEMBER 2021

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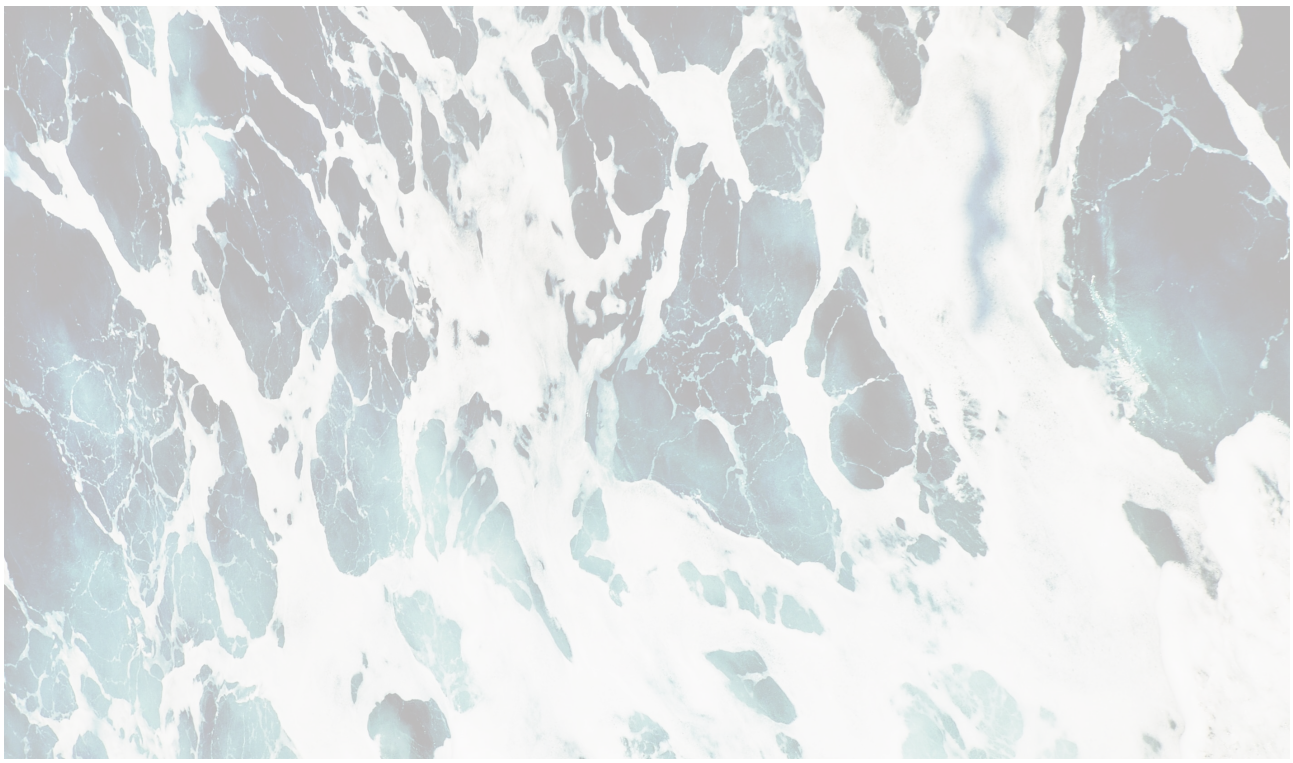
Accelerating Resilience and Climate Change Adaptation: Strengthening the Philippines' Contribution to Limit Global Warming and Cope with its Impacts



SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

JEFFREY SACHS CENTER on Sustainable Development
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The ASEAN Green Future project is a collaboration between the Sustainable Development Solutions Network, ClimateWorks Australia, the Jeffrey Sachs Center on Sustainable Development at Sunway University and research institutions from across Southeast Asia.

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Executive summary

The message of the IPCC Special Report on Global Warming of 1.5°C (IPCC 2018) is clear. Climate change is here, and the difference between warming to 1.5°C and 2°C engenders a dangerous tipping point that can change the world as we know it. The adverse consequences of warming beyond 1.5°C are especially dire for countries like the Philippines whose populations are disproportionately at risk. But limiting warming to 1.5°C will only prevent some of the worst-case scenarios. It will not and cannot eliminate the urgent need to cope with climate change impacts which will be dire in any case. It is thus critical for the Philippines to implement measures to adapt and protect itself and, at the same time, find ways to optimally support the global community and the ASEAN region to do the same.

In this paper, we discuss the state of play of climate action in the Philippines – i.e. what the country has done to advance climate-risk resilience and climate-smart development and where it is at vis-à-vis the international effort to limit global warming to 1.5°C – and how its 'ambition' on the latter squares with its efforts on the former. We propose a resetting of that ambition, suggesting that it reconnects to its anchor (adaptation/resilience) and context (sustainable development), away from the greenhouse gas (GHG) inventory-centric approach that has taken root, so that both national adaptation/resilience and global mitigation goals are better served. This is not the standard decarbonization path but rather one that may be more suitable to a highly vulnerable country with a relatively tiny carbon footprint per capita like the Philippines. In the Philippines, climate actions that prioritize adaptation and the building of resilient systems (addressing the demand for reliable, secure and affordable power, efficient and safe urban mobility, coastal risk reduction and food security) are likely to do more at the margin for global efforts to reduce the extent of climate change and cope with its impacts than disparate measures to reduce GHG emissions for two reasons. First, robust community ownership of climate action, a necessary condition for any successful pursuit of climate-smart low-carbon development, will follow more easily from dedicated investments and targeted market interventions to build local resilience; the same cannot be said for campaigns to reduce GHG emissions. Second, and perhaps of greater strategic importance, prioritizing resilience can open up previously missed opportunities to significantly contribute to global efforts based on the country's comparative advantages – for instance, the biodiversity of its seas.

The paper's first section provides an overview of the Philippines' climate change agenda, highlighting key principles, policies and instruments formalized under laws or by executive action, as well as the country's ambition as stated in its first national determined nationally determined contribution (NDC) submitted in April 2021. The second section provides a critique of that ambition, including how well it represents the priorities and urgency of the country's climate action agenda, suggesting necessary first steps so that the two can more purposefully and effectively cohere. In the third section, we provide illustrations of how a focus on adaptation and resilience in the power and transport sectors can propel coherent strategies to address urgent local needs while potentially accelerating GHG emissions reduction or avoidance as a co-benefit. Also discussed are coastal ecosystems and their importance to human survival and the quality of life locally and globally, especially in the face of climate change. A deliberate shift in the nature of the country's ambition from GHG emissions reductions to the protection and restoration of these (and other) important ecosystems will amount to a substantial strengthening of the country's contribution to global efforts under the Paris Agreement.

1. State of play

The climate change agenda in the Philippines as outlined in the National Framework Strategy on Climate Change explicitly prioritizes adaptation: "The national priorities … shall be adaptation and mitigation, with an emphasis on adaptation as the anchor strategy." (NFSCC 2010). Mitigation, in turn, is considered as a function of (or arising from) adaptation: "Whenever applicable, mitigation actions shall also be pursued as a function of adaptation" (ibid). This positioning of priorities is not surprising given the country's location, climate, and topography; the Philippines is ranked among the top countries vulnerable to the impacts of climate change.[1] At the same time, the Philippines considers itself to be a minor contributor to global warming.[2] In 2018, the country accounted for 0.48 percent of world GHG emissions, at a rate of about one-third the global emissions rate per capita (Table 1).

TABLE 1. TOTAL AND PER CAPITA GHG EMISSIONS AND CO_2 INTENSITY, THE PHILIPPINES, THE WORLD, ASEAN 10 AND SELECTED ECONOMIES, 2018

	PHL	World	ASEAN 10	EU	USA	AUS
GHG (million $MtCO_2e$)	235	48,940	3,552	3,330	5,790	619
% of world	0.48	1.00	7.25	6.80	11.83	1.27
GHG per capita (tCO_2)	2.2	6.45	5.42	7.45	17.72	24.78
CO_2 emissions (kg per 2017 PPP $ of GDP)	0.157	0.269	0.206	0.147	0.247	0.315

Source: Annex A; PPP: purchasing power parity

Priorities were made clear with the Climate Change Act of 2009 (RA 9729) which sought to "strengthen, integrate, consolidate and institutionalize government initiatives to achieve coordination in the implementation of plans and programs to address climate change in the context of sustainable development." The Act re-launched a comprehensive approach to climate change, after what had become a predominantly sectoral (and fairly fragmented) approach over the prior 20 years.3 The comprehensive approach included the establishment of a central coordinating institution in the Climate Change Commission (CCC); key policy instruments, in the National Framework Strategy on Climate Change 2010–2022 (NFSCC) and National Climate Change Action Plan 2011–2028 (NCCAP); and a mechanism to provide dedicated financing for the adaptation needs of local communities

1 The country is among the top five in the weather-related Long-term Climate Risk Index since 2015 and top three in the World Risk Index between 2011 and 2018 (and ninth in 2019 and 2020). The former analyzes impacts of extreme weather events such as storms, floods and heatwaves over a 20-year period and does not take into account important slow onset processes such as rising sea levels and acidification (https://germanwatch.org/en/19777). The latter assesses a country's disaster risk by combining four components: exposure to natural hazards (i.e., earthquakes, storms, floods, droughts and sea level rise), susceptibility, coping capacity, and adaptive capacity (https://reliefweb.int/sites/reliefweb.int/files/resources/WorldRiskReport-2020.pdf

2 This sentiment is expressed in the first Philippine NDC, when it describes the Philippines average emissions of carbon dioxide equivalent per capita as "way below the global average of 4 metric tons per capita."

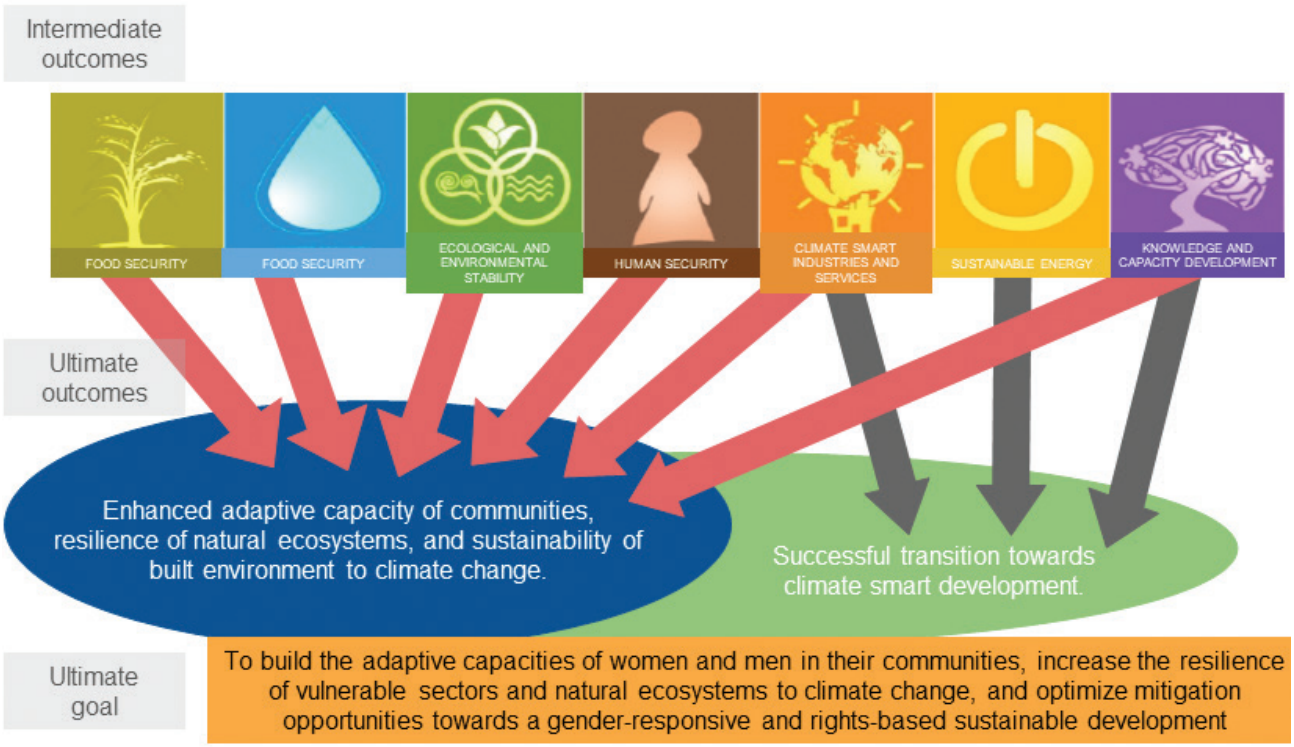
3 The Climate Change Act was a return to basics. As early as 1987, the government formed the Philippine Strategy for Sustainable Development (PSSD), a roadmap towards achieving economic growth and environmental integrity, followed closely by the Philippine Agenda 21 (PA21) in 1996, written in response to the 1992 Earth Summit; the Climate Change Act invokes PA 21. The Philippines was also among the first countries to institutionally respond to the challenge of climate change by creating the Inter-Agency Committee on Climate Change in 1991, recognized by the UNFCCC as "a leader and technical focal point" (Buendia et al. 2018). The "sectoral" approach refers to the series of stand-alone sectoral laws enacted between 1999 and 2008, implemented without the benefit of central coordinating institutions, including the Philippine Clean Air Act (1999), Ecological Solid Waste Management Act (2000), Philippine Clean Water Act (2004), Biofuels Act (2006), and Renewable Energy Act (2008). See WB 2013, p. 27.

and local governments, i.e. the People's Survival Fund.[4] A Philippine Disaster Risk Reduction and Management Act was also enacted in 2010, representing a "paradigmatic shift in the way disaster risks are managed, away from disaster response and toward prevention, with climate adaptation considered an appropriate mechanism for disaster prevention" (WB 2013: 28). Other important legislation ratified include the Green Jobs Act of 2016 and the Energy Efficiency and Conservation (EE&C) Act of 2019.[5]

The NFSCC highlights the critical aspect of adaptation, "meant to be translated to all levels of governance alongside coordinating national efforts towards integrated ecosystem-based management which shall ultimately render sectors climate-resilient" (NFSCC: 3). Its vision and goal of climate change policy are, respectively, "a climate risk-resilient Philippines with healthy, safe, prosperous and self-reliant communities, and thriving and productive ecosystems" and "to build the adaptive capacity of communities and increase the resilience of natural ecosystems to climate change, and optimize mitigation opportunities towards sustainable development" (ibid: 16).

The NCCAP's ultimate outcomes are (i) "the 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 six out of its seven priority areas directly relate to adaptation," i.e. food security, water sufficiency, ecological and environmental stability, human security, climate-smart industries and services, and sustainable energy (Figure 1). The NCCAP 2011–2028 is considered the lead policy document guiding the climate agenda at all levels of government and is organized into three six-year phases, which correspond to the term of the Philippine Development Plan (PDP), effectively establishing the country's "first long-term climate agenda" (WB 2013: 11, 27).

FIGURE 1. NCCAP 2011–2028, ULTIMATE GOALS, OUTCOMES AND INTERMEDIATE OUTCOMES



Source: Climate Change Commission

4 The People's Survival Fund (Republic Act 10174) was established in 2012 as an amendment (among other amendments) to the original Climate Change Act (Republic Act 9729).

5 The Green Jobs Act (Republic Act 10771), considered to be both an adaptation and mitigation strategy, provides a policy framework to "scale up promotion of sustainable growth and decent job creation, while building resilience against impacts of climate change", by providing incentives to enterprises generating green jobs across all economic sectors, among other provisions. The EE&C Act (Republic Act 11285) provides for the formulation and implementation of EE&C plans and programs to secure sufficiency and stability of energy supply and protect the environment. It also promotes the development and use of efficient renewable energy technologies and systems.

