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PHILIPPINES ECONOMIC UPDATE

SECURING A CLEAN ENERGY FUTURE

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PREFACE

The Philippines Economic Update (PEU) summarizes key economic and social developments, important policy changes, and the evolution of external conditions over the past six months. It also presents findings from recent World Bank analyses, situating them in the context of the country's long-term development trends and assessing their implications for the country's medium-term economic outlook. The update covers issues ranging from macroeconomic management and financial-market dynamics to the complex challenges of poverty reduction and social development. It is intended to serve the needs of a wide audience, including policymakers, business leaders, private firms and investors, and analysts and professionals engaged in the social and economic development of the Philippines.

The PEU is a biannual publication of the World Bank's Macroeconomics, Trade and Investment (MTI) Global Practice (GP), prepared in partnership with the Finance, Competitiveness and Innovation (FCI); Poverty and Equity; Social Protection and Jobs (SPJ); and Governance Global Practices. Lars Christian Moller (Practice Manager for the MTI GP), Souleymane Coulibaly (Lead Economist and Program Leader), and Ralph van Doorn (Senior Economist) guided the preparation of this edition. The team consisted of Kevin Chua (Senior Economist), Kevin Cruz (Economist), Ruijie Cheng (Young Professional), Karen Lazaro (Research Analyst), Eduard Santos, Ludigil Garces and Patrizia Benedicto (Consultants) from the MTI GP; Radu Tatucu (Senior Financial Sector Specialist) and Uzma Khalil (Senior Financial Sector Specialist) from the FCI GP; Nadia Belghith (Senior Economist) and Sharon Piza (Economist) from the Poverty & Equity GP; Paula Cerutti (Senior Economist), Ruth Rodriguez (Senior Social Protection Specialist), Yoonyoung Cho (Senior Economist) and Ma. Laarni Revilla (Consultant) from the SPJ GP; and Anuja Kar (Senior Agriculture Economist) and Mio Takada (Senior Agriculture Economist) from the Agriculture GP. A World Bank team from the Energy and MTI GPs, consisting of Feng Liu (Program Leader and Senior Energy Specialist) and Kevin Chua, prepared the Special Focus Note on Philippine Energy Transition: Towards a Secure, Affordable, and Clean Energy Future, under the guidance of Jie Tang (Practice Manager) and Lars Moller. The report was edited by Oscar Parlbäck (Consultant), and the graphic designer was Pol Villanueva (Consultant). Peer reviewers were Samuel Christopher Hill (Senior Economist) and Arvind Nair (Senior Economist). Logistics and publication support were provided by Geraldine Asi (Team Assistant), Teresita Victoria (Program Assistant), and Hunter Tiro (Consultant). The External Communications Team, consisting of Clarissa David, David Llorito and Stephanie Margallo, and Justine Letargo (Consultant) prepared the media release, dissemination plan, and web-based multimedia presentation.

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For more information about the World Bank and its activities in the Philippines, please visit www.worldbank.org/ph.

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ABBREVIATIONS AND ACRONYMS

AC	Air Conditioner	FDI	Foreign Direct Investment
ADS	Accelerated Decarbonization Scenario	FIT	Feed-in-Tariff
ASEAN	Association of Southeast Asian Nations	FMRs	Farm-to-Market Roads
BAU	Business-As-Usual	GBC	Green Building Code
BBL	One Stock Tank Barrel	GEAP	Green Energy Auction Program
BIR	Bureau of Internal Revenue	GHG	Greenhouse Gas
BOP	Balance of Payments	IT-BPO	Information Technology - Business Process Outsourcing
BPS	Basis Points	JETP	Just Energy Transition Partnership
BSP	Bangko Sentral ng Pilipinas	LCOE	Levelized Cost of Electricity
BTr	Bureau of The Treasury	LFPR	Labor Force Participation Rate
CA	Current Account	LFS	Labor Force Survey
CCDR	Country Climate And Development Report	LGUs	Local Government Units
CES	Clean Energy Scenario	LNG	Liquefied Natural Gas
CFPPs	Coal-Fired Power Plants	MDS	Moderate Decarbonization Scenario
CPS	Current Policy Scenario	NDCs	Nationally Determined Contributions
DOE	Department of Energy	NPL	Non-Performing Loan
DTI	Department of Trade And Industry	NREP	National Renewable Energy Program
EE	Energy Efficiency	PEP	Philippine Energy Plan
EECA	Energy Efficiency and Conservation Act	PPP	Purchasing Power Parity
EMDEs	Emerging Market and Developing Economies	PPTs	Percentage Points
EPIRA	Electric Power Industry Reform Act	PSA	Philippine Statistics Authority
EVOSS	Energy Virtual One-Stop-Shop	RE	Renewable Energy
EVs	Electric Vehicles	REF	Reference Scenario
FAO	Food and Agriculture organization of The United Nations	RPS	Renewable Portfolio Standard
		TRAIN	Tax Reform for Acceleration and Inclusion
		VAT	Value-Added Tax
		VRE	Variable Renewable Energy
		YOY	Year-on-Year

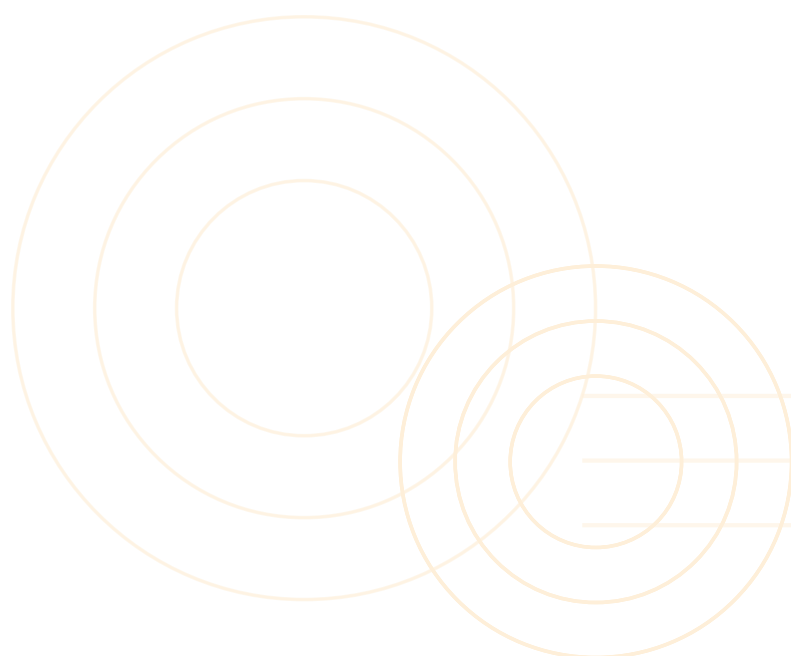


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EXECUTIVE SUMMARY

Robust domestic demand fueled growth, countering a weaker global demand in the first quarter of 2023. The economy expanded by 6.4 percent year-on-year (yoy) in Q1 2023, higher than the growth of regional peers such as Malaysia (5.6 percent), Indonesia (5.0 percent), Vietnam (3.3 percent), and Thailand (2.7 percent). The continued release of pent-up demand, improved employment, and steady remittances supported domestic activity. The services sector fueled growth, underpinned by the revival of tourism and consumer spending on domestic services. Meanwhile, the industry sector was hampered by weak external demand which weighed on manufacturing and mining. Favorable weather conditions and the rebound in livestock production led to better performance in the agriculture sector. On the expenditure side, household consumption and fixed capital investment drove growth, anchored on upbeat domestic activity, and improved household and business confidence, and despite the higher inflation and interest rate environment. Weaker external demand, however, weighed on net exports.

Headline inflation has declined since the start of the year, but remained elevated at an average of 7.9 percent in the first four months of 2023.

It exceeded the target range of 2-4 percent, driven by food inflation (9.7 percent) and utilities inflation (7.8 percent). Transportation inflation has steadily declined to 0.2 percent since their peak in July 2022 due to lower global crude oil prices. Core inflation, which excludes volatile food and energy commodity items, rose to 7.9 percent in April, a reflection of underlying price pressure. To combat high inflation, the government lowered tariffs on key agricultural commodities and approved a targeted cash transfer program to mitigate the impact of inflation on the poor. The Bangko Sentral ng Pilipinas (BSP) has also raised the key policy rate by 75 bps since January 2023 on the back of possible second-round effects from additional transport fare increases and wage adjustments.

The strong domestic demand, along with higher commodity prices, led to a wider current account deficit in 2022. The current account deficit widened from 1.5 percent of GDP in 2021 to 4.4 percent of GDP in 2022. This was due to a larger trade deficit where imports of goods outpaced exports. Services

trade grew along with the recovery in tourism and resilience in the information technology-business process outsourcing (IT-BPO) sector, while remittance growth softened to 3.8 percent in 2022. The current account deficit was financed by financial inflows, especially portfolio investment. With the wider current account deficit, the balance-of-payments (BOP) reversed to a deficit of 1.8 percent of GDP in 2022 from a 0.3 percent of GDP surplus in 2021. In Q1 2023, the BOP position reversed to a surplus (3.4 percent of GDP) due to higher remittances, global bond issuance of the national government, and other inflows of foreign portfolio investments. This contributed to a 6.0 percent peso appreciation between October 2022 and April 2023, and higher international reserves of 7.6 months of import by April 2023.

The fiscal deficit narrowed owing to reduced spending despite a decline in fiscal revenues.

Public revenues declined to 14.6 percent of GDP in Q1 2023 (15.9 percent in Q1 2022) as tax collections moderated amid slower GDP growth relative to last year's, and temporary effects due to the periodicity of VAT filings by firms. However, public expenditures fell to 19.5 percent of Q1 2023 GDP (22.3 percent in Q1 2022) due to lower current expenditures and national tax allotments to LGUs. As a result, the fiscal deficit fell to 4.8 percent of GDP in Q1 2023 from 6.4 percent in Q1 2022. This helped temper the growth of national government (NG) debt by 1.2 percent yoy as of Q1 2023, from 13.7 percent growth in the year prior. NG debt stood at 61.0 percent of GDP in March 2023, up marginally from 60.9 percent of GDP in 2022. The debt profile remains favorable, consisting mainly of long-term, domestic, and peso-denominated debt.

Labor market outcomes were mixed: Labor force participation increased and unemployment fell, but low-quality jobs are on the rise.

The labor force participation rate (LFPR) rose from 65.2 percent in September 2022 to 66.0 percent in March 2023 driven by increased participation by women. Unemployment fell from 5.0 percent to 4.7 percent during the same period. Between September 2022 and March 2023, net jobs creation was about a million, primarily in the agriculture and services sectors. Nonetheless, the share of elementary occupations associated with low and irregular

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pay remained high at almost 30 percent of total employment in March 2023 and the share of part-time workers increased above pre-pandemic levels. Moreover, the share of self-employed (own account) and unpaid workers increased above pre-pandemic levels, indicating growth in the informal labor market and a shift to low-productivity jobs.