In 2014, guidelines for formulating local climate change action plans were issued, [6] as was an executive order institutionalizing the Philippine GHG Inventory Management and Reporting System, that would "enable the country to transition toward a climate-resilient pathway for sustainable development."[7]

Notwithstanding high-level policy clarity and convergence, realizing operational convergence has been a struggle. A review of climate public expenditures and institutions in 2013 observed that, among others, development plans – national (i.e. PDP 2011–2016), departmental and local – were only partially aligned with the NCCAP, and that unless this and other missing elements in the institutional framework were addressed, the country's climate reform agenda could not be properly executed nor realized (WB 2013).8 The 2013 review gave rise to climate change expenditure tagging (CCET) using a common policy-based typology and guidelines. 9 CCET is intended to provide line and oversight agencies with the means to plan, prioritize and monitor the national climate change response allocation and performance – ultimately, to advance, strengthen and accelerate the implementation of the NCCAP across sectors and levels of government. Subsequently, two climate budget reports were produced (FY 2015 and 2016), and summary expenditure tables have been published annually since. 10 Still, in the succeeding PDP 2017–2022, 'climate change' was observed to be operationally assigned to the environmental sector, in competition (for funds) with other sub-sectors and development priorities; climate change adaptation remained conjoined with disaster risk reduction and management (DRRM), an inadequate humanitarian understanding of climate change; and there was "little sense of crisis, or that the current development path may no longer be possible, much less optimal in the context of climate change."[11]

Against this backdrop, the country submitted, in April 2021, its first Nationally Determined Contribution (NDC) under the Paris Agreement. The NDC stated the country's ambition for GHG mitigation for the period 2020 to 2030 to be a projected GHG emissions reduction and avoidance of 75 percent, of which 2.71 percent is unconditional and 72.29 percent is conditional, covering the agriculture, waste, industry, transport, and energy sectors, and referenced against projected business-as-usual (BAU) cumulative economy-wide emissions for the same period. The target reduction of 75 percent was deliberately set to convey high ambition, a progression from the country's Intended NDC (INDC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in October 2015.[12] In that earlier submission, the country set a GHG emissions reductions of about 70 percent by 2030 relative to the BAU scenario of 2000–2030 to come from the energy, transport, waste, forestry and industry sectors, with the entire 70 percent conditional on "the extent of financial resources, including technology development and transfer, and capacity building, that will be made available to the Philippines."

The first Philippine NDC also stated that it shall "endeavor to peak its emissions by 2030" – described by officials as 'aspirational peaking' – in line with "its sustainable development aspirations and in solidarity with ASEAN Member States" and that it shall "undertake adaptation measures across but not limited to, the sectors of agriculture, forestry, coastal and marine ecosystems and biodiversity, health, and human security, to preempt, reduce and address residual loss and damage."

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6 Department of Interior and Local Government (DILG) Memorandum Circular 2014-135. Subnational units in the Philippines are provinces, cities and municipalities.

7 E.O. 174 series of 2014. A GHG inventory management and reporting system was identified in the NCCAP as an activity to support better planning for climate change adaptation and mitigation actions.

8 There was also no convergence on financial arrangements for climate-related disaster management. Funding was still directed primarily toward recovery and rehabilitation rather than climate adaptation and disaster risk reduction. The review was carried out from February 2012 to March 2013. See https://www.worldbank.org/en/country/philippines/publication/getting-a-grip-on-climate-change-in-the-philippines

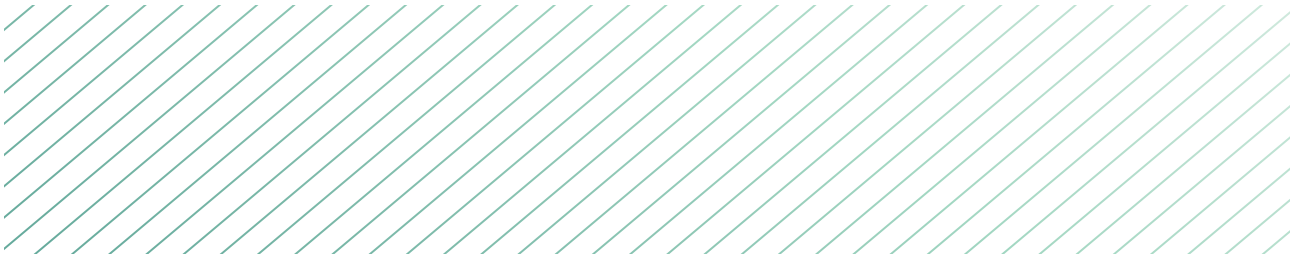
9 Guidelines for the tagging and tracking of climate change expenditures in the Annual Investment Programs of provinces, cities and municipalities were issued in July 2015. See DBM-CCC-DILG Joint Memorandum Circular No. 2015-01 (https://niccdies.climate.gov.ph/files/documents/Local%20CCET%20-DBM-DILG-CCC-.pdf)

10 Two summary tables are published by the DBM in the Budget Expenditure and Sources of Finance each year. The climate budget reports for FY 2015 and 2016 are available at https://climate.gov.ph/files/FY-15-CBB.pdf and https://climate.gov.ph/files/Fy%2016%20CBB.pdf.

11 https://icsc.ngo/portfolio-items/is-the-climate-crisis-adequately-baked-into-national-and-sub-national-development-strategies/

12 Department of Finance (DOF), February 2021. "In a word, we have higher stakes in this global effort than many other nations. I want us to be a world leader in making a difference in this battle against the climate crisis. I want us to pave the way in this area through our ambition" (https://www.dof.gov.ph/dominguez-calls-for-bolder-collective-action-vs-climate-crisis/).

2. Questions about the country's 'ambition'



A reduction of 75 percent in the stock of emissions collected between 2020 and 2030, along with a peaking of emissions by 2030, was universally welcomed by civil society groups for its ambition. On its face, 75 percent is an impressive number. However, a number of questions surround that target.

First, it is not clear what pathways are expected to bring about this target reduction/avoidance in the next 10 years; available figures on emissions avoidance/reduction by sector do not add up to 75 percent. To illustrate, the first iteration of the NDC, proposed in December 2020, projected a cumulative GHG emissions reduction/avoidance of 2671.13 MtCO2e, out of projected BAU cumulative emissions of 8,791.6 MtCO2e for 2020–2040, or a reduction/avoidance of 30 percent (Table 2, Figure 2).13 Summary figures by sector were provided and (unlike in the INDC which excluded agriculture) all sectors were accounted for.

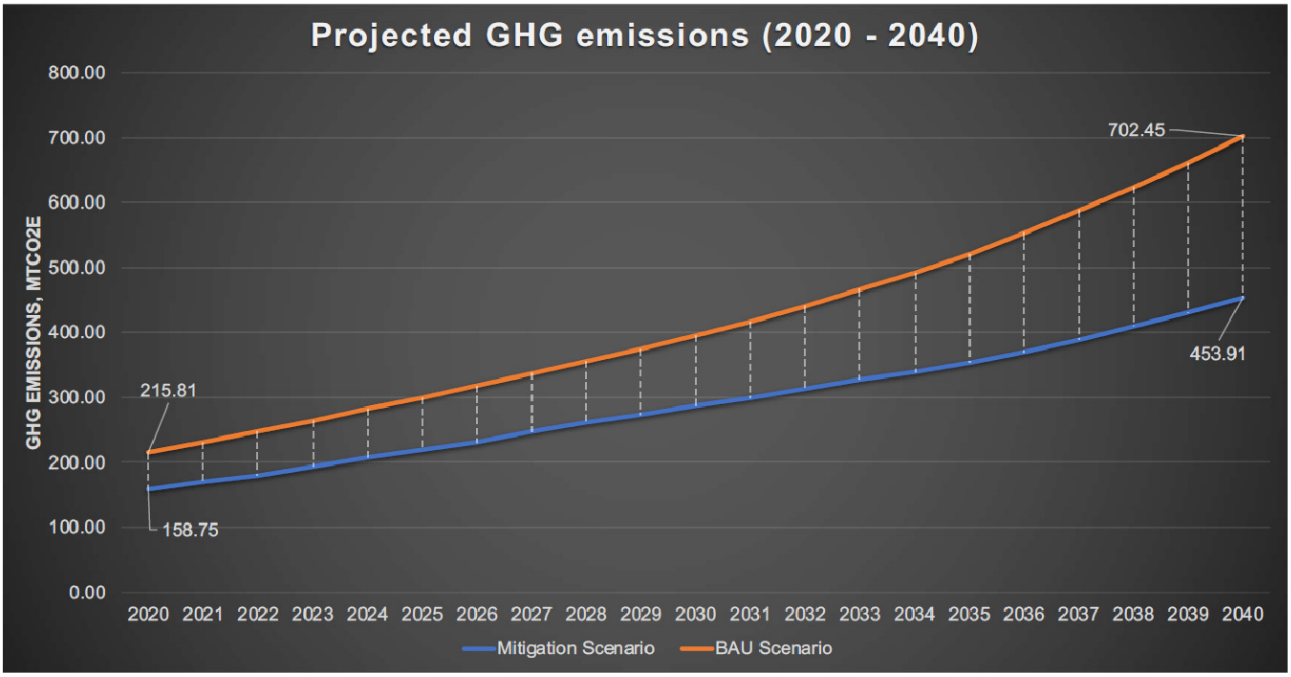
TABLE 2. PROJECTED GHG EMISSIONS AND EMISSIONS REDUCTION/AVOIDANCE, 2020–2040

	Projected GHG emissions, $MtCO_2e$, 2020–2040		Projected emissions reduction/avoidance, $MtCO_2e$, 2020–2040		
	BAU scenario	Mitigation scenario	Total	Conditional	Unconditional
TOTAL	**8791.63**	**6120.5**	**2671.13***	**2485.57**	**185.56**
% of BAU			**30.38**	28.27	2.1

Source: Climate Change Commission, 23 December 2020 * Breakdown by sector: Agriculture, 66.09; Waste, 159.34; Industrial process and product use (IPPU), 92.04; Transport, 113.6; Forestry and other land use (FOLU), 1714.47; Energy, 525.59.

13 The first iteration was presented at the 1st NDC Multi-Stakeholder Consultation on 23 December 2020 (see https://www.facebook.com/watch/live/?v=219310973019131&ref=watch_permalink). The endpoint of 2040 corresponds to the country's long-term vision of zero poverty by 2040 under Ambisyon 2040.

FIGURE 2. PROJECTED GHG EMISSIONS 2020–2040, BAU AND MITIGATION SCENARIOS



Source: Climate Change Commission, 23 December 2020

The 30 percent target reduction was raised to 75 percent in the second iteration of the NDC, presented in February 2021, this time referencing a cumulative BAU emissions for a shorter period – 2020 to 2030 – and covering all sectors except forestry and other land use (FOLU).[14] However, only an 11 percent reduction was accounted for (Table 3). The drop to 11 percent from the previous 30 percent seemed to be due to the exclusion of FOLU.[15]

TABLE 3. NDC ESTIMATES AS OF 31 JANUARY 2021*

Sector	BAU**	Cumulative GHG emissions ($MtCO_2e$) 2020–2030			
		Projected reduction/avoidance		Unconditional	Conditional
		Total	% of sector BAU		
Agriculture	539.09	158.3	29.4	0.0	158.3
Waste	286.09	64.9	22.7	8.0	56.9
IPPU (+WHR)	279.84	53.9	19.3	13.9	40.0
Transport	689.19	44.5	6.5	44.5	0.0
FOLU	-113.42				
Energy	1659.52	45.9	2.8	25.1	20.8
TOTAL	**3340.31**	**367.5**		**91.4**	**276.1**
% of Total BAU		**11.00%**		2.74%	8.27%

* Source: "Adjustments and Refinement in the NDC Measures from IPPU and Waste Sectors", Department of Environment and Natural Resources, 3 February 2021; ** Source: Climate Change Commission; IPPU: industrial process and product use; WHR; waste heat recovery; FOLU: food and other land use

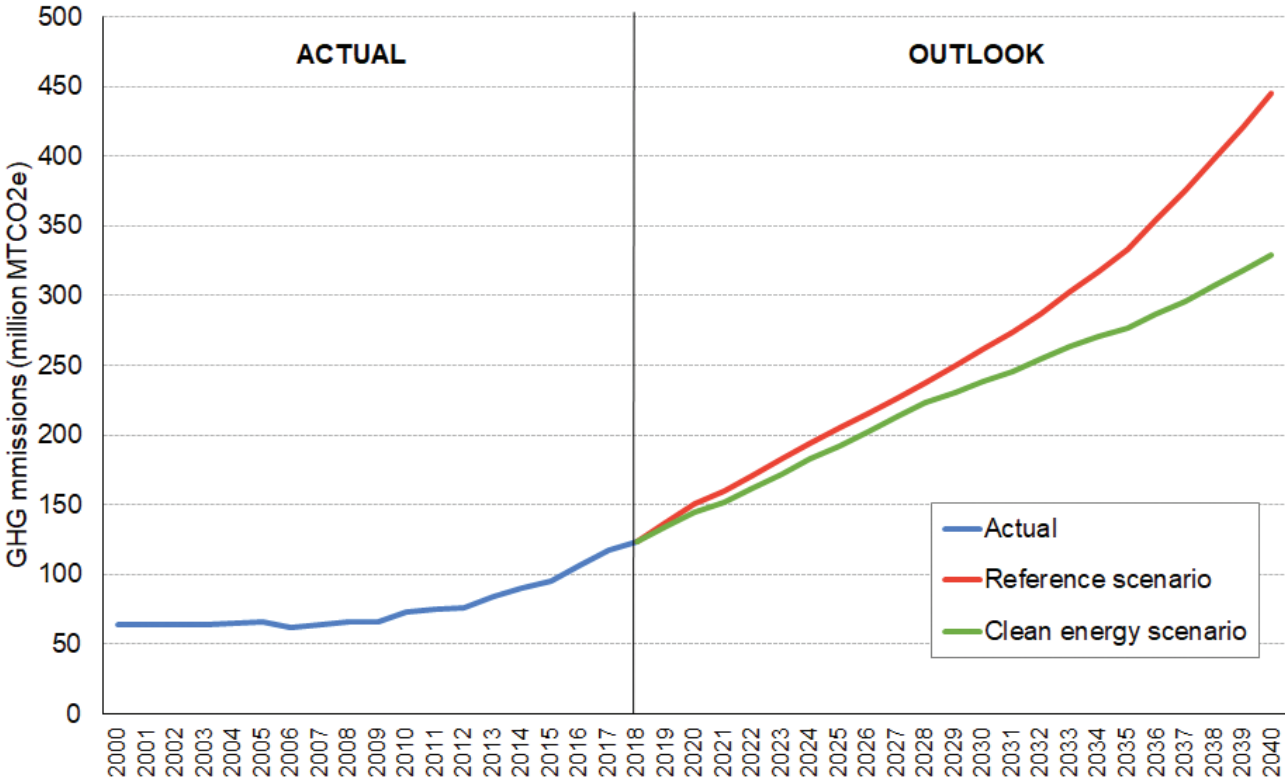
14 The 2nd NDC Multi-Stakeholder Consultation (https://www.facebook.com/watch/live/?v=187662476475843&ref=watch_permalink). In large part, the target was raised in response to a number of stakeholder reactions to the "underwhelming, inadequate and shameful climate commitment" proposed in December 2020. See https://www.rappler.com/nation/draft-document-philippines-lowers-carbon-emissions-reduction-target

15 If FOLU had been excluded from the December iteration, the projected GHG emissions reduction would have also shrunk to around 11 percent.

But no further information was provided for how the gap left by the FOLU sector would be filled, much less how the balance – a further reduction from 30 percent to 75 percent – could be achieved.[16]

Whether and how emissions can feasibly peak by 2030 is a second puzzle. Will the complete set of pathways supporting the 75 percent reduction target (whatever this set may be) also support a peaking of emissions by 2030 – and how? The matter arises because the Mitigation scenario curve in Figure 2 indicates an increasing trend in net emissions well beyond 2030 and suggests the same even beyond 2040. Although this curve represented the earlier draft NDC (the earlier 30 percent reduction), FOLU was included – making it more difficult to imagine how emissions could reach a maximum then turn downward by 2030 without FOLU as the final NDC stated. The Clean Energy scenario in the Philippine Energy Plan 2018–2040 (Figure 3), which is the basis for the energy sector's NDC (Table 4), does not indicate a peaking of emissions before 2030 or 2040 either.

FIGURE 3. TOTAL GHG EMISSIONS: ACTUAL VS. OUTLOOK (REFERENCE AND CLEAN ENERGY SCENARIOS)



Source: Author's replication of Philippine Energy Plan 2018-2040 Figure 44.

16 The earlier INDC target of a 70 percent reduction by 2030 relative to its BAU scenario of 2000-2030 was also unsupported. Estimates done in preparation for it, which included all sectors, indicated a best-case scenario – i.e. the implementation of all the mitigation options in a very long list of options examined at the time – of 44 percent in GHG emissions reduction/avoidance against the relevant BAU (B-Leaders, version as of 21 Feb 2016, p.153, at https://climate.gov.ph/files/01Feb2016_CBA-Study_0_INTEGRATED.pdf). A 2018 update of the estimates, undertaken after the country sign up to the Paris Agreement, indicated a 47.6 percent reduction.

TABLE 4. 2020–2040 ENERGY SECTOR GHG EMISSIONS REDUCTION/AVOIDANCE

	2010	2020	2025	2030	2035	2040	Total
BAU (Reference)	53.11	109.89	151.5	192.26	246.15	339.48	**4,277.59**
Transformation/Electricity	33.02	81.39	115.19	145.69	185.55	259.48	**3,241.16**
Industry	12.04	15.99	20.63	27	36.26	50.08	**612.53**
Others	8.05	12.51	15.67	19.56	24.34	29.93	**432.9**
CES	53.11	107.19	147.74	182.03	206.99	246.75	**3,751.99**
Transformation/Electricity	33.02	79.82	113.71	138.89	150.97	172.47	**2,787.52**
Industry	12.04	15.2	19.24	25.01	33.67	46.89	**570.73**
Others	8.05	12.18	14.79	18.13	22.35	27.39	**393.74**
Total GHG avoidance/ reduction	-	2.71	3.76	10.22	39.16	92.73	**525.59**
Unconditional target: EE&C	-	1.13	2.28	3.43	4.58	5.72	**71.96**

Source: Department of Energy (DOE), Presented 3 February 2021

The decision to exclude FOLU from the GHG emissions target leads to more questions. As explained to stakeholders during the February 2021 consultation, the forestry sector was excluded because, as a negative emitter, "there is nothing to mitigate."[17] Instead, "forestry is considered in the NDC as an adaptation priority and … support for the forestry sector will be available under the mechanisms of the Paris Agreement."[18] The Climate Change Commission (CCC) also explains that decoupling the forestry sector from other NDC sectors was necessary in the context of "keeping the integrity of the accounting process, also known as 'mitigation mathematics'."[19]

These explanations have not been helpful. Apart from the fact that government's own CCET guidance defines climate change mitigation as actions "aimed at reducing GHG emissions, directly or indirectly, by avoiding or capturing GHG before they are emitted to the atmosphere or sequestering those already in the atmosphere by enhancing 'sinks' such as forests" (CCC and DBM 2016, emphasis added),[20] the government's own estimates of BAU emissions from FOLU indicate that FOLU is expected to transform from a net negative emitter to a net positive emitter by 2030 (Table 3). This is a strong argument in itself for the inclusion of the sector, regardless of issues relating to the accounting of its GHG emissions.[21]

17 2nd Multi-Stakeholder Consultation for the First Philippine Nationally Determined Contribution (NDC), 03 February 2021, Summary of the Proceedings. Refer to footnote 15.

18 Ibid. Understood to mean that the forestry sector need not be in the NDC to obtain support.

19 "Why Forestry has to be excluded from the other NDC sectors for now", CCC, undated.

20 See also DBM-CCC-DILG Joint Memorandum Circular No. 2015-01.

21 Accounting issues are discussed in Ajani et. al (2013) and Grassi et. al. (2018). For instance, flow-based GHG inventories applied to the land sector "obscure fundamental differences between ecosystems: in their carbon stock stability, restoration capacities and density" (Ajani et. al. 2013). Or the difficulties of disentangling "simultaneous natural and anthropogenic processes that determine forest-related fluxes" and that "unlike other sectors, future emissions and removals in forests can change over time as a result of forest characteristics such as age-class distributions, which are largely determined by past forest management and natural disturbances" (Grassi et. al.2018).

TABLE 5. GHG EMISSIONS: 2010 INVENTORY AND BUSINESS-AS-USUAL PROJECTIONS 2020 TO 2030 ($MTCO_2E$)

SECTOR	2010 GHG Inventory	Projected business-s-Usual (BAU) GHG Emissions											
		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Cumulative 2020–2030
Agriculture	43.152	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	15.559	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	8.363	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	24.174	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	**-37.007**	**-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	53.105	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	**107.346**	**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)

More fundamentally, it is a surprise that the inclusion or exclusion of FOLU – or any other program/subsector– would hinge on its showing in the GHG inventory. Terrestrial forests provide benefits far beyond carbon sequestration services – among others, slope protection, flood mitigation, watershed protection, biodiversity protection and more. Multiple benefits are also provided by mangrove forests (and seagrass meadows), including storm protection, water quality improvement, and benefits to biodiversity and fisheries (IPCC 2019). Thus forest management is central to the country's climate change response – at least two priority areas of the NCCAP involve it – and mitigation co-benefits should be accounted for explicitly in the country's NDC.

The GHG inventory-centric approach implicit in the treatment of FOLU may explain the equally puzzling – and alarming – matter of an NDC which is only 3.6 percent unconditional (i.e. 2.71 out of 75), begging the question of how that tiny portion squares with the high-level policy clarity and urgency on climate action, including the requirement to infuse all development plans and policies with it. Exactly how important is climate resilience and sustainable development – consequently climate change adaptation and mitigation – if the country is willing to guarantee just 3.6 percent of its NDC? Does the 96.4 (conditional)–3.6 (unconditional) split of the 75 percent emissions reduction mean that NDC programs and measures are largely extraneous to the climate-resilience and adaptation requirements of the country?

That the NDC relating to the energy sector offers to reduce just 2.8 percent of its own BAU emissions for the period, although it accounts for 49.7 percent of the country's cumulative BAU emissions, and that nearly half of its NDC is conditional, raises the same questions.[22] As does the NDC involving agriculture, which is wholly conditional (and which, it turns out, includes carbon sequestration measures, such as rehabilitation/expansion of mangrove areas and establishment of bamboo plantations, adding to the confusion surrounding FOLU quite apart from the surprise that the rehabilitation of mangrove areas is considered to be a conditional measure.)

We suspect that the same GHG-inventory-centric approach, apart from triggering a decoupling of FOLU from the rest of the NDC sectors, also decoupled mitigation from adaptation (its anchor) and sustainable development (its context). Thus the NDC is operationally detached from the country's economy-wide climate action priorities, plans and programs which are driven by adaptation (e.g. NCCAP), and benefits from these priorities, including global adaptation or mitigation co-benefits, do not factor into NDC targets. Put another way, the NDC does not in fact embody a whole-of-government-and-society approach that the Philippine government has been implementing in pursuit of sustainable development.[23]

22 See figures from Table 3, e.g. 49.5 MtCO2e out of 1659.5 MtCO2e is 2.8 percent.

23 The Philippines would not have been alone had it chosen to emphasize new, stronger adaptation ambition in its NDC. An assessment of the CVF Climate Survival Leadership Barometer showed how, of the sixty-nine countries that submitted stronger NDCs in 2020, 66 countries strengthened their targets for adaptation (https://thecvf.org/our-voice/news/extreme-threats-for-most-vulnerable-as-nations-fail-on-paris-promises). The Barometer is an initiative of the Climate Vulnerable Forum (CVF) which played a strong leadership role in enshrining the global temperature threshold goal of 1.5°C in the Paris accord.

We note that mixed signals from the UNFCCC secretariat and other quarters on the matter of the treatment or inclusion of FOLU, or even adaptation, in NDCs may have played a large part in this decoupling.[24] We assert Article 4 paragraph 7 of the Paris accord, however, which should be read alongside other provisions that recognize the circumstances of non-Annex 1 countries (UNFCCC 2016).[25]

In view of the foregoing, we think that the necessary first step for strengthening and accelerating climate action in the Philippines would be to return to the first principle of adaptation as the anchor strategy, pursuing mitigation as a function of adaptation, with programs and measures driven by their impact on sustainable development and not by emissions reductions per se. Operationally this would mean (i) quantifying the operational (and indicative) investment requirements of the NCCAP, updated to at least 2040, (ii) programming and prioritizing these requirements in medium- (and longer-) term sectoral and national public investment programs (PIP), and (iii) identifying and estimating global adaptation and mitigation co-benefits. In essence, the CCET portions of the PIP would constitute the central programs and measures of the country's NDC. The selection of programs and measures would not start with but end with an estimation of potential emissions reductions.

Ideally, the science in the IPCC Special Report– especially, insights on the interplay between sustainable development and climate actions, i.e. the synergies/ trade-offs of adaptation and mitigation options consistent with a 1.5'C world and the SDGs – informs the sequencing of the NCCAP programs and measures. [26] The precautionary principle would apply, however, and adjustments would be done iteratively and regularly.

The classification of unconditional and conditional portions would follow from the PIP-CCET exercise. It is important to note, however, that international funding would likely gravitate to programs and measures with significant international spillovers and that it is not clear that the marginal contribution to global emissions reduction from actions to cut emission in the Philippines (from an already small base) will be of much significance. This highlights the importance of leveraging (and not excluding) programs with high adaptation-mitigation value such as those that protect global biodiversity and restore and strengthen ecosystems, both of which support the ability of countries to implement climate change adaptation and disaster risk reduction measures. Measures that attempt to demonstrate climate-smart adaptation and sustainable development models at subnational levels may also be of international interest.

24 For instance, one influential assessment, the 'Climate Action Tracker', excludes LULUCF from its analyses of whether NDCs are consistent with a "fair share effort" to holding warming to below 2 and 1.5°C (https://climateactiontracker.org/methodology/indc-ratings-and-lulucf/). Their reasons confirm Crooks et al (2017) who opine that the Kyoto Protocol ensured that "for 20 years of climate change policy making, the focus was on climate change mitigation and what industrialized countries could do on that front" leading to a "prioritization of addressing industrial production and the generation and use of energy, to the disadvantage of land-use matters" (p. 18). A recent analysis has called out CAT and other assessments for "systematic bias in favor of the biggest historical polluters" (https://www.sei.org/about-sei/press-room/bias-found-fair-share-assessments-climate-action/).

25 Article 4 paragraph 7 reads: "Mitigation co-benefits resulting from Parties' adaptation actions and/or economic diversification plans can contribute to mitigation outcomes under this Article." Other relevant provisions are Article 7, paragraph 1 and Article 4, paragraph 19.

26 See Chapters 2 and 5 of IPCC (2018)

3. Sector solutions for power, transport and the blue carbon economy

We discuss three examples of how climate action and ambition can be accelerated and strengthened by organizing actions around the demand for resilience and sustainable development.

Reforming systems to enable the delivery of reliable, secure and affordable power

The energy sector (excluding transportation) accounts for 1659.5 MtCO2e or 49.7 percent of BAU cumulative emissions for 2020 to 2030. Power transformation (primarily, power generation) accounts for 75.6 percent of that, or 37.6 percent of BAU cumulative emissions, which is larger than the share of the transportation or agriculture sectors. However, the sector's projected reduction is just 2.8 percent of its own BAU emissions, or 12.5 percent of the country's mitigation commitment, which represents a disproportionately small share, unconditional or not (in fact, 45 percent is conditional).

The 2.8 percent reduction is computed by estimating a Clean Energy scenario (CES) versus a Reference (REF) or business-as-usual scenario that is detailed in the Philippine Energy Plan (PEP) 2018–2040 (DOE 2018). The objectives of the PEP are (i) to increase the production of clean and indigenous sources of energy to meet the growing economic development of the country, (ii) to decrease the wasteful utilization of energy through the use of energy efficiency tools and strategies, and (iii) to ensure the balance between the provision of reliable and reasonably priced energy services, support for economic growth, and protection of the environment. The first two objectives are consistent with the first two priorities of the NCCAP for sustainable energy – (i) enhancement in the development of sustainable and renewable energy and (ii) the promotion and implementation of energy efficiency and conservation nationwide – and seem to be the central components of the CES (Table 6)

TABLE 6. DEMAND AND SUPPLY OUTLOOK 2018–2040: ASSUMPTIONS FOR REFERENCE AND CLEAN ENERGY SCENARIOS

Scenarios	Assumptions	
	Reference scenario (business-as-usual)	Clean Energy scenario (Alternative scenario)
Energy demand	Response to the requirements of the Build, Build, Build infrastructure program and AmBisyon Natin 2040. Maintain 2.0 percent biodiesel and 10.0 percent bioethanol until 2040.	Assumptions under the Reference scenario, plus the following: ✓ 10.0 percent penetration rate for electric vehicles for road transport (motorcycles, cars, jeepneys) by 2040 ✓ percent increase in aggregate natural gas demand between 2018 and 2040 ✓ 5.0 percent aggregate energy savings from oil and electricity by 2040.
Energy supply	Present development trends and strategies continue. Consider 6,300 MW committed and 33,200 MW indicative power projects as of December 2018. Increase renewable energy (RE) installed capacity to at least 20,000 MW by 2040. Consider the aspirational target of 35.0 percent share of renewables to the generation mix by 2030. Adopt 25.0 percent reserve margin. Assume 70.0 percent load factor for the total Philippines.	Assumptions under the Reference scenario, plus the following: ✓ Highly efficient power technologies; ✓ 10,000 MW additional RE capacity by 2040; and, ✓ 1,200 MW from other emerging technologies by 2035.

Source: PEP, Table 9

To illustrate, the PEP estimates that 71,817 MW (REF) and 75,325 MW (CES) in additional total installed capacity will be required by 2040 relative to installed capacity as of the end of 2018 to meet projected peak demand (Table 7). To meet this, the pathways and commitments highlighted in the PEP show significant increases in variable and flexible capacity by 2040, e.g. 18,500 MW (46 percent) and 3,200 (8 percent) respectively in Luzon; 1,324 MW (14 percent) and 1,340 (14 percent) in Visayas; and so forth (Figure 4).[27] Thus the NDC reflects an increasing utilization of variable and fixed renewable energy and a steadily reducing utilization of coal power.

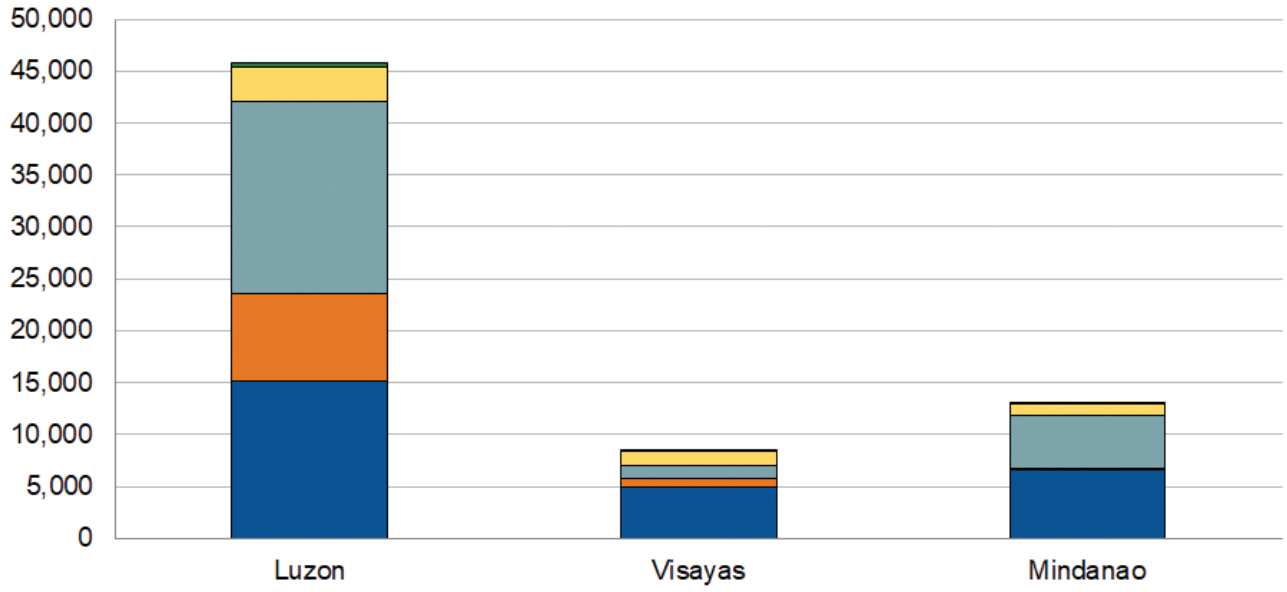
TABLE 7. REFERENCE VS. CLEAN ENERGY SCENARIOS: TOTAL INSTALLED CAPACITIES AND TOTAL CAPACITY ADDITIONS BY 2040 (FOR MILESTONE YEARS)

Fuel type	Installed capacities					Total capacity additions by 2040	
	2018	2019		2020			
	Actual	REF	CES	REF	CES	REF	CES
Coal	**8,844**	**18,900**	**17,850**	**31,470**	**18,150**	**22,626**	**10,506**
Oil-based	**4,292**	**1,993**	**1,993**	**1,993**	**1,993**	**115**	**75**
Natural gas	**3,453**	**4,760**	**4,620**	**18,240**	**21,660**	**14,787**	**18,207**
Renewable	**7,226**	**25,266**	**26,259**	**38,881**	**50,479**	**34,289**	**45,337**
Geothermal	1,944	1,890	1,890	1,770	2,770	697	1,597
Hydro	3,701	9,247	9,920	9,629	12,302	7,659	9,882
Biomass	258	660	660	660	1,550	402	1,292
Solar	896	11,393	11,393	22,050	24,960	21,254	24,064
Wind	427	2,076	2,396	4,772	8,897	4,378	8,503
Other technology	**-**	**-**	**-**	**-**	**1,200**	**-**	**1,200**
Total	**23,815**	**50,919**	**50,722**	**90,584**	**93,482**	**71,817**	**75,325**

Source: PEP, Table 15

27 Variable renewable energy denotes generators with variable output based on the availability of energy resources. Flexible capacity refers to facilities with fast ramping/fast start-up and shutdown capabilities connected directly to the transmission or distribution system that helps manage fluctuations in supply and addresses the variable delivery of renewable energy.