Outlook and Risks

Global growth is expected to slow substantially in 2023 before modestly recovering in 2024–25.

The growth slowdown happens amid a weak environment characterized by subdued global demand, persistent inflationary pressure, and tighter financial conditions. Nonetheless, global growth is expected to slow at a softer pace than initially projected in the January 2023 Global Economic Prospects to reflect better-than-expected growth in the United States and the Euro Area in late 2022 and early 2023, China's economic reopening, and improved global sentiment.¹ Meanwhile, monetary tightening and restrictive credit conditions are tempering interest rate-sensitive activities such as private investments and construction. In advanced economies, policy rate hikes due to persistent inflationary pressures and recent bank failures have led to tighter financial conditions and a slowdown in bank lending. In EMDEs excluding China, tighter fiscal and monetary policies are likely to dampen economic activity. EMDEs with weak credit profiles are expected to experience the most subdued growth amid tight financial conditions.

Despite weak external conditions, strong domestic demand will drive the Philippine economy to grow at 6.0 percent in 2023 and gradually decline over the medium term. This upward revision reflects the latest global growth upgrade for 2023 and the continued strength in domestic demand. Private consumption growth will be supported by improved employment, steady remittances, and better consumer sentiments, amid an expected decline in headline inflation and winding down of pent-up demand. Investment growth is expected to soften amid ongoing fiscal consolidation that will impact public investment and tightening financial conditions that will weigh on private investment. Softer global growth and the shift in global consumption towards more services will temper external demand, leading to a moderation

in goods exports and manufacturing activity.

Meanwhile, the contact-intensive services sector will support growth buoyed by spillovers from China's reopening, the recovery of international tourism, and robust domestic activity. The implementation of recently passed reforms will encourage private investment and attract more FDI, accelerating investment growth over the forecast horizon. Medium-term growth will gradually approach its potential rate at 5.7 percent as the output gap closes in line with the cyclical recovery.

The growth outlook is subject to downside risks.

From the external front, the possibility of higher-than-expected global inflation, tighter global financing conditions and an escalation of geopolitical tensions could further disrupt global activity and cause a sharper-than-expected global slowdown, which in turn will further temper external demand. Sticky core inflation due to tight labor markets and resilient demand could lead to larger-than-anticipated monetary tightening in many countries. Recent banking turmoil in advanced economies raises the possibility of additional bank failures that can unnerve the global financial markets. From the domestic front, the threat of El Niño and supply chain bottlenecks may yet again raise food supply challenges and place upward pressure on food prices. Over the long term, climate change and the increasing severity of natural disasters risk food security and magnify the vulnerability in the agriculture sector.

Pursuing revenue-enhancing policies can enhance fiscal consolidation efforts and support growth.

The Government has a political window of opportunity to implement challenging reforms early in its 6-year term. Revenue-enhancing policies could be more growth-friendly if delivered through appropriate reforms. For example, the impact of the TRAIN law on growth and poverty crucially relies on the efficient use of the additional revenues towards productivity-enhancing infrastructure and human capital investments. With politically challenging reforms, early preparation and engagement with the legislative body can help generate support and ensure that the government is well-placed for the timely implementation of reforms. Highlighting the successes of recent tax reform initiatives in strengthening resilience and achieving inclusive growth beyond its impact on fiscal sustainability can help improve public acceptance.

¹ World Bank. 2023. June 2023 Global Economic Prospects. Washington, DC.

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Improving public spending efficiency through better targeting of social protection measures is essential to protect the poor and vulnerable from economic shocks amid limited fiscal space. An efficient social protection targeting, and delivery system would help protect poor and vulnerable households amid the government’s efforts to rebuild fiscal buffers. During the pandemic, the country demonstrated the capacity to scale up social protection programs but was hindered by implementation challenges, delays, and the sheer magnitude of the pandemic shock. Ensuring a resilient delivery of social protection measures would require the: (i) adoption of the national ID system for social protection delivery; (ii) enhancement of the targeting system; (iii) development of digital platforms and tools; (iv) continued innovation of digital government-to-person payment methods; and (v) strengthening of contingency financing mechanisms and readiness for disaster response.

Strengthening the economic recovery and achieving the country’s long-term growth ambition would require an increase in investments. Prior to the pandemic, the contribution of capital accumulation to economic growth increased substantially because of the government’s commitment to public investment, while fast growth, solid macro-fiscal fundamentals, and structural reforms led to an increase in private investment. However, capital accumulation in the Philippines was still lower than in regional peers. In addition, COVID-19 caused a significant decline in both public and private investment, from an average of 25.9 percent of GDP in 2016–19 to 19.3 percent of GDP in 2020–21. Returning to the pre-pandemic level of investment spending will require a commitment to promote investment, including Foreign Direct Investment (FDI), and facilitate stronger partnerships with the private sector.

Special Focus – Philippine Energy Transition: Towards a Secure, Affordable, and Clean Energy Future

The Philippine energy sector needs to grow rapidly to support the country’s ambition of ending poverty and becoming a prosperous middle-class society by 2040. The government projects that the final energy demand will triple

between 2020 and 2040. Compared with ASEAN countries with significantly higher per capita GDP in 2019, the Philippines has substantially lower per capita electricity consumption at 0.9 MWh, vs. 2.8 MWh of Thailand and 5.2 MWh of Malaysia. The energy sector needs to overcome the dual challenges of meeting fast-growing demand and transforming its fossil-fuel-based infrastructure while keeping the energy supply secure, reliable, and affordable.

The Philippines would benefit from an energy transition toward low- and zero-carbon alternatives. A clean energy transition would substantially increase the use of indigenous and renewable energy (RE) resources while reducing the country’s reliance on imported fossil fuels, thereby enhancing energy security. A cleaner energy future is expected to be more affordable, given the global trends of declining costs related to deploying and integrating solar and wind power. Reducing fossil fuel consumption, particularly by electrifying urban transport and reducing the use of coal in power generation, would reduce ambient air pollution in urban areas, improving public health. Given that an increasing number of multinational firms are setting their own net-zero targets and examining their supply chains to achieve their climate commitments, greening the power supply through an energy transition would help the Philippines stay competitive and attract foreign investments.

The government is embarking on a substantial energy transition agenda. It recognizes that continuing historical trends in the energy sector would reduce energy security and deteriorate the Philippines’ external economic competitiveness. The country’s nationally determined contributions (NDCs) include reducing cumulative GHG emissions: an unconditional target of 2.71 percent and a conditional target of 75 percent below the business-as-usual baseline by 2030. The government’s energy strategy includes: (1) scaling up the deployment of RE, particularly solar and onshore and offshore wind power; (2) setting a cap on the growth of coal-fired power (cap on capacity by 2025 and generation by 2030); (3) ramping up liquified natural gas (LNG) to power investments; (4) promoting demand-side energy efficiency (EE) and electrification of transport; and (5) exploring the development of other low- or zero-carbon technologies such as nuclear power.

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In building a solid foundation for the country's energy transition, and accelerating the energy transition, the authorities should consider the following:

Recommendations	Descriptions
Increase the implementation of utility-scale solar and wind power projects to bring variable renewable energy sources to a tipping point in power generation	Focus should be on speeding up implementation by removing constraints to procuring, financing, and delivering solar and wind projects. Short- to medium-term measures include: <ul style="list-style-type: none"> Scaling up the Green Energy Auction Program (GEAP) with demand pull of the Renewable Portfolio Standards (RPS). Streamlining the permitting process through speeding up the full operationalization of EVOSS to cover all concerned national agencies and local government units. Removing barriers to financing, particularly in high-risk projects such as offshore wind and floating solar projects.
Prioritize planning and investments in transmission capacity and grid flexibility	The transmission development plan should be efficiently aligned with load growth patterns and generation capacity procured through GEAP. Government intervention is needed to keep transmission projects procured and delivered on time. The provision of ancillary services and investments in grid flexibility (e.g., energy storage systems) needs to be incentivized through proper pricing mechanisms.
Prudently pursue the LNG-to-power program to secure reliable power supply and increase the system flexibility for integrating variable renewable energy (VRE)	Due to the anticipated depletion of the Malampaya gas field, it is critical for the Philippines to complete its current Liquefied Natural Gas (LNG)-to-power program as planned. Additional LNG capacity should be carefully assessed based on the needs for maintaining the reliability of the power system, given the VRE capacity target for 2040, including potentially large addition of offshore wind capacity and the early retirement of coal-fired power plants (CFPPs).
Prioritize Energy Efficiency (EE) and demand-side management for buildings and industries	Improving EE in residential, commercial, and public buildings through regulations (e.g., enforcing energy efficient building codes and minimum energy performance standards for air conditioners and major appliances) and incentives (e.g., rebates for purchasing high-efficiency appliances and accelerated permitting process for high-class green buildings) would help moderate future electricity demand. Demand-side management and demand response should be incentivized through time-of-use tariffs and interruptible supply contracts.
Improve power system planning to better guide energy transition investment decisions	Least-cost planning tools need to consider the costs of carbon and local air pollution as well as stranded assets. The authorities should keep a dynamic view of technological changes and enhance the government's capability to assess the viability of emerging technologies, such as hydrogen and carbon capture and storage, and maximize RE while managing the cost of services.
Consider the use of an appropriate carbon pricing instrument to level the playing field between RE and fossil fuels while generating revenues	For example, setting a moderate price on carbon of up to US\$5/tCO ₂ could incentivize firms and individuals to adopt low carbon technologies while raising revenues of up to 0.4 percent of GDP. The revenues could be used to mitigate the short-term negative poverty impact of introducing a carbon tax through income support and reskilling of workers affected by decarbonization.
Establish a framework for addressing the early retirement of coal-fired power plants and ensuring a just energy transition	The authorities will need to emphasize the principles of competition and transparency in discovering the price for the early closure of CFPPs to minimize cost. A comprehensive cross-sectoral approach will be required to properly prepare a framework for a just energy transition process in the Philippines, and key stakeholders need to be involved early in the consultative planning process. The just transition process should include three focus areas: (i) institutional governance; (ii) people and communities; and (iii) environmental remediation.

Part 3 of the PEU investigates the state of the Philippines' energy transition, the challenges to decarbonization, and policies for a secure, affordable, and clean energy future.



PART 1

RECENT ECONOMIC AND POLICY DEVELOPMENTS

The Philippine economy outperformed its regional peers, expanding by 6.4 percent in the first quarter of 2023. The continued release of pent-up demand as well as recovering labor market, steady remittances, and tourism rebound supported domestic activity. Weak global conditions, however, tempered external demand, which weighed on manufacturing and net exports. Domestic demand remained robust despite elevated inflation. To address inflationary pressure and anchor inflation expectations, the Bangko Sentral ng Pilipinas (BSP) has raised the key policy rate by an additional 75 bps since January 2023. Meanwhile, a decline in public spending led to a narrower fiscal deficit. With robust economic growth, unemployment declined despite higher labor force participation, but the quality of jobs remains a concern.

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1.1 Recent Global Developments: Subdued Global Environment

Market challenges continue to weigh on the global economy despite higher-than-expected growth in advanced economies and emerging market and developing economies (EMDEs) in early 2023. Subdued global demand and the shift of consumption toward services are dampening global trade. Global inflation has decelerated from its peak in July 2022, but core inflation in many EMDEs has either accelerated or stabilized at elevated levels.

Although advanced economies and EMDEs posted higher-than-expected growth in early 2023, market challenges continue to weigh on economic activity. Advanced economies avoided a sharper economic slowdown than initially expected in 2022, benefitting from resilient labor markets, which supported robust wage growth and prevented a sharper decline in consumption. Warm winter weather and lower natural gas prices, especially in the United States and the Euro area, also contributed to economic activity and further buoyed consumption. However, substantial policy rate increases, tightening credit conditions following recent banking sector stress, and high inflation are weighing on economic activity into 2023. Similarly, growth in EMDEs slightly accelerated amid the rebound of economic activity in China, unexpected resilience in advanced economies, and improved domestic demand. EMDEs were generally resilient to the banking stress in advanced economies. Nonetheless, industrial production has decelerated since September 2022 (Figure 1), while tight domestic monetary policy, fiscal consolidation, and weak external demand are curbing growth in many EMDEs.

Subdued global goods demand and the shift of consumption away from tradable goods and toward services weighed on global trade. Amid weak global demand and limited positive trade spillovers from China's services-led rebound this year, global industrial production growth softened from 5.4 percent, year-on-year (yoy), in February 2022 to 0.6 percent in the same period in 2023. This resulted in the weakening of global merchandise trade in early

2023, which contributed to the easing of global supply chain pressures. As of April 2023, freight shipping prices have declined to their lowest level since 2020, and suppliers' delivery times have fallen to their lowest levels in almost four years. Meanwhile, services trade strengthened as demand shifted away from tradable goods and into services. The weaker demand for tradable goods adversely affected Philippine merchandise exports, tempering growth in the first quarter of 2023. Nonetheless, recovering international tourism and travel markets bode well to services exports in the Philippines.

Global inflation remained above target in most inflation-targeting economies, albeit decelerating from its July 2022 peak. Median headline global inflation decelerated from a peak of 9.4 percent, yoy, in July 2022 to 8.7 percent in February 2023, on the back of easing supply chain pressures and moderating commodity prices (Figure 2). Amid filled inventories and warmer-than-usual winter weather, the price of European natural gas has fallen back from its record high in August 2022 toward levels seen before Russia's invasion of Ukraine. Oil prices have also declined from their peak in Q3 2022,² which contributed to the steady decline in fuel price inflation in the Philippines so far this year. Nonetheless, global financial conditions remain restrictive due to further global monetary policy tightening and bouts of financial instability amid banking stress in advanced economies. The majority of EMDEs proved to withstand these financial conditions, incurring only muted increases in risk premia on external debt.

²The average spot price of Brent crude oil declined from its peak of US\$120/bbl in June 2022 to US\$78/bbl in March 2023.

Figure 1. Growth in EMDE industrial production (3-month on 3-month) has decelerated since September 2022.

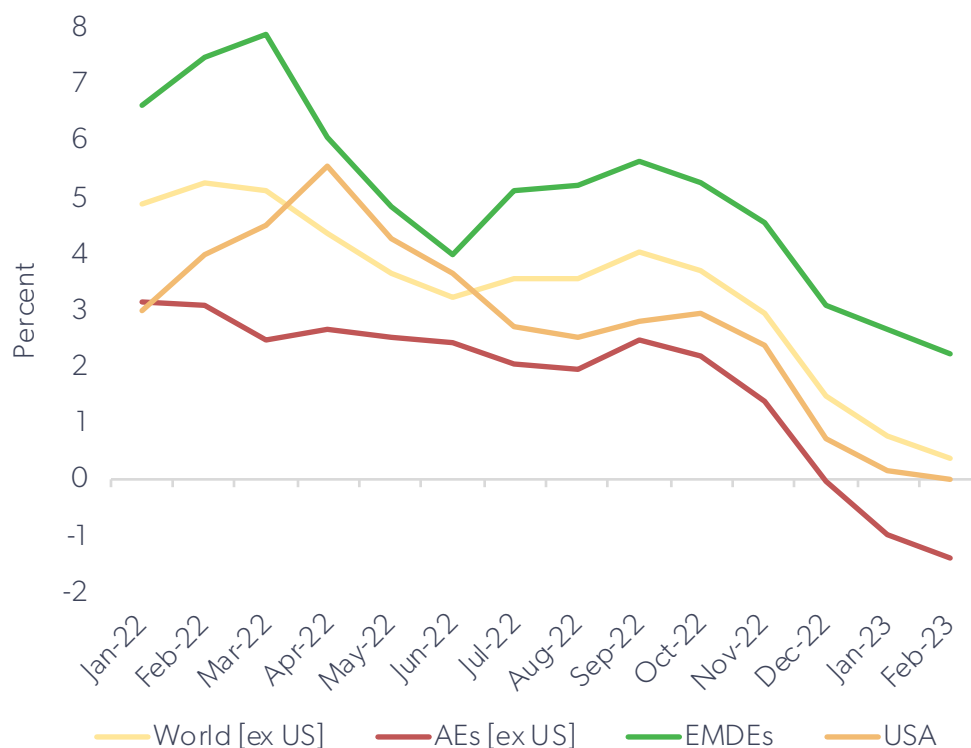
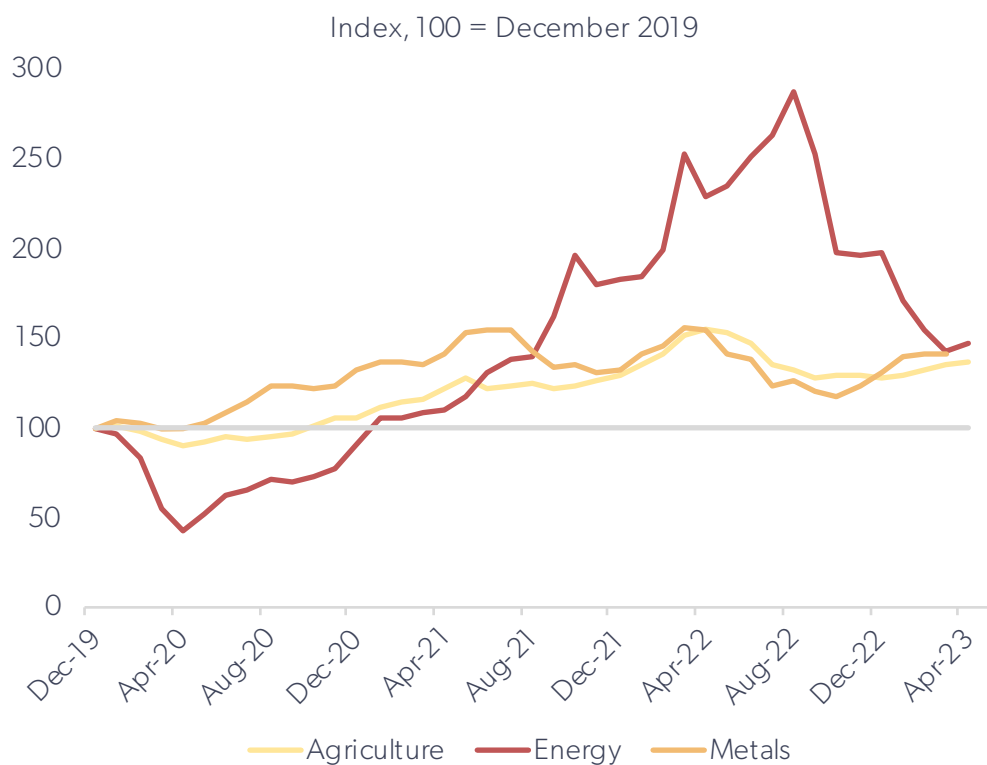


Figure 2. Moderating commodity prices helped reduce headline global inflation.



Sources: Haver Analytics, World Bank Global Monthlies, and Global Economic Prospects January 2023.

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1.2 Output and Demand: Robust Domestic Demand

The Philippines' economic growth remained robust despite elevated inflation in Q1 2023. Domestic activity was supported by lingering pent-up demand, a rebound in tourism, and better labor market outcomes. However, weaker global conditions are weighing on manufacturing and merchandise exports.

Robust domestic demand fueled growth in the first quarter of 2023 amid a subdued global environment. The economy expanded by 6.4 percent, yoy, in Q1 2023, higher than the level of growth posted by regional peers such as Malaysia (5.6 percent), Indonesia (5.0 percent), Vietnam (3.3 percent), and Thailand (2.7 percent). While lower than 8.0 percent growth in Q1 2022, the economy grew by 1.1 percent from the previous quarter on a seasonally adjusted basis. The continued release of pent-up demand as well as the strong labor market, steady remittances, and tourism rebound supported domestic activity. Nevertheless, slowing global demand for goods exports, particularly electronics, undermined the country's merchandise export and manufacturing sector performance.

The services sector drove growth while industry activity slowed and agriculture activity recovered. The services sector fueled growth and contributed 5.0 percentage points (ppts) to growth in Q1 2023. The sector's performance was driven by the continued economic reopening³, which supported the revival of tourism and consumer spending on domestic services.⁴ Meanwhile, the growth contribution of industry fell from 3.0 ppts of GDP in Q1 2022 to 1.2 ppts of GDP in Q1 2023, as weak external demand weighed heavily on exports, manufacturing, and mining. Favorable weather conditions and the rebound in livestock production following bouts of African Swine Fever improved the agriculture sector's contribution to growth.

Domestic demand remained strong despite high inflation and interest rates. Household consumption drove growth on the expenditure side in Q1 2023, contributing 4.8 ppts to growth. It was supported by improving consumer confidence, increased bank lending to households, steady

remittances, and a healthy labor market. More than 75 percent of the increase in household spending can be attributed to higher spending on non-essential items and the tourism recovery, suggesting lingering pent-up demand.⁵ However, rising inflation took a toll on household spending on food and non-alcoholic beverages, moderating consumption growth in Q1 2023.⁶ Public consumption contributed 0.9 ppts to growth, driven by higher maintenance and other operating expenditure. Meanwhile, gross fixed capital investment registered double-digit growth in Q1 2023, driven in part by increased public works.⁷ Private investment remained upbeat, supported by strong domestic activity, improved business confidence, and ample market liquidity, despite higher borrowing costs.