FIGURE 4. 2040 ADDITIONAL NET CAPACITIES PER GRID (MW)*



Baseload	15,220	5,000	6,553
Intermediate	8,400	700	200
Variable	18,500	1,324	5,148
Flexible	3,200	1,340	1,100
Peaking	420	200	40

Source: PEP, Figure 40. * Net of retiring plants between 2018–2040

Questions about the sufficiency of the projected reduction in coal, or the possible inclusion of nuclear power, have arisen. But in our view the more fundamental concern is the inadequate or incomplete alignment of the Clean Energy scenario with the third PEP objective – reliable and affordable power – and this is where we think opportunities for a more substantial NDC have been missed. There is strong unmet demand for reliable, secure and affordable power; and meeting this demand can offer far more synergies than trade-offs with the pursuit of economic growth as well as decarbonization.[28] By pursuing reliable and affordable power primarily, strategic actions such as competition policy reforms (not mentioned in the PEP), investing in decentralized modular renewable energy generation for small island and isolated grids (SIIGs) (highlighted in the PEP but not clearly featured in the BAU or CES), and investing in grid modernization (too narrowly defined in the PEP, e.g. not anchored on system resilience), would become necessary rather than peripheral. All can speed up decarbonization as a co-benefit, along with local economic growth and equity.

Competition policy reforms

The power market in the Philippines has been shaped by regulatory incentives focused almost exclusively on generation capacity rather than system-level resourcing. This has prioritized pricing strategies to mobilize capital for large volumes of baseload capacity – a focus that has led to inflexible capacity payments and dependence on baseload coal (and pending combined cycle gas turbine technology) in the main grid, and diesel generation sets in SIIGs (Annex B: Electricity). On the main grid, the focus on baseload generation has meant that system resilience, including flexibility, reliability and security, has been undervalued. In SIIGs, under current regulation, no incentives exist for electric cooperatives (who are the franchisees/distribution utilities in SIIGs) to procure cheaper sources of energy: the return to electric cooperatives per kWh is fixed regardless of source, with the

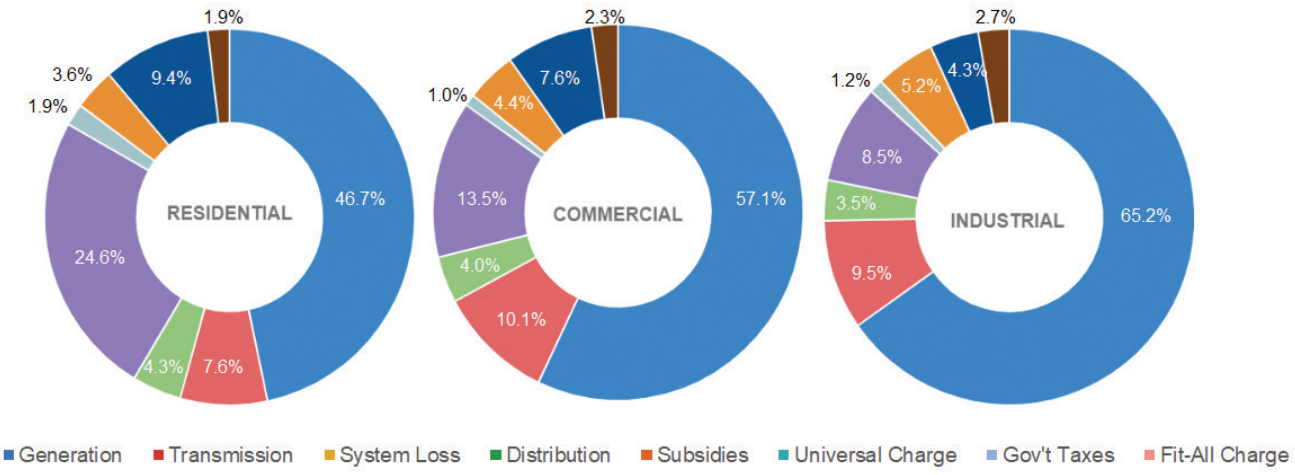
28 Those synergies are also embodied in the third NCCAP priority, 'climate-proofing and rehabilitation and improvement of energy systems infrastructures [sic]', which we interpret broadly to mean improving systems' resilience. A fourth NCCAP priority is the "promotion and adoption of environmentally sustainable transport" which, in the NDC, is included under transportation and not energy.

National Power Corporation Small Power Utilities group (SPUG) paying for any difference between a 'fair price' that SPUG sets and the purchase price of diesel in the area. SPUG payments are financed by universal charges levied on consumers in the main grid.

Competition policy reforms can significantly accelerate the energy transition in the country's main grid jurisdictions and substantially help realize the government's affordable electricity objectives more quickly. A key reform is to make fixed price bids, carve out clauses and uniform force majeure provisions mandatory in power purchase contracts. Mandatory fixed price bids would correct the automatic fuel price pass-through enjoyed by fossil fuels, particularly coal. Currently coal plant proponents bid low to secure tenders but are allowed to automatically pass on higher prices to the consumer once their plant begins operating commercially, effectively passing on growing global volatility risks in coal to taxpayers. Relatedly, carve out clauses would curtail contracted fossil supply when more affordable variable and firm renewable energy power options are available. Without mandatory carve out clauses, DUs – and their customers – are locked into paying for coal power whatever the fluctuation and however frequent the price changes, for the duration of the contract period. Uniform force majeure provisions would distribute risks, which are currently shouldered largely by DUs, particularly smaller DUs, and ratepayers.

The impact of these reforms will be felt most tangibly in a drop in electricity rates to main grid customers, where at present the largest component by far is generation costs at 46.7 percent of total for households, 57 percent for commercial and 65.4 percent for industrial customers (Figure 5).

FIGURE 5. AVERAGE SHARE (%) OF COST COMPONENTS OF ELECTRICITY RATE PER CUSTOMER, 2017–2018



Source: PEP, Figure 24

Competition policy reforms are particularly important to realize gains from changing market conditions for fossil fuels. In the Philippines, we are seeing thinning margins in fossil fuel generation, such as coal generation, due to a variety of reasons including higher operating costs incurred from insurance procurement or renewal challenges, as insurer policies on coal underwriting and investing are aligning with the global trends on sustainability and ESG (environmental, social and governance solutions).[29] Retail competition in the power sector and the interaction of renewable energy (and storage) cost deflation have also impacted the future profitability of fossil fuels.

29 While the Paris Agreement has not necessarily directly contributed to Philippines power sector development, the indirect impacts including global banks, insurers and corporations with 100% renewable energy targets, net zero targets, demand for ESG solutions or fossil fuel investing restrictions, have contributed to the increasing cost of operations of fossil fuel plants.

Investments in decentralized modular RE generation for small island and isolated grids (SIIGs)

Modular RE generation for SIIGs will benefit over half the population who are currently served by under-funded electric cooperatives that rely on diesel. The affordability problem is acute: prices are at levels that would never be accepted in the main Luzon grid. But efficiency gains from changing market conditions – RE is now roughly 60 percent cheaper than diesel-fired power – are not enjoyed by consumers in SIIGs.

It would also benefit the missionary areas currently assigned to the SPUG. As it is, just 14 percent of SPUG designated areas receive 24/7 electrification. The corporation has asked for an increase in cross-subsidies collected from all households to rectify this, but what is really needed is a financially sustainable solution that enables affordability and price stability and improves energy security. Should SPUG shift away from diesel, allowing a market-led transition to RE, the savings realized from fuel alone can be up to PHP 13.5 billion (USD 275 million) annually.

What is needed is timely investment and procurement support for transitioning the energy systems in SIIGs to more cost-effective technologies. This would foster more reliable and competitive power and, more importantly, generate employment opportunities. First-time access to electricity in rural areas is associated with a 36 percent increase in per capita income and a 34 percent increase in per capita spending (Navarro 2013). Reforming SIIGs and reducing the need for cross-subsidies to them will also mean social-economic benefits to main island consumers.

Despite a clear economic and financial case to transition to modernized technologies [30] as well as a clear direction set in the PEP towards low-carbon and distributed RE resources, a number of issues have held back investments in SIIGs. The current regulatory design that supports subsidized diesel generation sets is one. Other challenges are gaps in technical capacity and experience among stakeholders, regulatory complexity, a lack of public engagement with main island ratepayers regarding SIIGs reforms, and a dearth of tailored financial products, particularly with respect to small-scale and remote island energy projects.

Grid modernization

In the PEP, modernization includes infrastructure, software (e.g. applications to enable automated use of renewable energy, forecasting, etc.), and training programs, with a focus on emerging grid modernization technologies and deployment of distributed energy resources. However, grid modernization may be expanded from infrastructure, software and training, towards a framework that encourages flexibility, reliability, resilience, sustainability, affordability, and security.[31] Coupled with competition policy reforms, grid modernization can produce compelling outcomes. [32]

To have a modernized grid means to be resilient against extreme weather events and flexible to deal with shifts in demand. Resilience is a growing issue as the increasing intensity and frequency of extreme weather events impacts power sector infrastructure across generation, transmission and distribution. For example, electric cooperatives have been hit with at least PHP3.16 billion (US$65 million) in infrastructure damages over the last six months of 2020 due to climate-fueled disasters. As it is, however, the sector-based NDC considers all energy resilience policies and measures (such as the conduct of impact and vulnerability assessments of energy systems and infrastructure, integration of structural adaptations into the structural design and strengthening of

30 To provide an example, and using an estimation by Ocon and Berthau (2019), the near-term investment requirement based on hybridizing 276 existing NPC-SPUG plants, could be about USD 313 million, with an expected return for investors ranging between 10 and 15 percent. The RE share for plants with 24 hours of power is 25 percent while plants that deliver less than 24 hours of power are assumed to have an RE share of 55 percent.

31 The outcomes of a modernized grid include flexibility through cost reductions associated with forecast errors; reductions in losses associated with renewable energy curtailment and/or reductions in price spikes; flexibility to adapt to economic variabilities and take advantage of the arc of new technology development; reliability to maintain delivery of electric services, quality of power and reduced interruption by distribution systems; resilience to adapt to changing conditions such as a set of defined hazards; sustainability to reduce health and environmental costs; affordability to not exceed a customer's willingness and ability to pay; and security to prevent external threats and malicious attacks including reliance on unstable or volatile supply.

32 According to the PEP, "Initial results of the transmission expansion scenario models captured the integration of more than 30 GW of wind and solar in CREZs by 2040." CREZs are Competitive Renewable Energy Zones established by DOE Department Circular 2018-09-0027. As described, "The CREZ involves a proactive transmission planning approach, which aims to connect CREZ to the power system… [which] open the opportunities for private sector development and reduce investment barriers by directing transmission development and RE developers to the country's most promising RE opportunities."

infrastructure, and implementation of infrastructure reinforcement measures) as conditional, and their impacts, including mitigation co-benefits, have not yet been assessed or reflected in energy sector targets.[33]

Resilience goes beyond physical restoration; the modern grid should reflect not only the need of consumers for dependable and affordable power, but also their aspirations for a cleaner, healthier, and safer environment. A modernized grid which aims for increased flexibility and stability would integrate market opportunities such as a new ancillary services market. Energy storage systems, such as batteries, flywheels, and compressed air energy storage, would also have an important role in improving the stability and reliability of the electricity grid. The strengthening of substations, transformers, low or medium voltage lines, and other associated components would enable SIIGs to increase the use of renewable energy.

On energy storage systems, the PEP makes mention of over 2 GW of pumped hydro storage. However, there are opportunities beyond pumped storage that can contribute to reserve resources – specifically battery energy storage systems (BESS), the economic viability of which the PEP currently underestimates. For instance, the PEP assumes that storage batteries will complement variable renewable energy only by the 2040s, i.e. it does not mention BESS in its BAU or CES. However, at the start of 2021, 13 power projects in Luzon obtained financing and are supported by battery storage, with their combined capacity at 320 MW. Also in 2021, the San Miguel Corporation in the Philippines installed 40 MWh as part of a 470 MWh installation. The PEP can therefore be improved by including realistic cost trajectories of energy storage systems like batteries, flywheels, and compressed air energy storage in both the BAU and CES.[34]

A refinement of the grid modernization strategy can be made possible with support from the following analytics: (i) Cost-benefit analysis of the business as usual vs. the modernized grid (including distributed systems vs centralized systems); (ii) Cost-benefit analysis of hybridizing all NPC-SPUG assets to renewable energy with grid strengthening; (iii) Audit of the current grid plans vs a modernized grid; and (4) Technical and market strategies to build power system resilience that would include technology and investment needs, as well as estimates of socio-economic outcomes. Technical and market strategies would include grid and ancillary service modernization market design, including policy reforms to attract technology transfer and international capital.

Connectivity and mobility investments in urban areas have always been driven by a concern for the movement of motor vehicles rather than the movement of pedestrians. The severity of the mobility problem was exacerbated during the COVID-19 pandemic, when the suspension of public transport from March to May 2020 left households who did not own cars (an estimated 88 percent of households in and around metro Manila) without mobility options (ALMEC Corp 2015). Supply chains were also disrupted causing PHP 67 billion in losses for the agriculture sector as traders were unable to purchase produce for Metro Manila (Yu et.al, 2020).

33 2nd Multi-Stakeholder Consultation for the First Philippine Nationally Determined Contribution (NDC), 03 February 2021, Summary of the Proceedings

34 We are informed that an updated National Renewable Energy Program (NREP) 2020-2040 is now pending approval and includes BESS in its mix of technologies.