The slowdown in external demand weighed on net exports. Merchandise exports posted a significant contraction in Q1 2023 due to weaker global demand, reversing its contribution to growth from 1.0 ppt in Q1 2022 to -2.5 ppts in Q1 2023. In contrast, services exports performed strongly, fueled by the recovery in tourism services and the pivot from the consumption of goods toward services. This led to an increase in the growth contribution of services exports from 2.1 ppts in Q1 2022 to 2.6 ppts in Q1 2023. As a result, the growth contribution of total exports fell to 0.1 ppts in Q1 2023. Likewise, total imports' contribution to growth reduced to 1.7 ppts in Q1 2023 from 5.5 ppts in Q1 2022, as both imported goods and services growth moderated amid the slower consumption growth. The consumption slowdown reduced consumer goods imports, while the exports slowdown weighed on raw materials and intermediate imports, although this was partly offset by higher capital goods imports due to the resilience of investments. This resulted in net exports reducing growth by 1.6 ppts in Q1 2023.

³ The gradual re-opening started in February 2022 with the removal of quarantine restrictions from foreign tourists and returning Filipinos. In October 2022, mask-wearing in indoor and outdoor settings became voluntary. Health and safety restrictions on tourism establishments have also been relaxed. Moreover, proof of vaccination is no longer required in tourist spots. In November 2022, full in-person classes resumed.

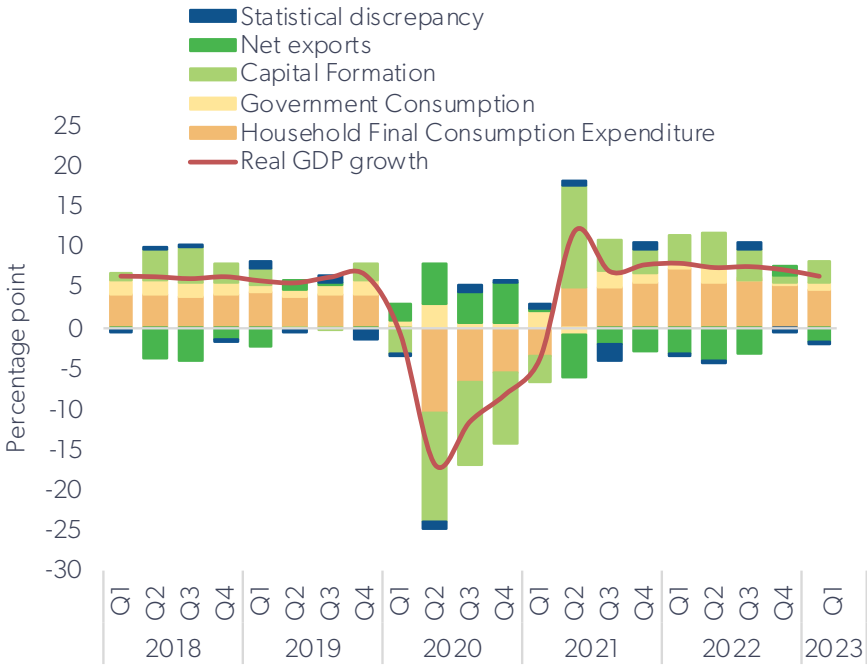
⁴ Tourism-related services such as transport, accommodation and food, and arts, entertainment, and recreation collectively contributed 2.3 ppts to services sector growth (8.4 percent yoy). Trade and other services contributed 1.9 ppts and 3.1 ppts, respectively. Meanwhile, IT-BPO-related services such as communication and professional and business services, contributed 1.0 ppts.

⁵ Spending on transport (1.3 ppts), recreation and culture (0.4 ppts), restaurants and hotels (1.9 ppts), and miscellaneous goods and services (1.2 ppts) drove the 77.5 percent growth in household consumption recorded in Q1 2023 (6.3 percent yoy).

⁶ Consumption growth slowed to 6.3 percent yoy in Q1 2023 from 10.0 percent yoy in Q1 2022.

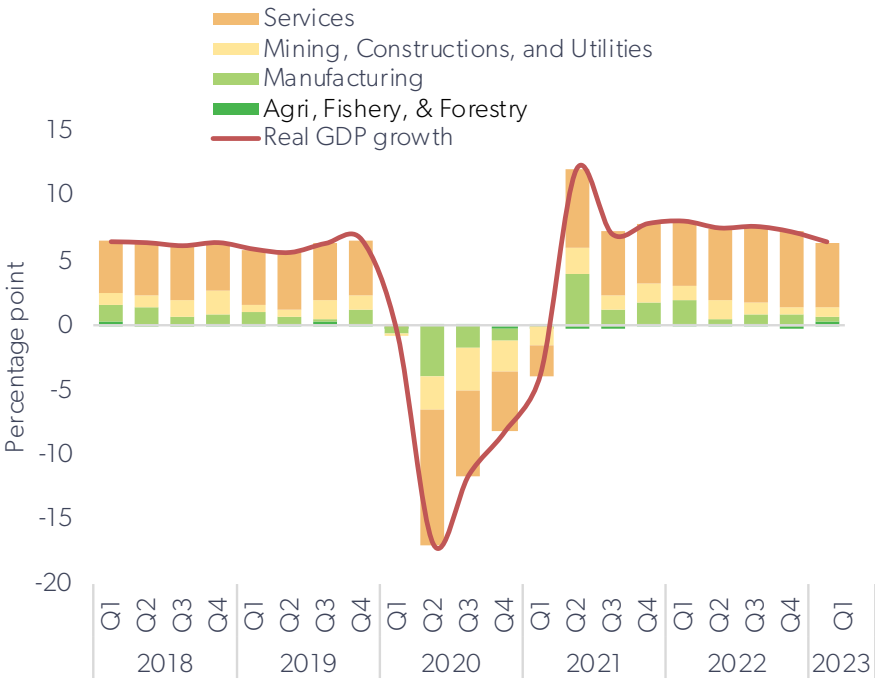
⁷ Infrastructure and other capital outlays surged by 36.1 percent, yoy, in Jan-Feb 2023.

Figure 3. Resilient domestic demand drove growth in Q1 2023.



Source: Philippine Statistics Authority (PSA).

Figure 4. The services sector mainly supported growth in Q1 2023.



Source: PSA.

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1.3 Inflation and Monetary Policy: Sticky Core Inflation

Headline inflation peaked in early 2023, but core inflation continued to rise. The BSP has raised the policy rate by an additional 75 bps since January 2023 to combat inflationary pressures.

Headline inflation has steadily declined since January 2023. It averaged 7.9 percent in the first four months of 2023, more than double the 3.7 percent in the same period in 2022. It exceeded the BSP’s target range of 2–4 percent (Figure 5) and remained the highest among regional peers (Figure 6). Food inflation (9.7 percent) and utilities inflation (7.8 percent) were fueled by shortfalls in the domestic food supply (Box 1), elevated power and water rates, and higher rent. Transportation inflation also remained elevated but has declined to 0.2 percent due to lower global crude oil prices. To combat high inflation, the government has lowered tariffs on key agricultural commodities and approved a targeted cash transfer program to mitigate the impact on the poor.⁸ While headline inflation peaked in January at 8.7 percent and declined to 6.6 percent in April, core inflation, which excludes volatile food and energy commodity items, rose further to 8.0 percent in March and 7.9 percent in April, a reflection of underlying price pressure driven by recent wage adjustments and strong domestic demand.

The BSP has continued to hike its key policy rate to address high inflation and anchor inflation expectations. The BSP has raised the key policy rate by 75 bps to 6.25 percent since January 2023 to manage the possible second-round effects from additional transport fare increases and wage adjustments. The rate hikes also aimed to curb rising demand-side pressures, as domestic demand remained robust and labor market conditions showed strength at the beginning of 2023 while cushioning

the impact of tighter global financial conditions. Despite the higher interest rates, business loans expanded at 9.0 percent in the first three months of 2023 from 6.9 percent in the same period in 2022, while loans for household consumption rose by 24.8 percent from a contraction of 4.5 percent.⁹

The financial system remained resilient with well-capitalized banks and no material exposure to recently failed banking institutions abroad. Asset quality continued to improve, as evidenced by the decline in the gross non-performing loan (NPL) ratio, from 4.2 percent in February 2022 to 3.3 percent in the same period this year, amid robust domestic demand (Figure 7). In addition, the restructured loans to total loans ratio declined from 3.1 percent in February 2022 to 2.6 percent in February 2023, indicating an improvement in borrowers’ ability to service their debt. Meanwhile, the NPL coverage ratio is adequate at 104.9 percent, which is higher than pre-pandemic levels, showing the stability of financial buffers in the banking sector. Bank profitability continued to show considerable improvement, surpassing pre-pandemic levels as the return on asset and return of equity ratios reached 1.4 and 11.9 percent, respectively (compared to 1.3 and 10.5 percent, respectively, in December 2019). However, given the policy rate hikes both domestically and abroad, regulators should focus on transparency, conduct regular stress testing, and ensure constant communication between the central bank and financial market.



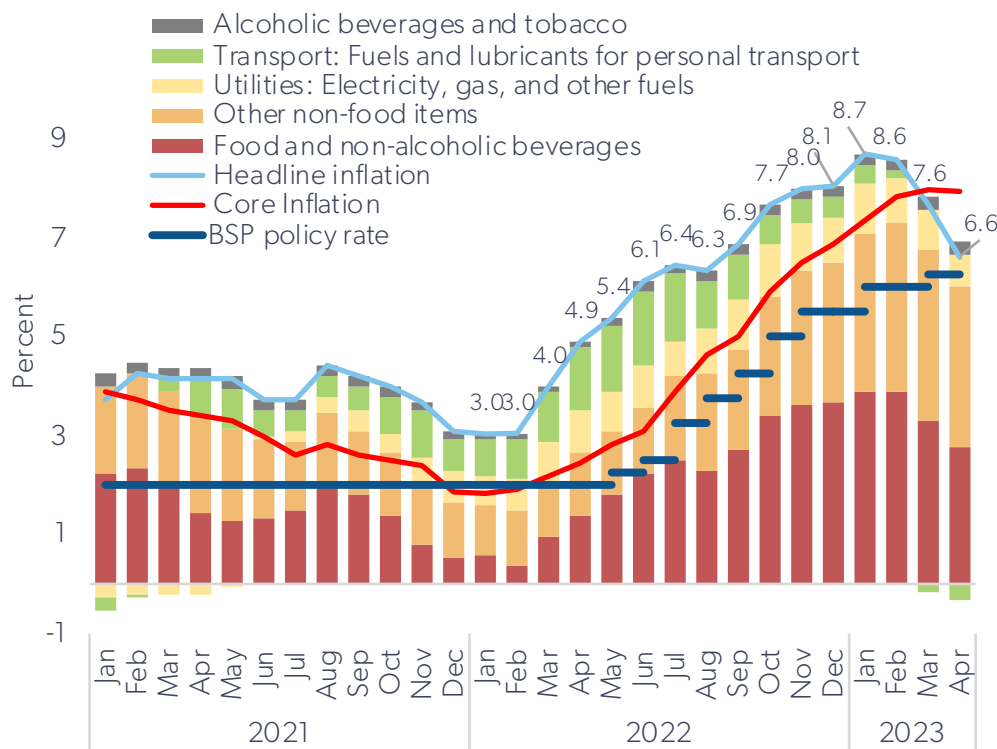
Photo by: MDVEdwards/Shutterstock

⁸ To combat high inflation, the government has extended Executive Order 171, which lowers tariffs on key agricultural commodities, until end-2023. In addition, the government has increased food imports to address supply shortages. In response to the increase in fuel prices and the price of other commodities in early 2022, the government launched a targeted cash transfer program worth Php18.3 billion, providing cash assistance to the bottom 50 percent of households (total of Php3,000 per household) for a six-month period until December 31, 2022. In February 2023, the government extended the program, providing an additional Php9.3 billion worth of cash assistance (Php1,000 per household) to vulnerable households after headline inflation reached 8.7 percent, which was higher than expected and the highest since November 2008, in January.

⁹ Monetary policy lag is estimated at 12-15 months based on the interest rate channel of monetary policy in the Philippines. A transmission lag of one to two years typically corresponds to a central bank’s policy horizon. See J. Dacio and C. Cruz, 2012, “Tenets of Effective Monetary Policy in the Philippines,” Bangko Sentral ng Pilipinas Review 2012.

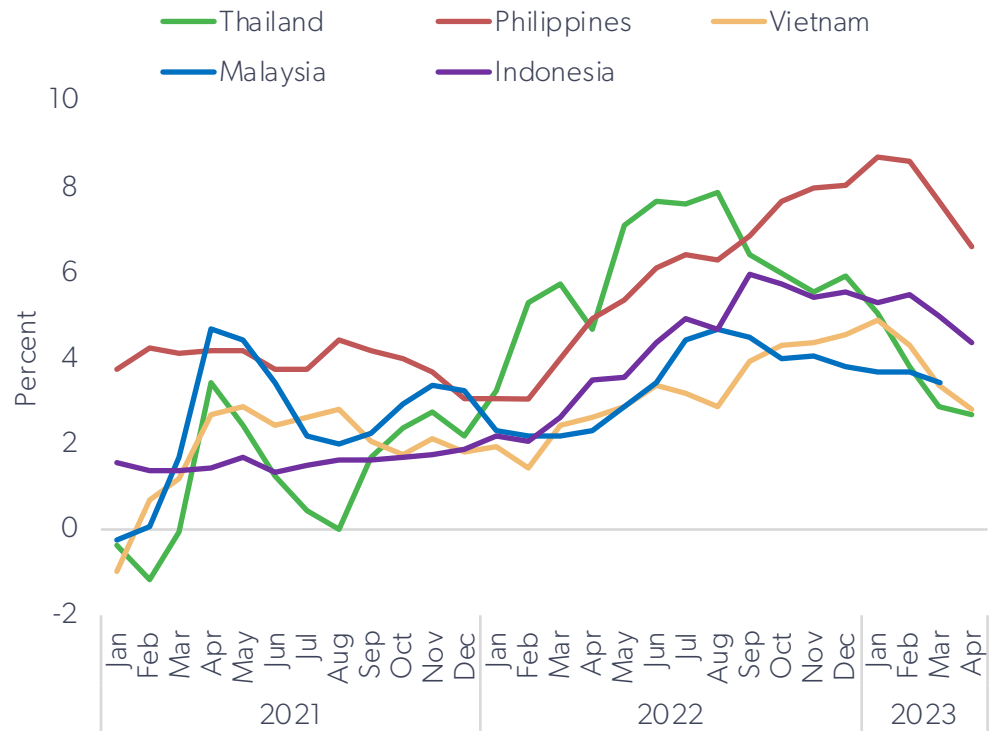
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Figure 5. Headline inflation averaged 7.9 percent in the first four months of 2023, ...



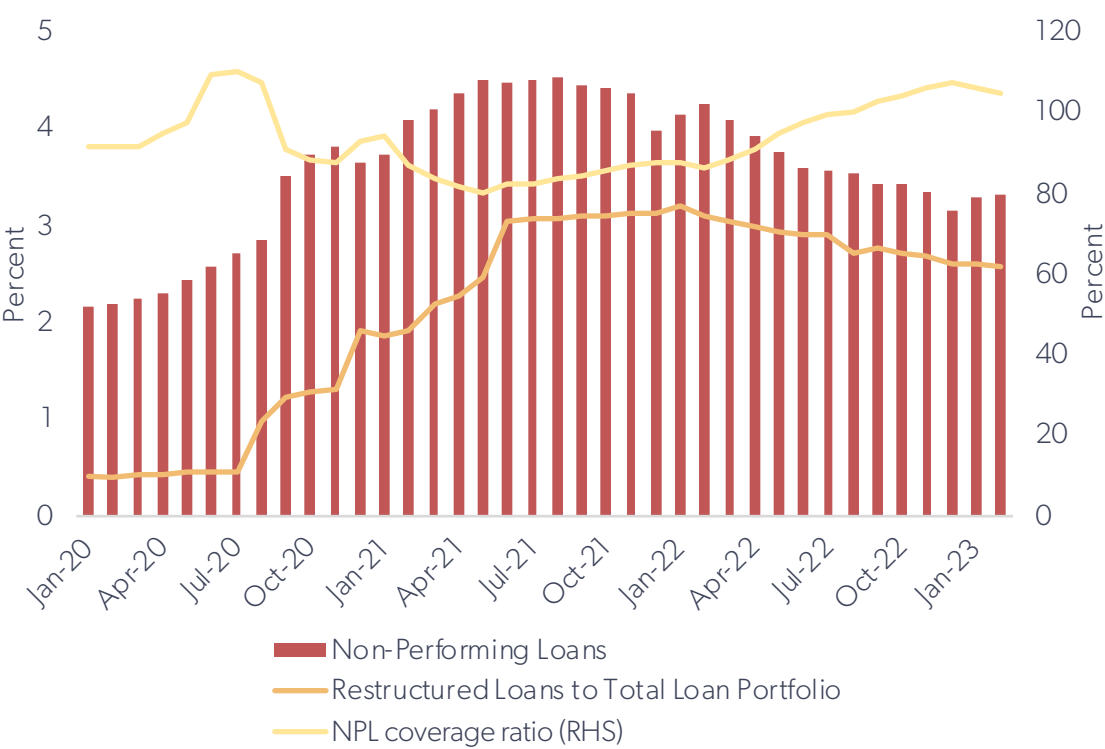
Source: PSA.

Figure 6. ... which, was the highest among ASEAN peers.



Source: BSP.

Figure 7. Forward-looking asset quality indicators improved amid the economic reopening.



Source: BSP.



Photo by: Matyas Rehak/Shutterstock

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1.4 External Sector: Wider Trade Deficit

The Philippines recorded a balance-of-payments (BOP) deficit of 1.8 percent of GDP in 2022, a reversal from a 0.3 percent of GDP surplus in 2021. Higher commodity prices and the recovery of domestic demand led to higher merchandise imports, widening the trade deficit and fueling a depreciation of the peso in 2022. In the first four months of 2023, the Philippine peso appreciated against the US dollar as the BOP returned to a surplus.

The current account (CA) deficit widened in 2022 due to a surge in merchandise imports.

It widened from 1.5 percent of GDP in 2021 to 4.4 percent of GDP in 2022 as the merchandise trade deficit worsened (Figure 8). Merchandise imports rose by 18.5 percent due to elevated commodity prices and the recovery of domestic demand, while merchandise exports grew at a slower rate of 5.9 percent, dragged by a slowdown in global activity. The surge in imports was due to more expensive mineral fuels and lubricants as well as higher import demand for consumer goods, raw materials, and intermediate goods last year. In contrast to merchandise trade, net receipts from services trade grew by 11.3 percent due to the recovery in the tourism sector and resilience in the information technology-business process outsourcing (IT-BPO) sector. Meanwhile, the growth of remittances softened to 3.8 percent in 2022 due to the global economic slowdown.

Net financial inflows financed the CA deficit in 2022. The financial account registered a net inflow of 3.1 percent of GDP in 2022, up from 1.6 percent of GDP in 2021. This was driven by portfolio investment, which reversed from a net outflow of 2.6 percent of GDP in 2021 to a net inflow of 0.3 percent of GDP in 2022, due to residents' lower demand for foreign debt securities and higher investment of national government-issued debt securities by non-residents. Direct investments registered lower net inflows in 2022, as net foreign direct investment (FDI), which mainly consisted of investments in manufacturing, real estate, and financial industry, declined from 3.0

percent of GDP in 2021 to 2.3 percent of GDP in 2022. Similarly, the net inflow of other investments declined from 1.8 percent of GDP in 2021 to 1.5 percent of GDP in 2022, amid lower inflows of special drawing rights.¹⁰ Despite higher financial inflows, the CA deficit widened in 2022, resulting in a higher BOP deficit (Figure 9). In Q1 2023, the BOP position reversed to a surplus (3.4 percent of GDP) due to higher remittances, the national government's global bond issuance, and other inflows of foreign portfolio investments.

The Philippine peso has gained strength against the US dollar since late 2022. Between October 2022 and April 2023, the peso appreciated by 6 percent due to BOP surplus and market anticipation of slower monetary tightening by the Federal Reserve amid signs of cooling US inflation. In 2022, a shortfall in the BOP and monetary tightening abroad led to a 9.6 percent depreciation of the Philippine peso against the US dollar. The Philippine peso has depreciated the most against the US dollar relative to the currencies of regional peers, although most currencies have rebounded since late 2022 (Figure 10). In real effective terms, the peso depreciated by 1.9 percent, yoy, in 2022. The resulting external price competitiveness of the peso against the basket of currencies of major trading partners could help boost the country's trade competitiveness. Meanwhile, gross international reserves dropped by 11.6 percent to US\$96.1 billion by end-2022, before recovering to US\$101.5 billion (7.6 months of import coverage) by April 2023.