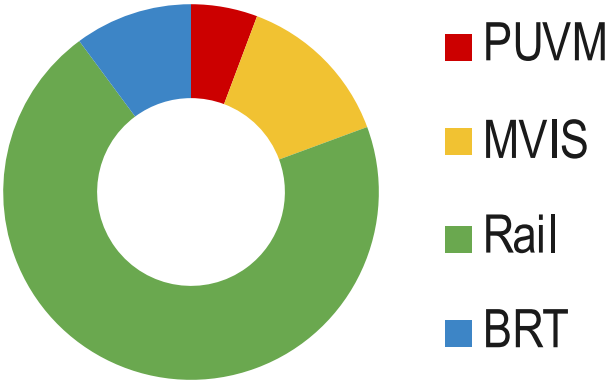
At the same time, inadequate and ineffective transport planning and fragmented public transportation management have led to traffic congestion, loss of productivity, increasing air pollution and high energy use, especially in highly urbanized cities (HUC) in the country. Despite the pandemic, metro Manila's traffic congestion rate for 2020 was at 53 percent (meaning a 30-minute trip took 53 percent longer to complete), tying with Bogota and Mumbai as the second worst city for traffic congestion in the world; metro Manila was tied for first place in 2019 with a congestion rate of 71 percent.[35] Traffic congestion in metro Manila is estimated to cost road users PHP 6.0 billion by 2030; low-income households spend 20 percent of their monthly income on transport (ALMEC Corp. 2014). Emissions from mobile sources, mainly motorized vehicles, account for the bulk of air pollutants (74 percent), higher still in Metro Manila at 81 percent.[36]

Transportation is the third largest source of GHG emissions in the country, after electricity and agriculture, and within transport, the road sector makes the largest contribution.[37] The road sector accounted for 90.49 percent of the sector's emission in 2010. Its emissions are projected to increase to 80.464 million MtCO2 in 2030, representing 92.38 percent of the sector's emissions, and to 155.956 MMtCO2 in 2040, representing 93.91 percent of the sector's emissions.[38]

The NDC of the transportation sector is relatively small versus its BAU emissions. However, at their core, programs listed under the NDC are driven by development and adaptation objectives, and not by the need to mitigate climate change, explaining why they are wholly unconditional.[39] The proposed NDC covers transport fleet modernization and inspection, modal shift, and infrastructure development. Specifically, it includes four programs: The Public Utility Vehicle Modernization Program-1 (PUVMP-1), Motor Vehicle Inspection System-1 (MVIS-1) Program, Rail Projects, and Bus Rapid Transport (BRT) Program under the national government's Build-Build-Build Flagship Program (Figure 6). Rail projects account for the largest share of projected emissions reductions.

FIGURE 6 TRANSPORT SECTOR MITIGATION OPTIONS

PROGRAM	GHG (CO2) emissions Reduction in million tonnes
PUVM	0.57
MVIS	1.36
RAIL	7.02
BRT	1.01
TOTAL	**9.96**



Source: DoTR, presented 3 February 2021

Notably, three out of the four programs are focused on reforming the public transport system, and also aim to shift transport modes from private vehicle use to multi-modes such as public transport. Public transport is the optimal arena for delivering transport efficiency, as more people are 'moved' per unit of vehicle and there can also be a phased-in conversion towards more fuel-efficient public transport fleets. This also addresses pressures of congestion and reduces competition for space and urban sprawl.

35 The TomTom Traffic Index covered 416 cities across 57 countries on six continents (http://tomtom.com/en_gb/traffic-index.) in 2020. For 2019, see https://www.tomtom.com/press-room/general/26026/tomtom-traffic-index-global-traffic-congestion-up-as-bengaluru-takes-crown-of-worlds-most-traffic-congested-city/.

36 Department of Environment and Natural Resources. "National Air Quality", 2018.

37 World Research Institute. "Climate Watch Historical GHG Emissions," (2018). https://www.climatewatchdata.org/ghg-emissions

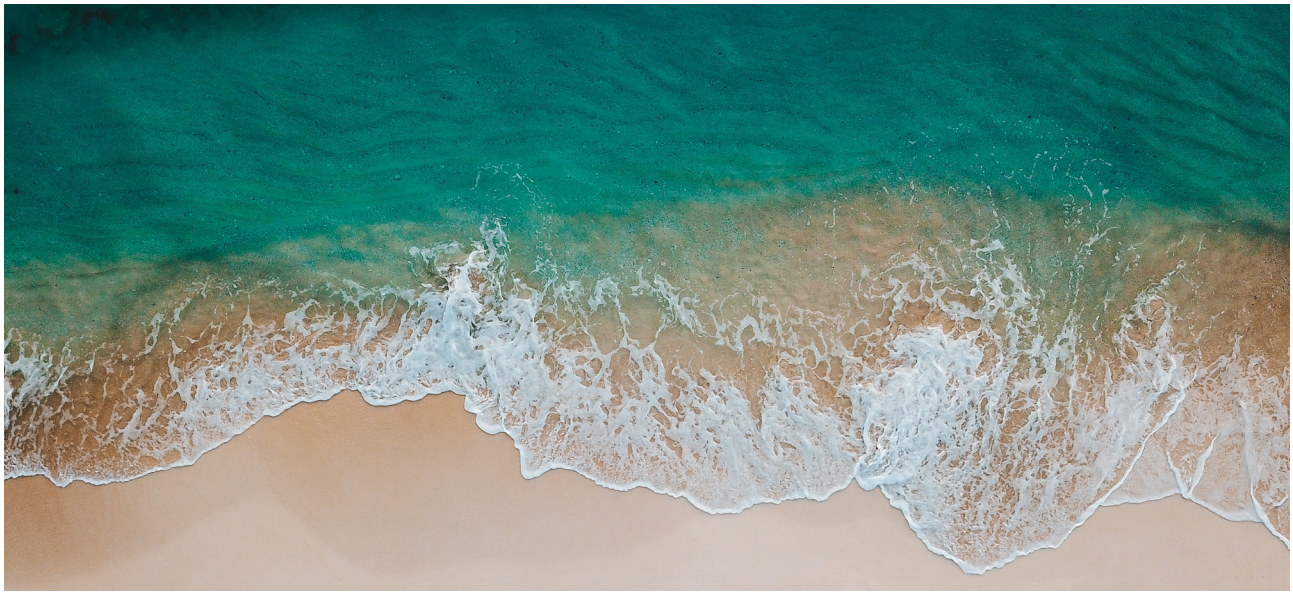
38 Department of Transportation (DoTr), "Transport Sector Nationally Determined Contribution," Presentation at the 2nd Multi-stakeholder Consultation for the First Philippines Nationally Determined Contribution, 3 February 2021. Projections assume growth projections indicated in Ambisyon 2040.

39 Transport NDC programs and measures are aligned with the NCCAP 2011–2028.

For example, the PUVMP aims at not only modernizing the public transport fleet (e.g. replacing outdated engines with more fuel-efficient and electric vehicle units) but also improving travel safety and accessibility for the commuting public, especially vulnerable groups (women and persons with disabilities).[40] The PUVMP also pursues equity by formalizing public transport players (through franchise and route rationalization) and eliminating the 'boundary system'.[41] Trade-offs are still expected and need to be addressed, however. Apart from the high upfront cost of fuel-efficient public transport units, route rationalization in Metro Manila would mean a 22 percent reduction in the jeepney fleet (Mettke et. al 2016) and transport groups have underscored the economic displacement of jeepney drivers. [42]

It should also be emphasized that the sector considers any reduction in GHG emissions resulting from its programs to be secondary benefits, or co-benefits, of a more strategic development agenda for the transport sector, which is the development of an environmentally friendly, people-centred, accessible transport system. This is evident in three policy frameworks developed since 2010, namely the National Environmentally Sustainable Transport Strategy (NEST), the 2017 National Transport Policy (NTP), and the 2020 Philippine Urban Mobility Program (Annex C: Transportation). Transport and climate-smart development components in the NCCAP 2011–2028 are based on the NEST. Consequently, the programs listed under the transport sector's NDC, which are aligned with the NCCAP, are also aligned with the NEST.[43]

Other potential measures, including integrated terminal exchanges and greenways projects, continue to be considered by the sector. In this context, we suggest that the Philippine Urban Mobility Program (PUMP), which focuses on safe and efficient subnational mobility, be considered a particularly relevant and practical opportunity as it can directly advance local SDGs while optimizing opportunities for GHG emissions avoidance/reduction in the process. PUMP aims to unlock opportunities for prosperity by providing a framework for the national government to support cities and urban towns to improve mobility with inter-connected, multi-modal means (GIZ 2019). Among others, PUMP features (i) the delivery of improved facilities for walking and cycling, (ii) the modernization of public vehicles and rationalization of routes, (iii) actions to improve the efficiency of urban freight and logistics, and (iv) the promotion of transit oriented development. The PUMP is expected to deliver tangible sustainable development benefits to travellers and households – ultimately more compact, liveable and prosperous communities (Table 8) – but also co-benefits in the form of reduced GHG emissions estimated at 6 to 10 percent of total accumulated transport emissions between 2020 and 2030 (Figure 7).



40 For instance, by equipping the fleet with vehicles with lowered step-through entry point and CCTV cameras, among other strategies.

41 Pontawe and Napalang (2018). The 'boundary system' is a vehicle rental arrangement among transport operators wherein drivers are compensated after meeting the 'boundary' or agreed fixed amount remitted by drivers to transport operators after a day of transport operations.

42 Anna Bueno. "The Modernization Plan is Changing Jeepney Drivers' Lives Forever," CNN Philippines (December 11, 2020). https://cnnphilippines.com/life/culture/transportation/2020/12/11/jeepney-modernization-deadline.html

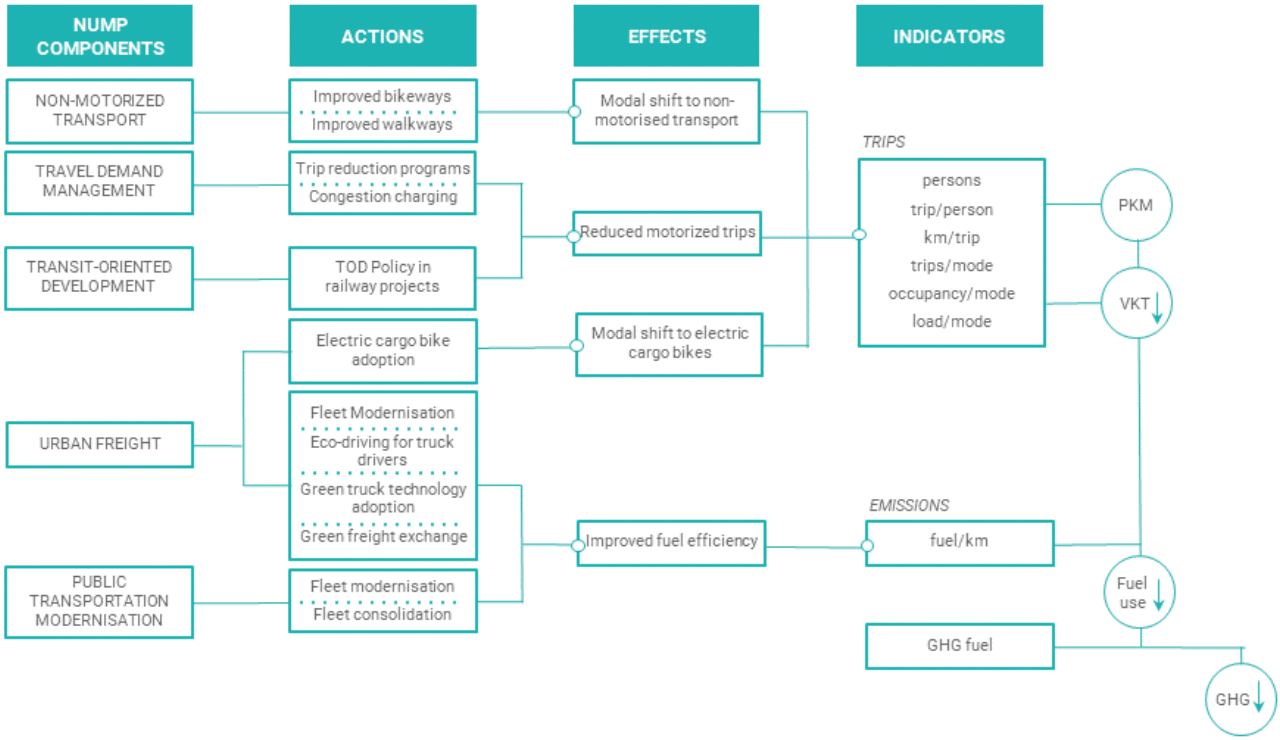
43 For example, PUVMP1 supports NEST strategies (repeated in NCCAP) on cleaner fuels (Euro 4 adoption); BRT is a component under Public Transport Planning and Travel Demand Management; MVIS is an explicit strategy of NEST and also indicated in NCCAP as Vehicle emission control, standards and I/M. Also PUVMP, NMT and Travel Demand Management which are in PUMP are explicit in NEST strategy.

TABLE 8. QUALITATIVE ASSESSMENT OF SUSTAINABLE DEVELOPMENT BENEFITS FROM PUMP (SAMPLE ONLY)

Benefits	Relative importance	Justification
Improved non-motorized transport (NMT) conditions	High	Improved user convenience and comfort Improved accessibility for non-drivers, which supports equity objectives Higher property values
Increased NMT transport activity	High	User enjoyment Improved public fitness and health Increased community cohesion which tends to increase local security
Reduced automobile travel	High	Reduced traffic congestion, Increased traffic safety Energy conservation, pollution reduction Economic development Road and parking facility cost savings Consumer savings
More compact communities	High	More liveable communities Improved accessibility, particularly for non-drivers, which supports equity objectives Reduced sprawl costs Open space preservation Transport cost savings

Source: GIZ (2019), Table 25

FIGURE 7. THE CAUSAL CHAIN FOR GHG EMISSIONS REDUCTION DUE TO THE PHILIPPINE URBAN MOBILITY PROGRAM



Source: GIZ (2019), Figure 9

Cities and urban centres are the nexus of implementation of PUMP. Hence, these measures require buy-in, ownership and leadership from cities and local governments. **It is in the integration of PUMP elements into local development plans that climate action can be accelerated, with decarbonisation as a co-benefit, on top of contributing to the achievement of the SDGs in each of the participating cities and urban centres.**

Integration is supported by Omnibus Franchising Guidelines (2017) which give importance to local-level transport planning and the use of the local government's local public transportation route plans (LPTRPs) in the issuance and approval of transport franchises.[44] The recent 'Mandanas' ruling of the Supreme Court also supports local integration and the full devolution of functions for local development, including transport planning, to cities and local governments by increasing internal revenue allocations to them. In other words, it is an opportune time for cities and provinces (as consolidating administrative political units) to reconfigure their transportation and mobility plans as key components of comprehensive land-use plans and comprehensive development plans, guided by PUMP and consistent with the vision of a "safe, secure, reliable, efficient, integrated, intermodal, affordable, cost-effective, environmentally sustainable, and people-oriented national transport system."[45]

The primary challenge of PUMP will be finding innovative processes and arrangements around the institutional fragmentation in transport planning and management between and within national/regional agencies and local government units (provinces, cities, municipalities). There are also technical capacity issues, especially for cities and local government units, in the generation of needed baseline information to inform and integrate transport planning in land-use planning and local development planning

The rollout of the PUMP would benefit from the following support: (i) quantification of potential impacts on SDGs at the national level, (ii) subnational modelling of transportation and mobility options and their sustainable development and mitigation co-benefits taking into account geography (e.g. landlocked or island provinces, among other variations), types of urban forms and cities (e.g. metropolitan areas, component cities), and (iii) piloting components of PUMP at province and city levels including, among others, the piloting of 'green routes', i.e. formulating locally appropriate definitions of green routes, as an integral part of province/city LPTRPs.[46]

Ultimately, an efficient transport system plays a key role in delivering prosperity and in building resilience of urban systems, quite apart from benefits in GHG and non-GHG emissions reduction. The Philippines' transport NDC is a means to that end.

Empowering coastal blue carbon ecosystems for coastal risk-reduction, food security and national and global climate risk resilience

The Philippines is a maritime nation with a coastline of 36,289 km, the fifth longest in the world, and marine ecosystems that comprise anywhere from 66 to 86 percent of the country's domain. [47] Approximately 60 percent of the country's population live in coastal zones, including the majority of the country's poor (fisher folk and subsistence farmers), who depend on local ecosystems for food and income. [48] Approximately 10 million Filipinos rely directly on small-scale fishing to meet their household food needs (Courtney et al. 2016), 70 percent of the protein requirements of the Filipinos for nutrients, minerals, and essential fatty acids are derived from fish

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44 Department of Transportation. "Department Order No. 2017-11: Omnibus Guidelines on the Planning and Identification of Public Transport Services and Franchise Issuance," (2017) https://ltfrb.gov.ph/wp-content/uploads/2017/11/DO-2017-011.pdf. See also Department of Transportation, Department of the Interior and Local Government. "Joint Memorandum Circular No. 01, series of 2017: Guidelines on the Preparation and Issuance of Local Ordinances, Orders, Rules and Regulations concerning the Local Public Transport Route Plan (LPTRP)," (2017). https://www.dilg.gov.ph/PDF_File/issuances/joint_circulars/dilg-joincircular-2017719_433697831c.pdf

45 As articulated in the National Transport Policy. See https://www.neda.gov.ph/the-national-transport-policy-and-its-implementing-rules-and-regulations/.