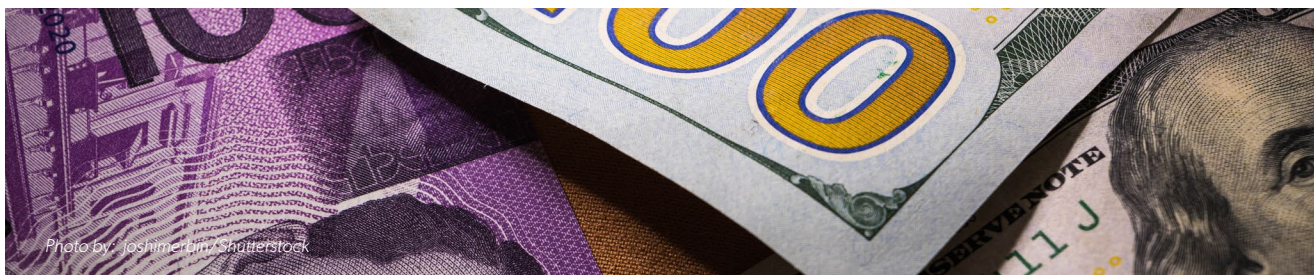
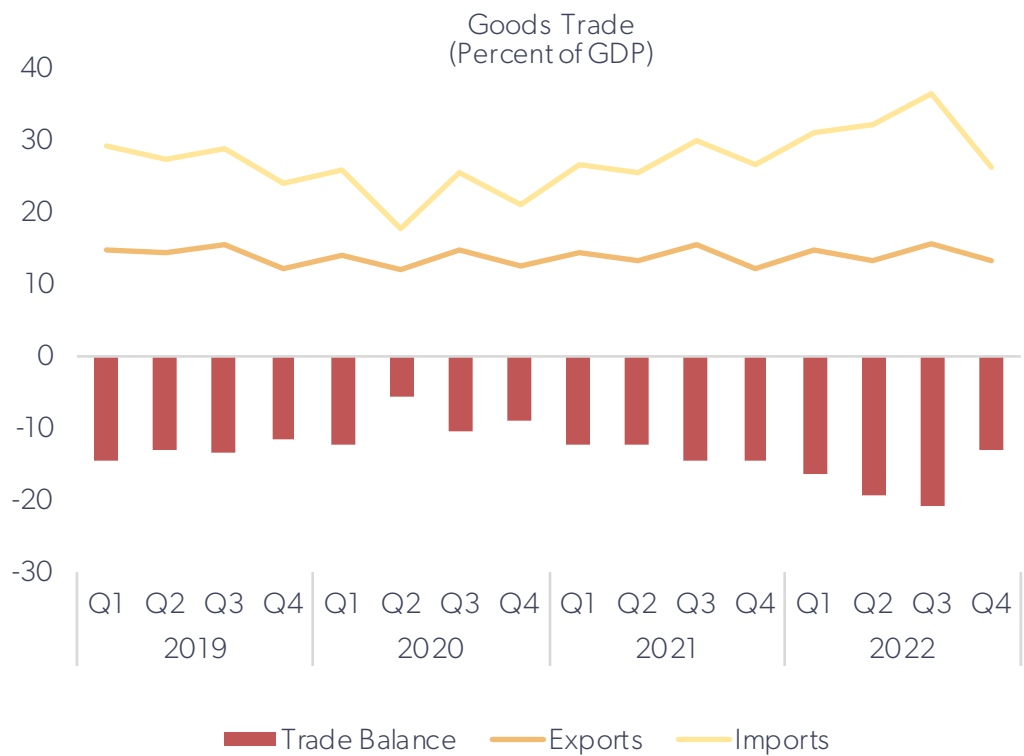


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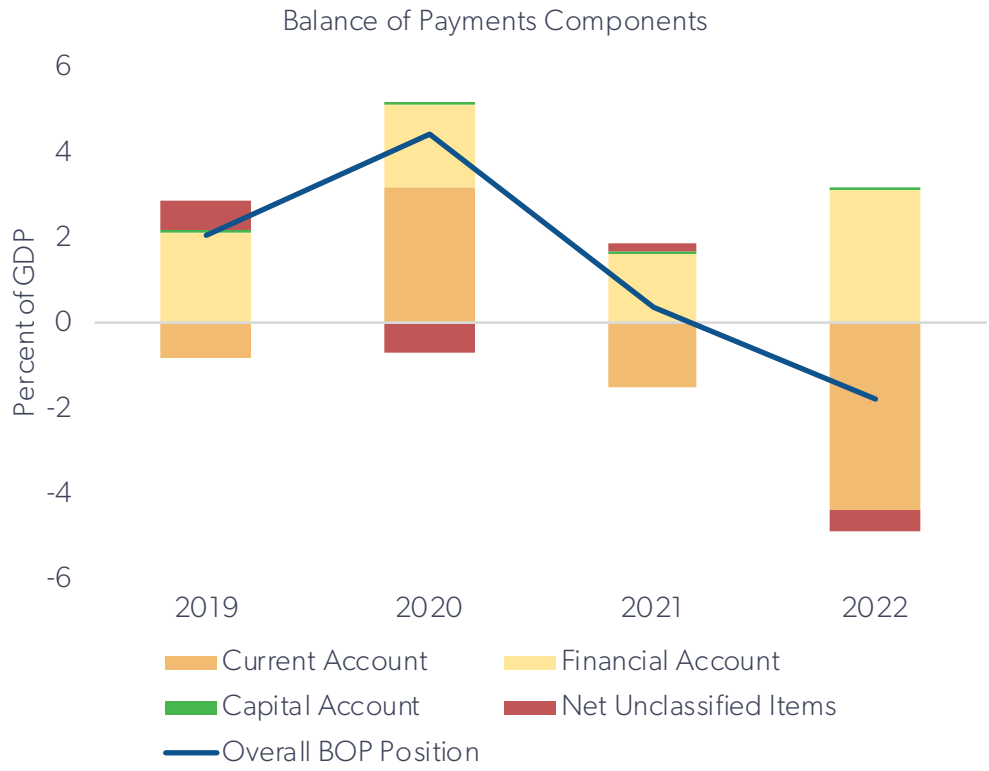
¹⁰ In August 2021, the IMF increased the allocation of special drawing rights to member countries in a bid to boost foreign reserves and increase global liquidity amid the pandemic.

Figure 8. Higher imports widened the goods trade deficit.



Source: BSP.

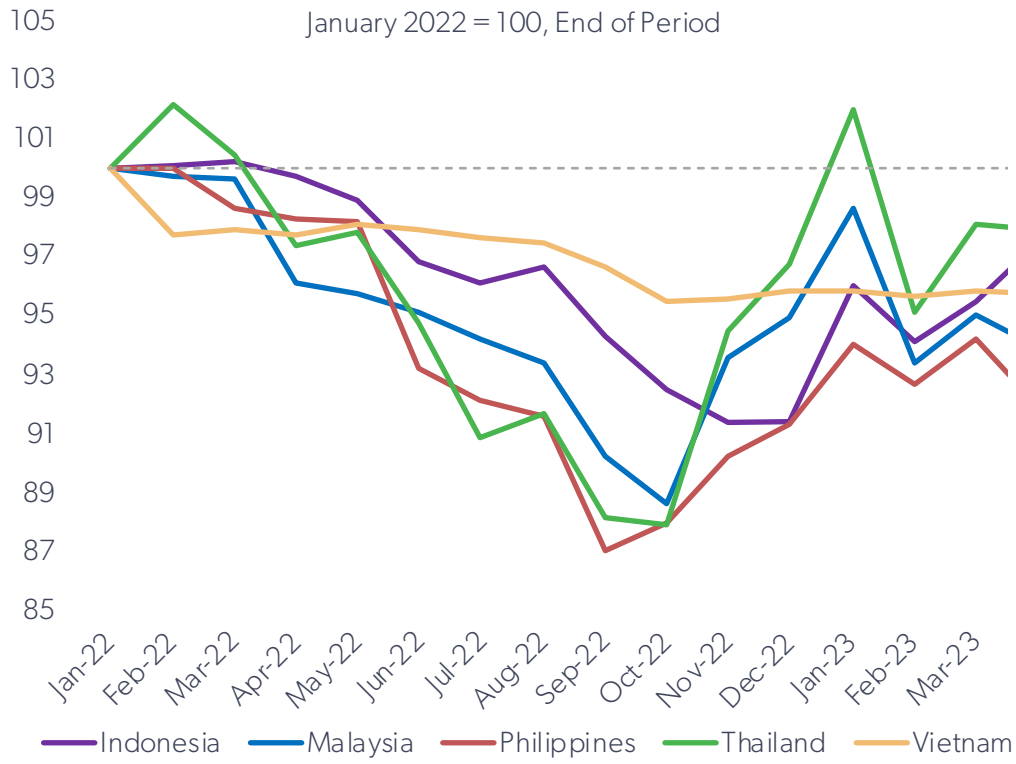
Figure 9. The BOP shortfall was driven by a larger CA deficit.



Source: BSP.

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Figure 10. Regional currencies have strengthened since October 2022.



Source: Haver Analytics.

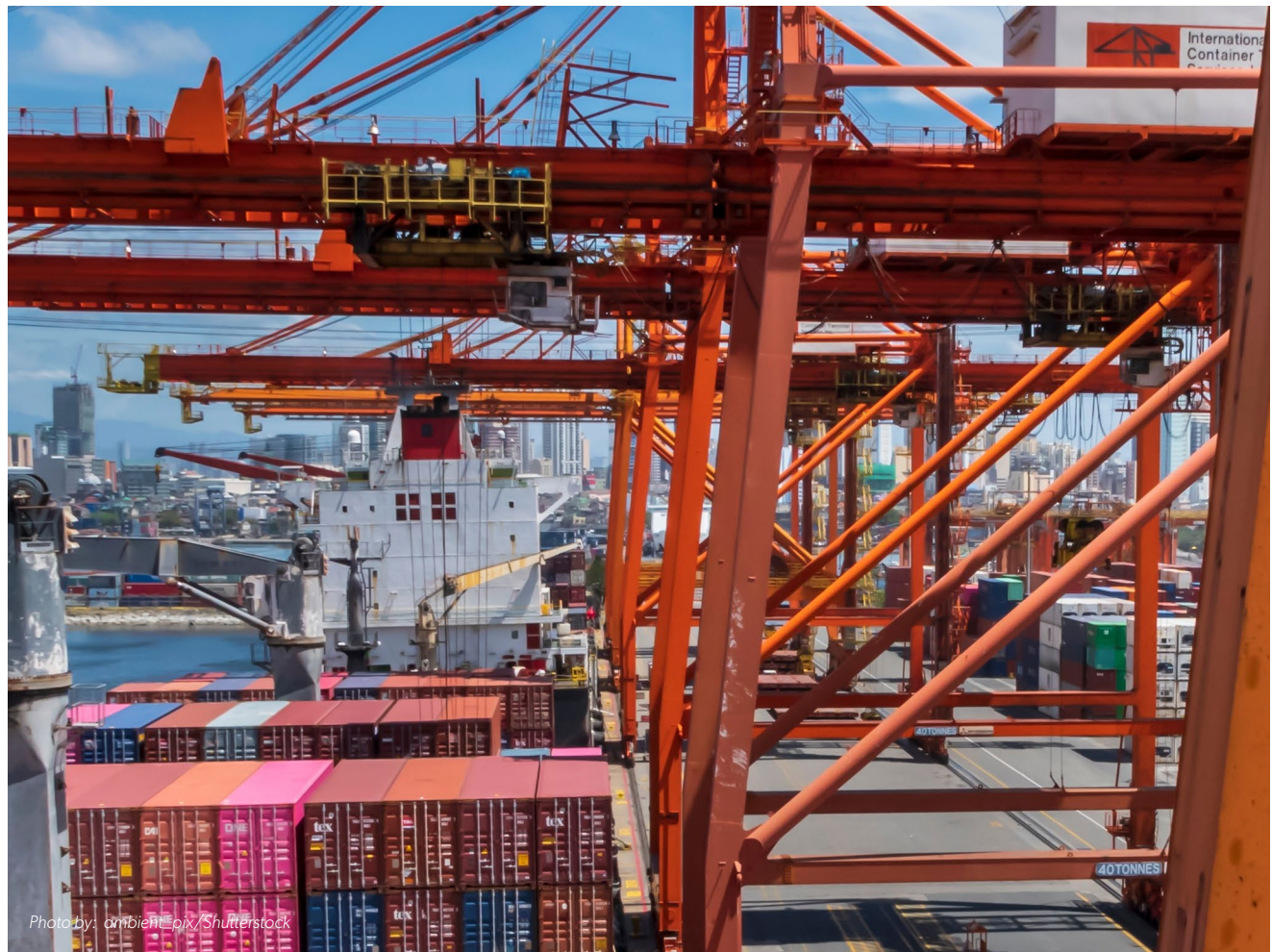


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1.5 Fiscal Sector: Narrowing Fiscal Deficit

A large decline in public spending due to lower local government unit (LGU) allotments and national government disbursements narrowed the fiscal deficit in the first quarter of 2023. This contributed to a marginal increase in national government debt to 61 percent of GDP in end-March 2023.

Despite a reduction in public revenues, a larger decline in disbursements caused the fiscal deficit to narrow, tempering national government (NG) debt growth. Public revenues declined to 14.6 percent of GDP in Q1 2023, as tax collections moderated and authorities’ changed the timing of value-added tax (VAT) payments. Public expenditures fell to 19.5 percent in Q1 2023, due to lower national tax allotments to LGUs¹¹ and lower current expenditures. As a result, the fiscal deficit narrowed to 4.8 percent of GDP in Q1 2023 (Figure 11), which caused national government debt to grow by 1.2 percent, yoy, as of March 2023 . NG debt stood at 61.0 percent of GDP as of March 2023, up marginally from 60.9 percent of GDP by end-2022 (Figure 12). The debt profile remains favorable, consisting of long-term (78.0 percent), domestic (68.7 percent), and peso-denominated (68.2 percent) debt.

Revenue collection declined from 15.9 percent of GDP in Q1 2022 to 14.6 percent of GDP in Q1 2023, in part due to lower GDP growth and a change in the timing of VAT payments. Tax revenues declined to 12.8 percent of GDP in Q1 2023, primarily due to lower tax collection by the Bureau of Internal Revenue (BIR) and the shift from monthly to quarterly VAT collection payments.¹² Reduced BIR tax collection (9.0 percent of GDP in Q1 2023, compared to 10.2 percent in Q1 2022)

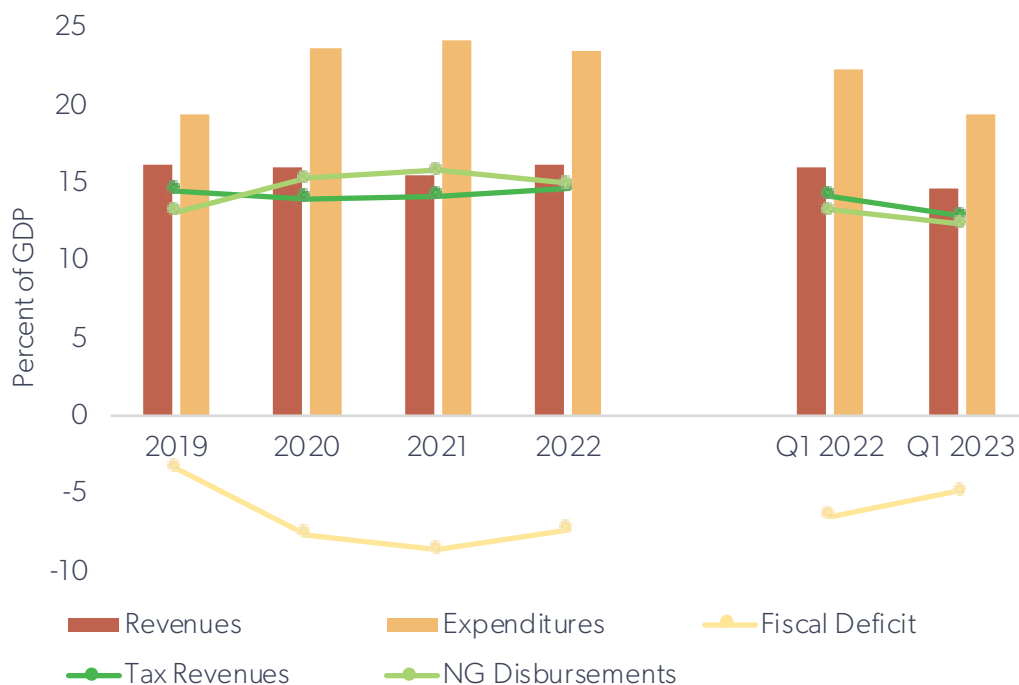
accounted for most of the decline in total revenue collection (1.2 ppts out of the 1.3 ppts decline in public revenues). Meanwhile, import duties collected by the Bureau of Customs was flat at 3.8 percent of GDP, given the tempered foreign demand for imported goods.

Public spending declined from 22.3 percent of GDP in Q1 2022 to 19.5 percent of GDP in Q1 2023, amid the implementation of the fiscal consolidation agenda and reduced national government transfers to LGUs. The decline in public spending was driven by the fall in national tax transfers to LGUs, from 5.4 percent of GDP in Q1 2022 to 4.1 percent of GDP in Q1 2023, as a result of the lower tax revenue base in 2020.¹³ Disbursements of national government agencies fell from 13.2 percent of GDP in Q1 2022 to 12.3 percent of GDP in Q1 2023, primarily through a reduction in current operating expenditures. The government continued to support expansionary infrastructure spending, as spending on capital outlays increased by 19.7 percent, yoy, in the first two months of the year. Seasonal spending, such as expenditures related to free tuition at state universities and colleges, also propped up national government disbursements in Q1 2023. Disbursements fell short of the government’s first quarter target of 21.3 percent of GDP.



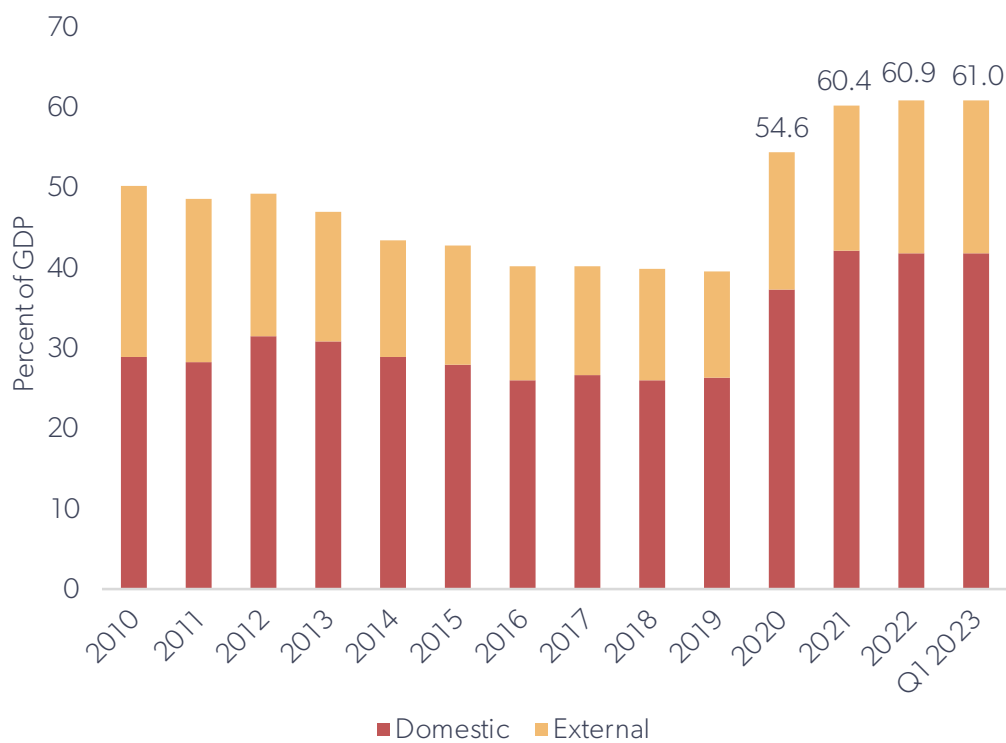
¹¹ The 2023 national tax allotment to LGUs was determined using 2020 tax collections, which saw revenues plummet as COVID-19 took a toll on the economy.
¹² The Q1 2023 VAT payment deadline to the BIR was April 2023. The shift from monthly to quarterly VAT payment was mandated under the 2019 TRAIN law.
¹³ National tax allotments to LGUs are computed based on the tax collections three years prior to the current calendar year.

Figure 11. Lower expenditures caused the fiscal deficit to narrow.



Source: Bureau of the Treasury (BTr).

Figure 12. NG debt growth has been flat while the fiscal deficit has narrowed.



Source: BTr.

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Box 1. Addressing Challenges to Food Security in the Philippines

The sharp increase in food inflation was reflective of the pass-through effects of international price increases and tight domestic food supplies. First, the disruptions brought on by Russia’s invasion of Ukraine pushed global commodity prices to record levels, raising the price of food imports and agricultural inputs such as animal feed, fuel, and fertilizer. Second, weather disturbances such as typhoons and heavy monsoon rain led to agricultural production losses. Third, local meat production continued to slump due to flare-ups of African Swine Fever and higher cost of animal feed. Fourth, currency depreciation and import delays likely exacerbated food supply issues and exerted upward pressure on imported inflation. Lastly, inadequate transport and logistics,¹⁴ especially the lack of and poor state of farm-to-market roads (FMRs), has restricted the expansion of agricultural value chains, adding to supply-side woes and exacerbating food inflation.

High food prices disproportionately affect the poor. In 2018, food accounted for more than half of household expenditures for the poorest 60 percent of Filipinos. As a result, high food prices have a big impact on the poor, with food items fueling inflation more for the bottom 30 percent of households than for households with higher income levels (Figure 13). Moreover, the Food and Agriculture Organization (FAO) estimates that an average Filipino needed to spend at least US\$4.1 per day in 2020 to have a healthy diet. This means that the recent rise in food prices threatens the gains the country has made in combatting malnutrition and stunting, with 5.2 percent of the population undernourished and 27 percent of children under the age of 5 suffering from stunting.