46 There is no official definition of a 'green route', although proposals from the Senate and House narrowly define them as "public transportation routes created or identified by LGUs and approved by the DOTr to be exclusively traversed by electric public utility vehicles (PUVs)." The DOTr is currently implementing a project ('Promotion of Low Carbon Urban Transport Systems in the Philippines Project') that defines green routes as thoroughfares for sustainable transport and mobility options and that is expected to produce a framework and criteria for green routes.

47 The Philippines has a land area of roughly 300,000 km2 (including inland bodies of water), an archipelagic baseline that includes 590,000 square kilometers of water and an exclusive economic zone covers 2,263,816 square kilometers of sea. Depending on how one reckons it, marine ecosystems would comprise anywhere from 66 to 86 percent of the country's non-aerial domain. (Figures are from http://iilss.net/philippines-maritime-claims-about-archipelagic-baselines/ and http://www.seaaroundus.org/data/#/eez/608?chart=catch-chart&dimension=taxon&measure=tonnage&limit=10)

48 Around 832 municipalities, 57 cities and 64 provinces are considered coastal (LLarina 2019). Among the basic economic sectors, farmers and fisherfolk and their households have the highest poverty incidence at 31.6 and 26.2 percent respectively (https://psa.gov.ph/content/farmers-fisherfolks-individuals-residing-rural-areas-and-children-posted-highest-poverty)

(Santos et al. 2011), and over 1.6 million Filipinos depend on the fishing industry for their livelihood (ibid). In 2018, the Philippines was the eighth largest producer of fish (including fish, crustaceans, mollusks, and aquatic plants) and the fourth largest producer of aquatic plants (including seaweeds) in the world (BFAR 2020).

The seas of the Philippines are also extremely rich in biodiversity.[49] The Philippines sits at the apex of the Coral Triangle, which supports an array of biodiversity and is recognized as the global epicenter of marine biodiversity (Santos et al. 2011). Philippine reef systems span roughly 26,000 square kilometers – the second largest in Southeast Asia (SEA) – harboring about 500 species of stony coral, 42 species of mangrove, and 16 species of seagrass (ADB 2014). Total area to mangrove forests and seagrass meadows is roughly 0.26 million hectares and 97,800 hectares respectively.[50] The Philippines' biodiversity is a key resource because healthy ecosystems "will be more resilient to climate change" and "must lie at the center of any adaptation policy."[51]

Despite the diversity and vastness of the country's marine resources and their role in human survival and the quality of life, the marine economy has received relatively scant attention in national development plans and programs; the bias of public investments in the agriculture sector has always been in crops, specifically in rice.[52] Thus, the volume of commercial and marine fisheries production has been on the decline, pulling down overall fishing production even as inland fisheries and aquaculture have shown slight increases.[53] The decline is largely the result of the degradation of coral reefs which serve as habitat for marine organisms due to siltation from deforestation, destructive fishing practices, overharvesting of mangroves, lime and sand quarrying, and plastic pollution, among other factors.[54]

The degradation of coastal ecosystems is of particular concern given their multiple roles, especially in climate change adaptation and mitigation. Coastal wetlands are among the most productive ecosystems, providing services that not only underpin fish stocks and maintain food security, but also protect coral reefs and populated coastal lowlands from erosion and flooding, among other ecological and socio-economic benefits to local communities and national economies (Crooks et al. 2017, Quevedo et al. 2021). Tamayo et al. (2018) estimate that reef ecosystem services in 15 regions have a total economic value of US$4 billion/year, or US$140,000/km/year.[55] Azanza et al. (2017) estimate the economic contribution of coral reefs, mangroves and seaweed ecosystems (e.g. fisheries, tourism, shoreline protection nursery role, biodiversity, carbon sequestration, research) to be US$966.6 billion in 2007 prices (Table 9). Mangrove loss alone has resulted in increases in flooding to more than 267,000 people per year between 1950 and 2010. Restoring these mangroves would bring more than US$450 million/year in flood protection benefits (WAVES 2017).

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49 The Philippines' biodiversity extends beyond its seas of course. The country is considered one of 18 mega-biodiverse countries of the world, containing two-thirds of the earth's biodiversity and between 70 percent and 80 percent of the world's plant and animal species (https://www.cbd.int/countries/profile/?country=ph). The Philippines' biodiversity provides several ecosystem services including food, water, energy sources, pharmaceuticals, biomass fuels, carbon sequestration and climate regulation, crop pollination, cultural and spiritual inspiration and ecotourism value (https://www.usaid.gov/philippines/energy-and-environment/bwiser). The Philippines is also one of the world's biodiversity hotspots, however, with at least 700 threatened species.

50 The figure for mangroves is provided by Crooks et al. (2017). The figure for seagrass is from Quevedo et al. (2021). The mapping of seagrass has so far been limited as remote sensing techniques generally do not work due to the constant presence of water (Crooks et al. 2017). Blanco et. al (undated) reports that based on NAMRIA coastal habitat layers, there are 388,867 hectares of seagrass/seaweeds, but seagrass and seaweeds/macroalgae are not distinguished.

51 https://ec.europa.eu/environment/nature/climatechange/index_en.htm

52 Driven by a rice self-sufficiency policy, rice cultivation claimed anywhere between 47 and 52 percent of the agriculture budget, excluding irrigation, from 2000 to 2011. With irrigation, the share of rice was about 77 percent (HDN 2013, p. 11 and footnote 31). The share of rice has fallen to 48 percent including irrigation since the rice tariffication law of 2019 (WB 2020).

53 Philippine Statistical Authority, Fisheries Situation Report, January to March 2021 (https://psa.gov.ph/fisheries-situationer). See also https://www.bworldonline.com/philippine-fisheries-dying/

54 Santos et al. (2011) and UNEP et al (undated) accessed at https://www.sea-circular.org/country/philippines/. Fishermen have noted that plastics are smothering coral reefs, resulting in lower fish yields and ecosystem-wide impacts.

55 The estimate included potential reef fisheries value, willingness-to-pay biodiversity value and tourism value.

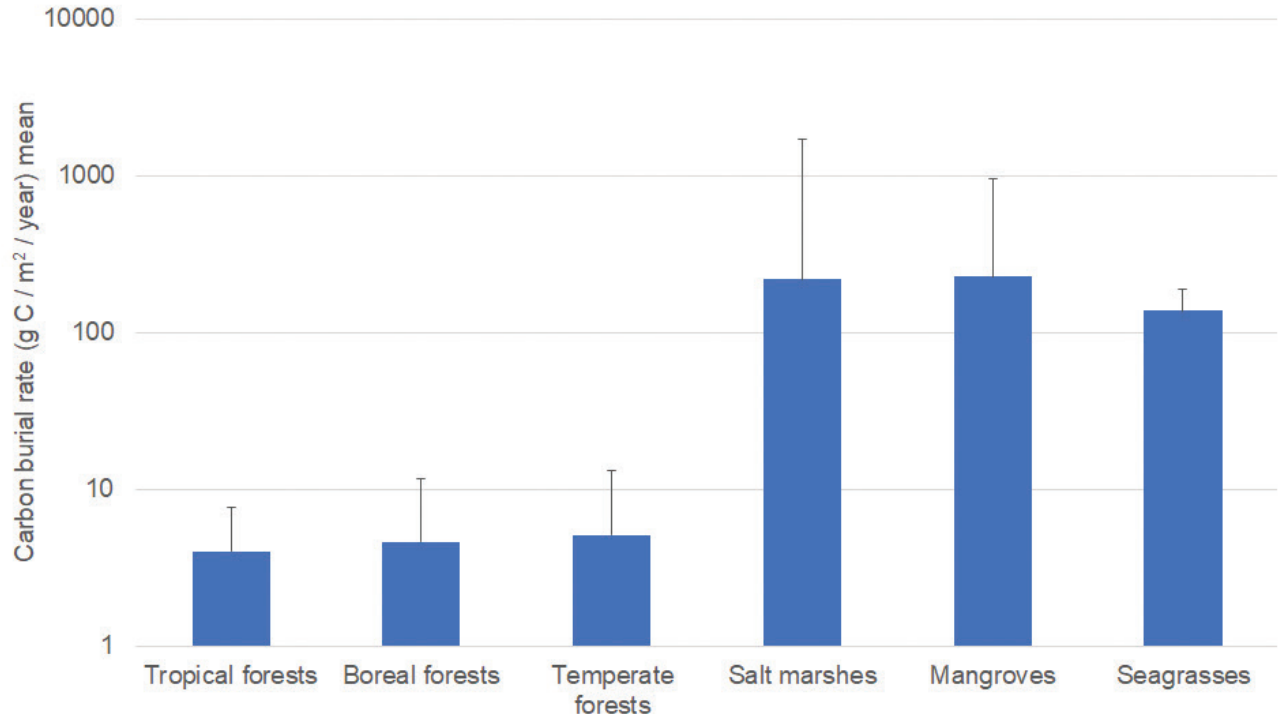
TABLE 9. ESTIMATED TOTAL MONETARY VALUE OF MARINE ECOSYSTEMS* (IN US$ BILLION, 2007 PRICES)

Marine ecosystem	Total monetary value
Coral reefs	915.847
Seagrass	2.828
Mangroves	47.918
Total	966.594
Note: continental shelf*	533.808
Total including continental shelf	**1,500.40**

Source: Azanza et al. 2017, Table 5.

The extent to which communities and economies will be able to adapt to climate change impacts will hinge critically on the sustained supply of ecosystem services from coastal wetlands (among other critical ecosystems) which sustain life and livelihoods. But coastal wetlands also play a critical role in the regulation of global climate itself, buffering the adverse effects of changing (increasing) world CO2 levels in the atmosphere. Specifically, mangroves, seagrasses and tidal marshes – collectively known as coastal blue carbon ecosystems (BCE) – sequester carbon dioxide from the atmosphere, building stocks of carbon in their biomass and soil material; the sequestration rates of BCE far surpass that of terrestrial forests (Figure 8). In turn, when degraded or destroyed they can become a significant source of GHG emissions, releasing "thousands of years of sequestered carbon over a period of years to decades." (Crooks et al. 2017, p.1).

FIGURE 8. CARBON SEQUESTRATION RATES COMPARED*



Source: Macleod et al. 2011, Figure 5 * Mean long-term rates of C sequestration in soils. Error bars indicate maximum rates of accumulation. Note y-axis in logarithmic scale

In other words, BCEs are not just a critical local and national resource but a critical global resource as well. Consequently, improving BCE management – their conservation, protection and restoration – presents a strategic opportunity for the Philippines to advance not only the wellbeing of coastal communities but also climate-risk resilience and sustainable development at both national and global levels.[56] Placing BCE management at the center of the country's NDC for both 'adaptation' and 'mitigation' will be a far more substantial contribution of the country to global climate risk-resilience and sustainable development under the Paris Agreement.

As it is, however, this strategic opportunity has not yet been operationally realized, much less seized, by the Philippines. On the one hand, the importance of coastal and marine ecosystems to both adaptation and mitigation, including the potential of blue carbon, was explicitly articulated in the country's INDC, reflecting the NSFCC, NCCAP, and First and Second National Communications to the UNFCC (in 1999 and 2014 respectively) which were formulated before it. On the other hand, the Philippine Master Plan for Climate Resilience Forestry Development 2016–2028 (PMPCRFD) allocated just 4.4 percent of its 'Strengthening Resilience of Ecosystems' budget to "mangrove rehabilitation/plantations development" (Table 10) – or only 1.3 percent of the total PHP135.16 billion budget projected for the 13-year PMPCRFD. Other components of the PMPCRFD largely focused on terrestrial forests and their goods and services.[57] This fairly marginal treatment of mangroves is reflected in the country's NDC, where (as earlier mentioned) FOLU as a whole is excluded and mangroves rehabilitation is inserted under the agriculture sector NDC as a conditional measure.

TABLE 10. INDICATIVE BUDGET 2016–2018, PMPCRFD COMPONENT A, "STRENGTHENING RESILIENCE OF ECOSYSTEMS AND COMMUNITIES TO CLIMATE CHANGE", AND SHARE TO MANGROVE REHABILITATION/PLANTATIONS DEVELOPMENT

Programs/Activities	Budget (thousand pesos)			
	2016	2017–2022	2023–2028	Total
Watershed Management Planning and Forest Land Use Planning Program	**204,800**	**1,372,900**	**104,000**	**1,681,700**
1 Training on vulnerability assessment, adaptation planning, IWM, FLUP	10,200	83,100	0	**93,300**
2. Vulnerability assessment	61,000	237,000	80,000	**378,000**
3. Adaptation planning	30,600	89,400	24,000	**144,000**
4. Identification/ assessment of other watersheds	0	504,400	0	**504,400**
5. Formulation of integrated watershed management plans	28,000	103,000	0	**131,000**
6. FLUP formulation w/ LGUs	75,000	356,000	0	**431,000**
Forest protection and rehabilitation	**3,649,047**	**17,015,514**	**15,683,880**	**36,348,441**
1. Protection of existing forests and Plantations	813,214	5,385,660	6,129,804	**12,328,678**
2. Rehabilitation of degraded areas in protection forests	613,134	1,785,756	1,530,000	**3,928,890**
3. Mangrove rehabilitation/ plantations development	720,751	683,022	288,000	**1,691,773**
4. Agroforestry development	1,501,948	9,161,076	7,736,076	**18,399,100**
REDD+ Implementation	9,000	60,000	122,000	**191,000**
Total	**3,862,847**	**18,448,414**	**15,909,880**	**38,221,141**

Source: PMPCRFD Table 15.

Component A shown in this table accounts for 28.3 percent of the total PMCRFD budget. IWM: integrated water management; FLUP: forest land use plan; LGU: local government unit; REDD: reducing emissions from deforestation and forest degradation.

56 Acknowledging Crooks et al. (2017) which argues the strategic opportunity for east Asia.

57 PMPCRFD Table 23 lists all components, their estimated budgetary requirements and potential fund sources.

It is, of course, the protection, conservation and restoration of BCE – an ecosystem-based approach – that will matter to climate change adaptation and mitigation, and not simply replanting which seems to have been the approach over the last decade, with wasteful results.[58] Among others, an ecosystem approach would not isolate mangroves from seagrasses and would recognize the crucial role of blue carbon among the ecosystem services they both provide; "blue carbon" is not found in the PMPCRFD. An ecosystem-based approach would also enforce the prohibition against the conversion of mangroves to fishponds or any other purposes as well as enforce the reversion back to mangroves where this has occurred.[59] The implementation of greenbelts would also be critical.

The strategic opportunity to advance global climate change commitments through the conservation, protection and restoration of BCE can be shared by many countries in the region. While BCE are heavily concentrated in a few countries and regions, Southeast Asia is its "unambiguous geographic global center." [60] On mangroves alone, five of the top eleven mangrove-holding countries globally are in the region, specifically, Indonesia, Malaysia, Philippines, Thailand and Vietnam (Table 11), with associated large amounts of mangrove biomass and soil carbon stocks (Table 12). However, some of the greatest deforestation rates are also occurring in the region (Table 13), primarily through aquaculture but also palm oil production. As a first approximation, Crooks et al (2017) estimate that around 3.7 billion tonnes CO_2 have emitted from converted mangroves and tidal marshes across the region, and annual carbon sequestration of around 6 MMt CO_2 has been lost.[61]

TABLE 11 ESTIMATED MANGROVE AREA IN 2000 USING DIFFERENT TECHNIQUES AND COVERAGE IN 2012 (N HA)

Country	2000				2012	
	Giri et al.	MFW	BIOME	WAM	MFW	BIOME
Indonesia	2,707,572	2,407,313	4,664,152	2,986,392	2,332,429	4,305,957
Malaysia	558,581	496,868	873,795	709,727	472,584	770,043
Philippines	259,037	209,105	211,515	257,780	206,424	208,761
Thailand	245,121	193,345	436,165	250,057	188,633	399,979
Viet	215,529	71,640	128,791	101,497	70,817	126,293
Cambodia	47,572	33,839	75,339	60,189	32,322	65,375
China	17,910	3,223	3,580	20,118	3,155	3,491
Brunei	11,089	10,423	14,652	17,134	10,341	14,345
Timor-Leste	1,067	857	853	n.d.	846	843
Japan	1,000	792	803	652	786	797
Singapore	583	167	167	464	167	165
Total	**4,065,061**	**3,427,572**	**6,409,812**	**4,404,010**	**3,318,504**	**5,896,049**

Source: Crooks et al. (2017), Table 1

58 Commission on Audit (2019). Mangrove reforestation has been part of the National Greening Program (NGP) which began in 2011. However, after allotments totaling PHP23.89 billion from FY 2010 to 2015 (increasing to PHP 44.6 billion by 2018), performance audit findings are that forest cover has just marginally increased, i.e. "from 6,836,711 hectares in CY 2010, forest cover reached 7,014,152 hectares in CY 2015 – only 11.82 percent of the 1.50 million-hectare target of the NGP." Notably, this overall increase is net of a decrease in mangrove hectares from 310, 305 hectares in 2010 to 303,373 hectares in 2015 (shown in Figure 10 of the COA report). Problems with this program include incorrect site-selection, a typical problem if planting is done without a whole ecosystem in mind.

59 Mangrove loss in the Philippines has been due to land use conversion for aquaculture and human settlements primarily.

60 This section draws heavily from Crooks et al. (2017), summarizing key findings.

61 Authors say that estimates are likely to be underestimated, since in areas where drained organic soil remains, emissions will be continuing to this day.

TABLE 12. ESTIMATED MANGROVE AND SOIL (1M) CARBON STOCKS IN 2012 (IN $MMTCO_2E$)

	Model 1	Model 2	Model 3
Indonesia	4,597.30	6,967.60	6,036.80
Malaysia	932	1,671.20	1,450.00
Philippines	375.2	576.5	496.1
Thailand	330	545.4	467.5
Vietnam	121	212.7	181.1
Cambodia	55.4	131.5	112.8
China	18.9	39.2	32.9
Brunei	1.3	42.7	37.4
Timor-Leste	0.9	n.d.	n.d.
Japan	0.4	n.d.	n.d.
Singapore	0.2	n.d.	n.d.
	6,432.60	10,186.80	8,814.60

Source: Crooks et al. (2017), Table 2

TABLE 13. ESTIMATES OF MANGROVE LOSS 2000–2012

	MFW		Biome	
	2000-2012	Annually	2000–2012	Annually
Malaysia	4.89%	0.41%	13.23%	1.10%
Cambodia	4.48%	0.37%	11.87%	0.99%
Indonesia	3.11%	0.26%	7.68%	0.64%
Thailand	2.44%	0.20%	0.75%	0.06%
China	2.11%	0.18%	2.49%	0.21%
Philippines	1.28%	0.11%	2.10%	0.17%
Timor-Leste	1.28%	0.11%	1.20%	0.10%
Viet	1.15%	0.10%	3.37%	0.28%
Brunei	0.79%	0.07%	7.68%	0.64%
Japan	0.76%	0.06%	1.94%	0.16%
Singapore	0.00%	0.00%	2.46%	0.21%

Source: Crooks et al. (2017), Table 3

4. Closing remarks

Indeed, since many of the threats facing BCE are transboundary in nature, additional benefits can be gained through transboundary collaboration. The ASEAN Working Groups on Coastal and Marine Environment and Nature Conservation and Biodiversity may be venues to consider this further. The ASEAN-China Declaration for a Decade of Coastal and Marine Environmental Protection in the South China Sea (2017–2027) may also be an instrument of collaboration. Just recently (in May 2021), ASEAN member states adopted the Regional Action Plan for Combating Marine Debris, which built on the earlier Bangkok Declaration on Combating Marine Debris in ASEAN Region and the ASEAN Framework of Action on Marine Debris.

To accelerate practical action on BCE, it is recommended (by Crooks et al. 2017) that the tracking of BCE gains and losses (including working to improve seagrass data) and quantification of GHG emissions/removals are improved following the guidance provided in the 2013 IPCC Wetland Supplement; 62 that the role of coastal blue carbon ecosystems as a vehicle for sustainable environmental infrastructure is promoted; and that the significance of coastal BCE for policy areas and plans (e.g. on trade, aid and integrated coastal management) is identified and evaluated, among other measures.

Importantly, the inclusion of coastal blue carbon ecosystems within NDCs would be an opportunity to restate the importance of coastal ecosystems to both adaptation and mitigation commitments under the Paris Agreement as well as an opportunity to present cross-cutting methodologies and secure support for comprehensive approaches (Crooks et al. 2017). An inventory of NDC actions pertaining to BCE among the ASEAN states indicates that the strategic opportunity to combine both adaptation and mitigation opportunities of BCE has yet to be leveraged (Annex D: Inventory of Blue Carbon in ASEAN NDCs).

This paper suggests a different path to strengthen the Philippine contribution to the Paris Agreement. This path features climate change adaptation and resilience as its anchor and sustainable development as its context, instead of the usual GHG inventory-centric approach, so that both national and global adaptation/resilience imperatives are better served. It is a path that recognizes that highly vulnerable countries with relatively small carbon footprints per capita like the Philippines are likely to do more for global efforts to reduce the extent of climate change and cope with its impacts if they build robust community ownership for climate action and leverage opportunities based on their own comparative advantages; one comparative advantage of the Philippines is the biodiversity of its marine and coastal resources. It is also a path that recognizes that climate change impacts will be dire even if global warming is successfully limited to 1.5 °C. Thus, adaptation and resilience are imperatives for all countries, and national contributions that are organized to support these efforts will be vital.

62 Hiraishi, Takahiko, et al. (2014). A supplement to the 2006 IPCC guidelines for national greenhouse gas inventories.

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Annexes

Annex A

TOTAL PER CAPITA GHG EMISSIONS, CO2 INTENSITY, AND NDC, FOR THE ASEAN 10, AND SELECTED ECONOMIES 2018

	Indonesia	Thailand	Malaysia	Viet Nam	Philippines	Myanmar	Cambodia	Singapore	Laos
GHG ($MtCO_2e$)	1703.9	431.2	388.1	364.4	234.8	231.6	69.2	66.7	38.6
% of world*	3.47	0.88	0.79	0.74	0.48	0.47	0.14	0.14	0.08
GHG per capita, (tCO_2) **	6.37	6.21	12.31	3.81	2.20	4.31	4.26	11.82	5.47
CO_2 emissions (kg per 2017 PPP$ of GDP)	0.192	0.205	0.276	0.356	0.157	0.120	0.165	0.086	0.350
Top 3 sources of emissions	LUCF 734.28	Electricity 105.57	Electricity 125.36	Electricity 109.13	Electricity 70.34	LUCF 111.97	LUCF 31.69	Electricity 25.83	Electricity 14.04
	Electricity 243.36	Transport 77.88	LUCF: 81.44	Agriculture 70.99	Agriculture 61.37	Agriculture 78.38	Agriculture 21.3	Industry 14.62	Agriculture 9.58
	Agriculture 200.24	Industry 71.90	Transport 60.83	Manuf: 63.91	Transport 35.64	Electricity 9.76	Transport 5.77	Manufacturing 14.01	LUCF 9.36
NDC: reduction by 2030	41%, 29% uncond. (2016)	25%, 20% uncond (2020)	45% in EI vis 2005, 35% uncond. (2016)	27%; 9% uncond (2020)	75%, 2.71% uncond. (2021)	--	42%, cond (2020)	36% in EI vis 2005 (2020)	60%, uncond. (2021)

Brunei	ASEAN 10	European Union	USA	Australia
17.0	3,552	3,330	5,790	619
0.03	7.25	6.80	11.83	1.27
39.51	5.42	7.45	17.72	24.78
0.276	0.206	0.147	0.247	0.315
Fugitive 8.63	LUCF 974.23	Electricity 1108.45	Electricity 2103.17	Electricity 221.26
Electricity 5.21	Electric 712.42	Transport 807.16	Transport 1762.24	Agriculture 159.54
Transport 1.35	Agriculture 525.91	Building 435.04	Building 550.68	Transport 99.54
20%, uncond. (2020)		55% vis 1990	50–52% below 2005 levels; electricity carbon free by 2025 (2021)	26–28% below 2005 levels, including LULUCF; 11–15% excluding LULUCF; (2020)

Base data: https://www.climatewatchdata.org/ except CO_2 emissions per PPP$ of GDP which is from https://data.worldbank.org/indicator/ * Authors' computation using 48.94Gt as world GHG in 2018; ** Authors' computation using 2019 population and annual population growth by country from www.climatewatchdata.org to estimate 2018 population: PPP: purchasing power parity: LUCF; land use change and forestry; LULUCF: land use, land use change and forestry

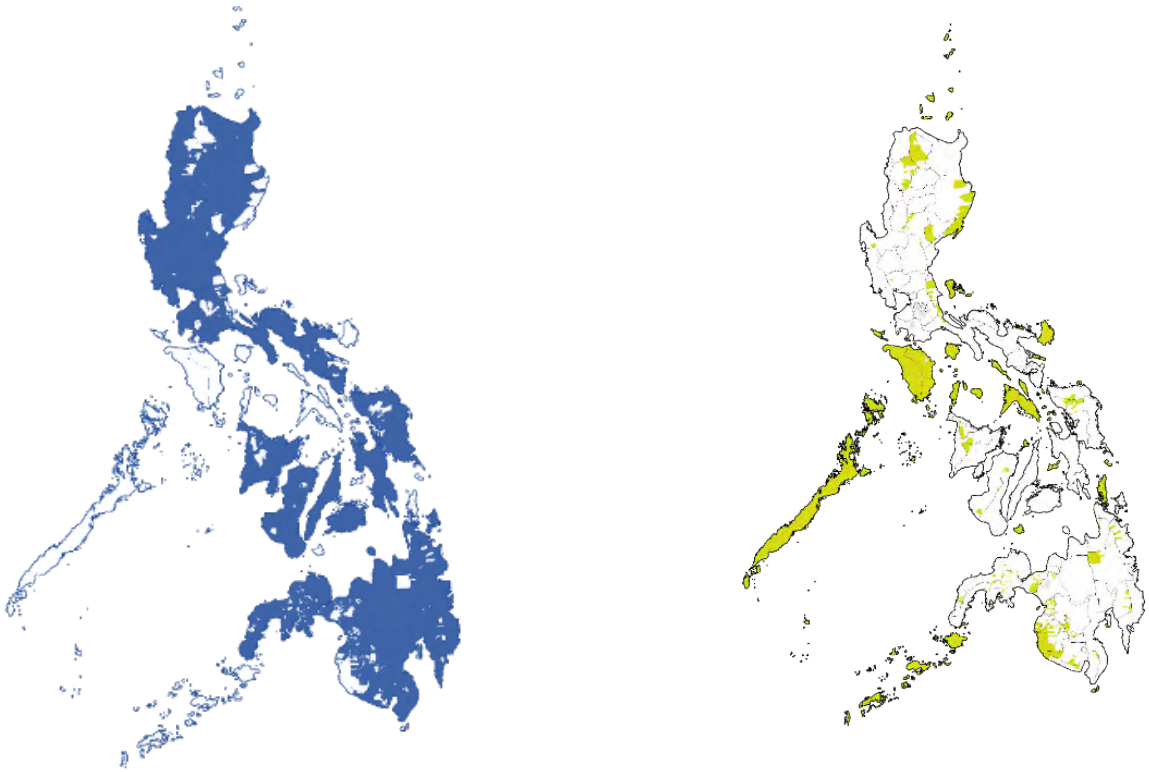
Annex B

Notes on the electricity sector

The Electric Power Industry Reform Act (EPIRA) was first discussed in the early 1990s, as there was a power crisis in 1991 that lasted until 1993. At the height of the crisis, in 1992–1993, outages averaged seven hours a day (four to eight hours in Luzon and up to 12 hours in Mindanao). EPIRA was finally enacted in June 2001 through the Republic Act 9136.

EPIRA promised competitive markets through the unbundling of the power sector and the transferring of risk to distribution utilities and independent power producers; the previous responsibility of government through the National Power Corporation (NPC) to procure least-cost generation supply as a monopoly procurer was transferred to private distribution utilities, such as Meralco, the country's largest power distribution utility firm in the Luzon main grid, and electric cooperatives (ECs) in small island and isolated grids (Annex Figure 1). The transmission function would be handled by a private firm while the assets remain owned by government. EPIRA also established a wholesale electricity market operator and the energy regulatory commission, an independent body to regulate pricing and agreement in the power industry.

ANNEX FIGURE 1 MAIN GRID AND SMALL ISLAND AND ISOLATED GRIDS (SIIGS)



Off-grid electrification is typically the responsibility of the electric cooperative (EC) franchises, which provide distribution and collection services, and in some cases, own generation assets as well. There are 121 ECs serving more than 56 million people in the Philippines. ECs are an important player because they are community/customer owned and are typically the primary entity that end-use customers interact with (and hold accountable) at the local level for the electrification of remote areas, quality of service/frequency of outages, and customer prices. To procure the power needed for their customers, ECs have the option to: (i) generate their own power (typically through a subsidiary company); (b) enter into power supply agreements with private new power providers (NPPs) subsidized by funds from the Universal Charge for Missionary Electrification (UCME) cross-subsidy; (iii) engage with the government owned and controlled Small Power Utilities Group (SPUG) under the National Power Corporation (NPC) which supplies generation (typically in the form of diesel generators), which also receive funds from the UCME cross-subsidy to reduce the tariff rate for consumers; or (iv) have remote areas

of their territory categorized as unviable "QTP areas" (qualified third parties areas) by the government, at which point a third-party (e.g. a private developer) has an opportunity to fully take over the generation and distribution in that area.

Reliability is a long-standing problem in the power sector. In early June 2021, the main Luzon grid was put under red alert status, with potential power outages, due to low power supply. The power outages were caused by unplanned and extended maintenance shutdowns of high-generation capacity power plants representing over 2,000 MW of capacity and reaching as high as 2,600 MW, as well as heightened demand as a result of the warmer temperatures. This caused reserves to fall below the mark to operate the grid and deal with spikes in demand; the grid needs at least 466 MW of regulating reserve and 647 MW each of dispatchable and contingency reserves. Most off-grid areas with electricity also face rolling blackouts and unplanned power outages as a result of grid instability and inadequate generation capacity. With working capital funds at approximately PHP10.1 million (US$206,000), it may be warranted to consider a sustainable insurance facility for electric cooperatives affected by climate-fueled disasters for improved access to liquidity in a timely manner (Ahmed 2020).

Annex Table 1 provides a snapshot of weak energy reliability with electricity interruptions, ranging from 1 day to 13 days of power interruptions per month, in 2019. It is estimated that a power outage that affects the country for an hour will cost the service and industry sector (sans mining, quarrying and construction) approximately PHP4.49 billion in losses.

ANNEX TABLE 1. ENERGY RELIABILITY FOR SELECT ELECTRIC COOPERATIVES OVER THREE QUARTERS IN 2019

Region	Average Number of Interruptions	Average Duration per Interruption (minutes)	Estimated average Interruption per month (days)
Mindanao			
Zamboanga del Norte Electric Cooperative, Inc. (ZANECO)	11.88	5125.64	5
Zamboanga del Sur II Electric Cooperative, Inc. (ZAMSURECO II)	14.51	1914.62	2
Zamboanga City Electric Cooperative, Inc. (ZEMCELCO)	44.32	1637.03	6
Camiguin Electric Cooperative, Inc. (CAMELCO)	32.01	1103.03	3
Basilan Electric Cooperative, Inc. (BASELCO)	38.66	4471.76	13
Visayas			
Province of Siquijor Electric Cooperative, Inc. (PROSIELCO)	14.9	1084.75	1
Biliran Electric Cooperative, Inc. (BILECO)	14.74	1829.69	2
Luzon			
Ilocos Norte Electric Cooperative, Inc. (INEC)	10.33	1604.69	1
Ifugao Electric Cooperative, Inc. (IFELCO)	25.21	2379.47	5
Lubang Electric Cooperative, Inc. (LUBELCO)	48.2	2909.31	11
Palawan Electric Cooperative, Inc. (PALECO)	17.22	1193.77	2
Albay Electric Cooperative, Inc. (ALECO)	35.85	1097.65	3
Masbate Electric Cooperative, Inc. (MASELCO)	22.13	2887.33	5

Source: https://www.nea.gov.ph/ao39/phocadownload/ECs%20Classification/2019%20Compliance%20Report%20on%20the%20Performance%20of%20ECs%20for%20the%203rd-Qtr.pdf

Annex C

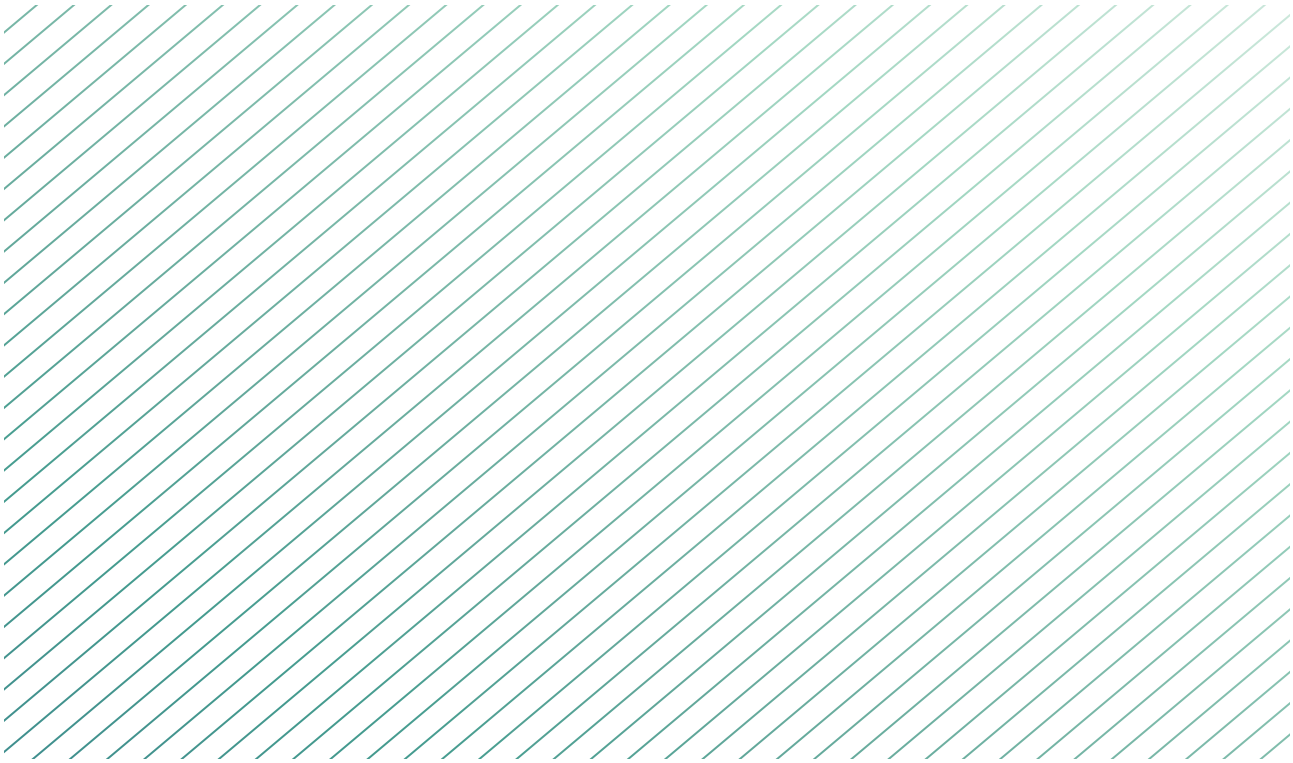
Transportation sector: national policy frameworks

The National Environmentally Sustainable Transport (NEST) Strategy, completed in 2010, envisioned an inclusive, equitable and people-centered transport with two goals.1 First, the reduction of the annual growth rate of energy consumption and associated greenhouse gas (GHG) emissions from the transport sector in urban areas of the country, and second, the enhancement of sustainable mobility through the development of a viable market for environmentally sustainable transport (EST) goods and services, which involves, among others, the promotion of transportation systems of low-carbon intensity and a shift towards the use of more sustainable transport modes.

NEST identified 12 thematic EST strategies which covered comprehensive aspects of: (1) public health; (2) strengthening roadside air quality monitoring and management; (3) traffic noise management; (4) vehicle emission control, standards, and inspection and maintenance; (5) cleaner fuels; (6) public transport planning and travel demand management; (7) non-motorized transport; (8) environment and people friendly infrastructure development; (9) social equity and gender perspectives; (10) road safety and maintenance; (11) knowledge base, awareness, and public participation; and (12) land-use planning.

The National Transport Policy was approved in 2017 to address fragmentation and lack of inter-agency coordination in transport planning, management and development.2 It comprehensively outlined an integrated approach to land use and transport planning, and mandated cities to update their respective comprehensive development plans (CDPs) to reflect prioritization of pedestrians and public transport over private vehicles, and identify resources needed.

The Philippine Urban Mobility Program (PUMP) was approved in August 2020 to complement the National Transport Policy.3 It outlined an operational phased-in approach to address the evolving challenges of urban mobility along five thematic areas: public utility vehicle modernization roll-out (public transport), non-motorized transport (active transport), urban freight, travel demand management and transport-oriented development.



1 Department of Transportation and Communications, Department of Environment and Natural Resources, National Center for Transportation Studies (2011). “Formulation of the Philippines’ Environmentally Sustainable Transport (EST) Strategy” http://ncts.upd.edu.ph/est/?page_id=14

2 National Economic and Development Authority (2017). “The National Transport Policy and its Implementing Rules and Regulations” https://www.neda.gov.ph/the-national-transport-policy-and-its-implementing-rules-and-regulations/.

3 Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH (2019) https://www.changing-transport.org/wp-content/uploads/2020_Philippine_Urban_Mobility_Programme.pdf

Annex D

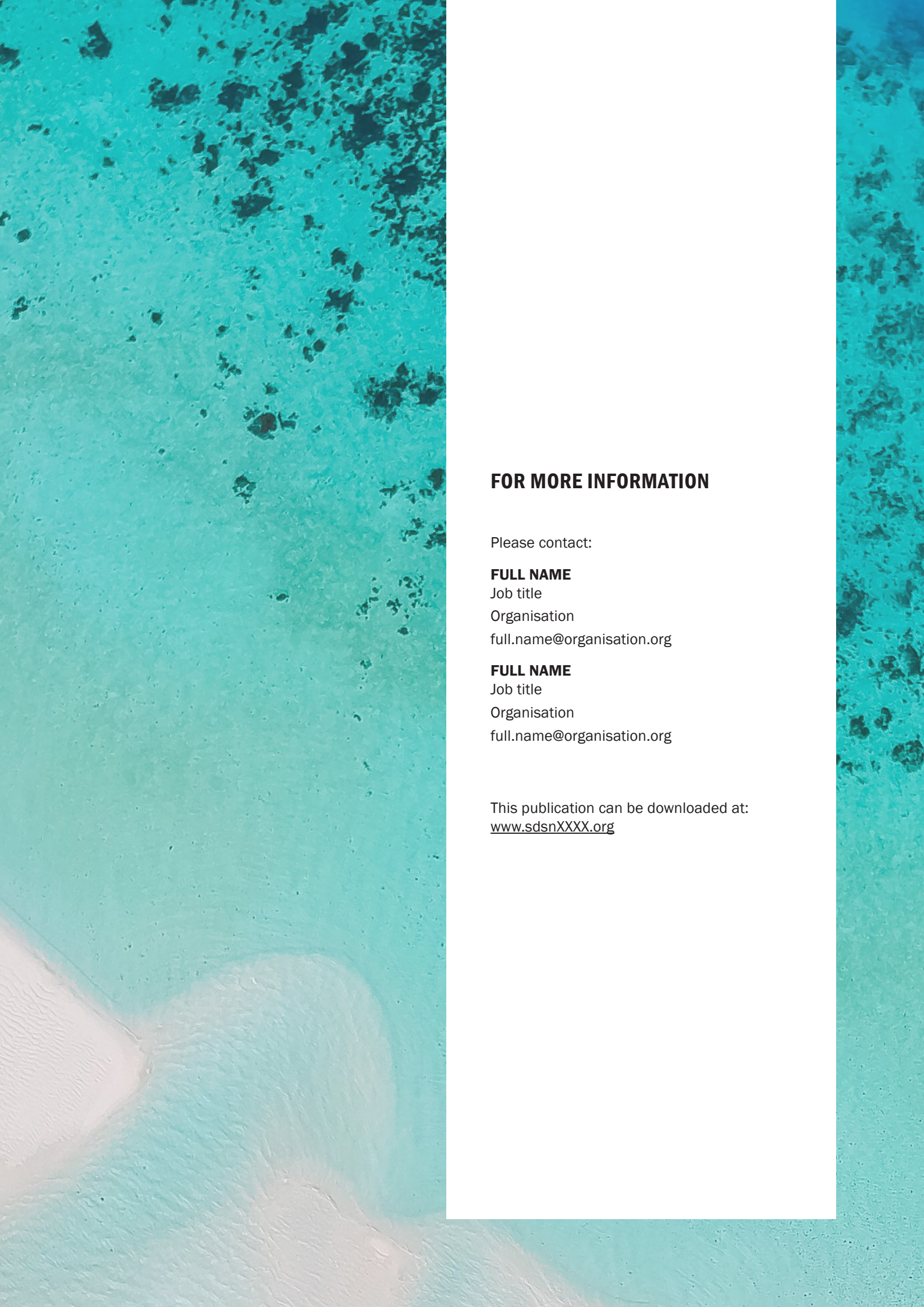
INVENTORY OF BLUE CARBON IN ASEAN NDCS *

Country	Mitigation	Adaptation	NDC actions
Brunei **(NDC, December 2020)**			Note: In its earlier INDC, mangroves' role in mitigation was explicitly recognized and forestry, coastal and flood protection were identified as adaptation priorities. **Increase carbon sink through afforestation and reforestation with a target of planting 500,000 new trees.** Brunei Darussalam aims to increase its forest reserves from 41% to 55%. Current efforts seek to increase Brunei Darussalam's carbon sink through reforestation efforts. At present, 104,920 trees are identified for current reforestation efforts, and a further 400,000 trees are proposed leading up to 2035.
Cambodia **(NDC, December 2020)**		Coastal zone management for climate adaptation	**Coastal zones identified for priority adaptation actions** **Coastal zones:** Rising sea levels are expected to impact coastal systems through inundation, flood and storm damage, loss of wetlands, erosion, saltwater intrusion, and rising water tables. Priority adaptation actions are: - Protection, risk mitigation, and resilience building from marine pollution particularly caused by activities on land including marine pollution from waste and aquaculture activities - Effective management and protection of ecological systems of marine and coastal zones to avoid adverse impacts from various factors, build their resilience and restore their functions for productive and healthy oceans.
Laos **(NDC)**			**Not applicable**
Indonesia (NDC, July 2021)		Coastal zone management for climate adaptation	**Integrated management of mangrove ecosystem as part of coastal zone protection for enhanced climate resilience.** Indonesia will improve its management of natural resources to enhance climate resilience by protecting and restoring key terrestrial, coastal and marine ecosystems. Key programme: coastal zone protection. Strategic actions are: Mainstreaming adaptation into policies and programmes on coastal zone and ocean; implementation of ecosystem based adaptation in coastal zone development; implementation of integrated management of mangrove ecosystem; enhance coastal zone and ocean pollution control, including marine litter and plastic debris; development of climate resilient coastal zone; Increase communication, education and public awareness on the important role of coastal ecosystem protection in natural disaster impact reduction; restoration of degraded coastal zone as essential ecosystem; improve livelihood of communities living in or depending on coastal areas.

Country	Mitigation	Adaptation	NDC actions
Malaysia **(INDC, 2016)**		Coastal zone management for climate adaptation	**Coastal management recognized as an adaptation measure. Wetlands may be included in land use, land use changes and forestry (LULUCF) in future.** As part of the solution towards coastal erosion, both hard and soft engineering approaches had been implemented. For the longer term, Integrate Shoreline Management Plans (ISMPs) have been developed and implemented for specific areas. In addition, a National Coastal Vulnerability Index to sea-level rise is being developed. Detailed sea level rise studies had also been conducted at some of the vulnerable coastal areas to project future vulnerabilities in a 20-year sequence from 2020 to 2100. Assumptions and methodological processes: ... LULUCF: The inclusion of non-forest land (cropland, grassland, wetlands and settlement) will be determined later.
Myanmar **(INDC, 2015)**		Conservation, protection and restoration efforts	**Mangroves and coastal zones' roles in adaptation recognized with plans to conserve coastal ecosystems including mangroves, a mangrove rehabilitation project and coastal zone management identified as adaptation measures.** Developing a coastal zone management plan to effectively conserve terrestrial and underwater resources including mangrove forests. Also cooperating with international organizations providing technology and funding to reduce the risk of climate related disaster risk for local communities. The National Strategy Action plan (NSAP, 2015) has been published as well." Specifically, Myanmar is implementing projects such as ... the Project for Mangrove Rehabilitation Plan for the Enhancement of Disaster Prevention in Coastal and Delta Areas.
Philippines **(NDC, April 2021)**		Conservation, protection and restoration efforts	**Coastal and marine ecosystems identified for adaptation measures** The Philippines shall undertake adaptation measures across but not limited to, the sectors of agriculture, forestry, coastal and marine ecosystems and biodiversity, health, and human security, to preempt, reduce and address residual loss and damage ... The country shall also endeavor to undertake equitable adaptation strategies with mitigation co-benefits and ensure their contribution to the national pandemic recovery. Note: In the 2015 INDC, marine ecosystems role in mitigation and adaptation was recognized with explicit reference to blue carbon. Blue carbon is no longer mentioned. Specific adaptation measures were also mentioned, i.e. legal protection for marine ecosystems and marine resources and the possibility of including marine ecosystems in REDD (reducing emissions from deforestation and forest degradation) plus and national biodiversity targets.
Singapore **(NDC, March 2020)**		Conservation, protection and restoration efforts Coastal zone management for climate adaptation	**Mangrove conservation and restoration to minimize flooding, enhancing of marine and coastal habitats to protect biodiversity, and exploration of innovative coastal protection measures, including nature-based solutions, as adaptation measures.** Singapore has undertaken local measures to protect its infrastructure and living environment against the risk of rising sea levels ... Beyond these, Singapore has studied its coastline and developed a national, island-wide plan to protect itself from rising sea levels. Singapore will continue to explore innovative approaches to coastal protection measures, which may include a combination of conventional engineering solutions such as sea walls, tidal gates and pumping stations, and nature-based solutions. Singapore is also conserving and restoring its mangrove forests. Mangroves help to dissipate waves and trap sediment, potentially serving as a flexible form of coastal defence while reducing erosion. Singapore will conserve more native plants and animals by carrying out recovery plans for over 70 more animals and plant species, enhancing 30 hectares of forest, marine and coastal habitats.

Country	Mitigation	Adaptation	NDC actions
Thailand **(NDC, October 2020)**		Conservation, protection and restoration efforts	**Conservation, rehabilitation and sustainable use of 'natural resources and biodiversity' as a national adaptation priority.** (Note: It is assumed that this includes marine ecosystems, given the mention of ecosystem-based adaptation.) **Natural resources management sector** aims to sustainably manage natural resources and biodiversity to respond to climate change impacts by enhancing the conservation, rehabilitation, and sustainable use of natural resources and biodiversity and strengthening public participation. The main principles taken into account in formulating Thailand's NAP include Sufficient Economy Philosophy, local wisdom, sustainable development, Ecosystem-based Adaptation (EbA).
Vietnam **(NDC, November 2020)**	LULUCF and forestry	Conservation, protection and restoration efforts	**Developing and restoring coastal forests recognized as a measure to achieve GHG reductions; protecting, restoring and planting mangroves and coastal protection forests recognized as part of coastal protection and adaptation efforts.** Measures to achieve GHG reductions in different sectors: "Protecting, conserving and sustainably using forests and forest land to increase carbon sequestration and forest certification; planting and developing forests, prioritizing production forests, large timber forests and coastal forests; restoring protection forests and special-use forests; **Adaptation efforts:** - Implementing the target programme for sustainable forestry development for the 2016–2020 period; conserving and enhancing forest carbon stocks; protecting, restoring and planting mangrove and coastal protection forests aiming to exceed over 30% of the plan to 2020. - Raising awareness and building sustainable management models for mangrove forests for coastal protection. - Evaluation criteria: Increase of forest coverage to 42–42.5%; increase of the area of coastal protection forests, including the extension of mangroves plantation; preservation and sustenance of the ecosystems.

* Author's assessment following the framework of Martin et. al. (2016), updating the entries found in pp. 6–21 except in the case of Malaysia and Myanmar



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