To ensure food and nutrition security in the Philippines, people need to have access to a daily diet that is safe, nutritious, and affordable,

which means that the country must have a vibrant, productive, and resilient food system. Food and nutrition security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life. It has four dimensions: availability, access, utilization, and stability.¹⁵ In the Philippines, food and nutrition security challenges fall into three main areas: energy deficiency (hunger), micronutrient deficiency (hidden hunger), excessive net energy intake and unhealthy diet (overweight/obesity). Malnutrition imposes large human, economic, fiscal, and social costs. It contributes to maternal and child mortality, child stunting, poor learning capacity, lost productivity and incomes for adults, high health costs, and slower economic growth. In the Philippines, lower productivity due to malnutrition is estimated to cost between 1.5 percent of GDP (UNICEF, 2017) to 2.93 percent of GDP (Save the Children, 2016).

Over the short term, the government has approved several measures in response to high food prices and alleviated concerns around rising food insecurity. On the production side, the previous administration initially approved fertilizer grants worth Php20 billion and fuel subsidies worth Php0.5 billion to cushion the impact of high commodity prices on farmers. Despite these initial measures, input costs remained high, prompting the new administration to expand fertilizer subsidies by Php13.3 billion and extend another Php1.0 billion worth of fuel subsidies to farmers and fishermen in 2023. The government has also signed cooperation agreements with Chinese firms for a steady supply of fertilizers at reasonable prices. To augment the local food supply, tariff rates on swine, corn, and rice have been temporarily reduced until December 2023, while easing some non-tariff measures such as phytosanitary import permits were being considered.

¹⁴ Given that the country is an archipelago, logistics is more challenging for the Philippines than for many other countries. At the national level, the Philippines performs worse than regional neighbors on various measures of logistics effectiveness. The country ranks lower than Thailand and Vietnam in terms of trading across borders and has the lowest liner shipping connectivity compared with these countries and Indonesia. The Philippines also has the lowest regional ranking in terms of overall logistics performance.

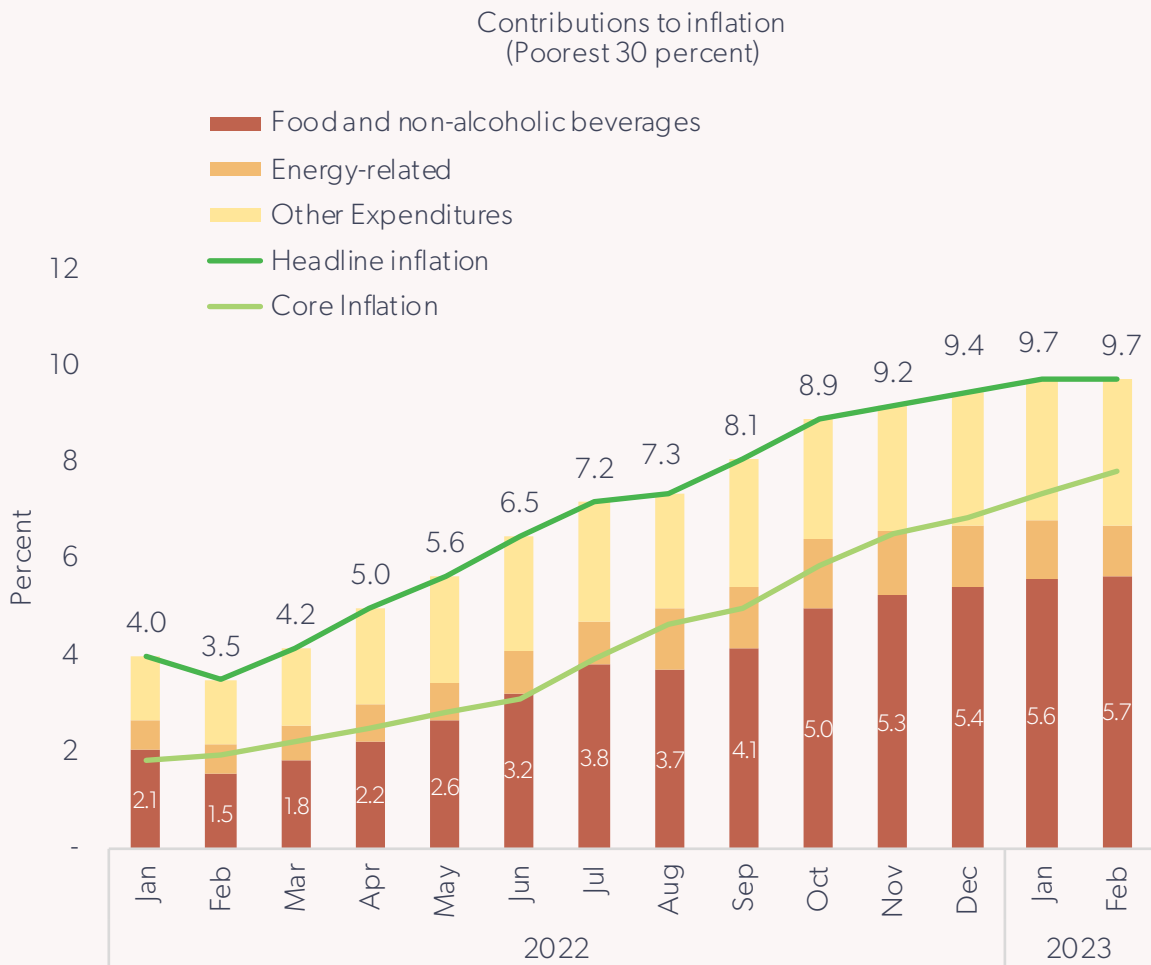
¹⁵ Availability relates to the supply of food through production, distribution, and exchange; Access refers to the affordability and allocation of food as well as the preferences of individuals and households; Utilization relates to a variety of factors that affect the quantity and quality of food that reaches household members, such as adequate diet, preparation, processing, and cooking of food, clean water, sanitation, and health care; Stability refers to the ability to obtain food over time without losing access to food as a consequence of sudden shocks (e.g., an economic or climatic crisis) or cyclical events (e.g., seasonal food insecurity).

On the consumption side, to cope with higher cost of living, a Php500 monthly cash transfer program worth Php18.3 billion was also implemented for the poorest 50 percent of the population from June to December 2022. Such cash transfers were proven to be effective in the country, with similar policies like the Pantawid Pamilyang Pilipino Program successfully reducing poverty. Collectively, these measures amount to 0.3 percent of GDP.

Over the long term, policy space to address inflation and food insecurity needs to be broadened or rebalanced, as food policy is intrinsically multi-sectoral and requires long-term structural changes. Successfully addressing inflation and food insecurity requires a shift from protecting a specific product (e.g., rice) and

type of farmer to improving the overall resilience, competitiveness, and sustainability of the agriculture sector. Also, the process of agricultural transformation requires policies and other interventions that extend beyond the scope and mandate of the Department of Agriculture and its affiliated agencies. Changes in the structure and focus of agriculture are intertwined with parallel developments in the management of water and other natural resources (Department of Environment and Natural Resources), agri-food logistics (Department of Transport), small and larger industry development (Department of Trade and Industry), and nutrition and food safety (Department of Health). In addition, policies and programs to scale up climate-smart agriculture are expected to increase the resilience of the agri-food system to weather shocks and reduce GHG emissions.

Figure 13. Poor households suffer more than the average household from high food prices.



Source: PSA.

1.6 Employment and Poverty: Concerns Of Low-Quality Jobs

Higher labor force participation and net job creation mask the persistence of low-quality jobs. While households' perception of their financial situation and incomes continues to improve, elevated inflation and labor market fluctuations remain a threat to poverty reduction.

Labor force participation gradually increased and unemployment fell in recent months. The labor force participation rate (LFPR) marginally rose from 65.2 percent in September 2022 to 66.0 percent in March 2023, driven by an increase in women's participation at a faster rate than that of men in the post-pandemic period (Figure 14). The national unemployment rate fell from 5.0 percent to 4.7 percent during the same period, although at a slower pace than previous years, indicating that the labor market continued to accommodate jobseekers in some sectors (Figure 15). Youth unemployment dropped from 11.5 percent in September 2022 to 10.2 percent in March 2023, while underemployment, which fluctuated during the pandemic, exhibited a downward trend in the same period.

While new jobs have been created, they have primarily been in the agriculture and services sectors. Between September 2022 and March 2023, net jobs gain totaled about 998,000, down from nearly 2 million jobs between April and September 2022. Jobs were created in the agriculture sector, which may be attributed to the return of farm activities after the typhoon season. The services sector, particularly in accommodation, food, administrative, and other services activities, also contributed to net job gains, signaling the return of workers to the largest sector in the economy. Jobs in the electricity, gas, steam, and air conditioning industries grew by almost 64 percent between

September 2022 and March 2023, in line with the large share of investments in the sub-sector in 2022.¹⁶ Yet, job losses came from a slowdown in industrial activity, with manufacturing losing about 1 million jobs due to supply chain issues related to higher costs and weather disturbances.¹⁷

Low-quality jobs are on a rise, even surpassing pre-pandemic levels. The share of elementary occupations associated with low and irregular pay remained high at almost 30 percent of total employment in March 2023, higher than the pre-pandemic level of 27 percent in January 2020. The rise in elementary jobs was related to the increasing number of jobs in the services sector associated with accommodation, food, administrative services, and wholesale and retail trade. The share of part-time workers—those working less than 40 hours a week—also increased between January 2020 and March 2023 (31.6 vs. 34.4 percent). Furthermore, the share of wage and salary workers among the employed slipped to 61.6 percent in March 2023, about 4 ppts lower than the pre-pandemic level. In turn, there has been an increase in the share of self-employed (own account) workers of about 1.4 ppts and unpaid workers of about 2.7 ppts, during the same period¹⁸, indicating growth in the informal labor market and shift to low-productivity jobs. Job losses in the formal labor market during the pandemic and interest in flexible work arrangements may have contributed to the increase in low-quality jobs.



Photo by: MDVEdwards/Shutterstock

¹⁶ Philippine Statistics Authority, 2023, Approved Investment, Fourth Quarter 2022, February 15, Available online: https://psa.gov.ph/sites/default/files/Publication_Approved%20Investments_Q4%202022_0.pdf

¹⁷ A. Yaola, 2023, Manufacturing growth cools in Dec., Business World, February 10, Available online: <https://www.bworldonline.com/top-stories/2023/02/10/504117/manufacturing-growth-cools-in-dec/>

¹⁸ R. Rivas, 2023, Philippines mutes rise of unpaid workers, highlights rosy jobs figures, April 11, Available online: <https://www.rappler.com/business/philippines-highlights-jobs-figures-mutes-unpaid-workers-unemployment-report-february-2023/>

Figure 14. Female labor force participation has trended upward ...

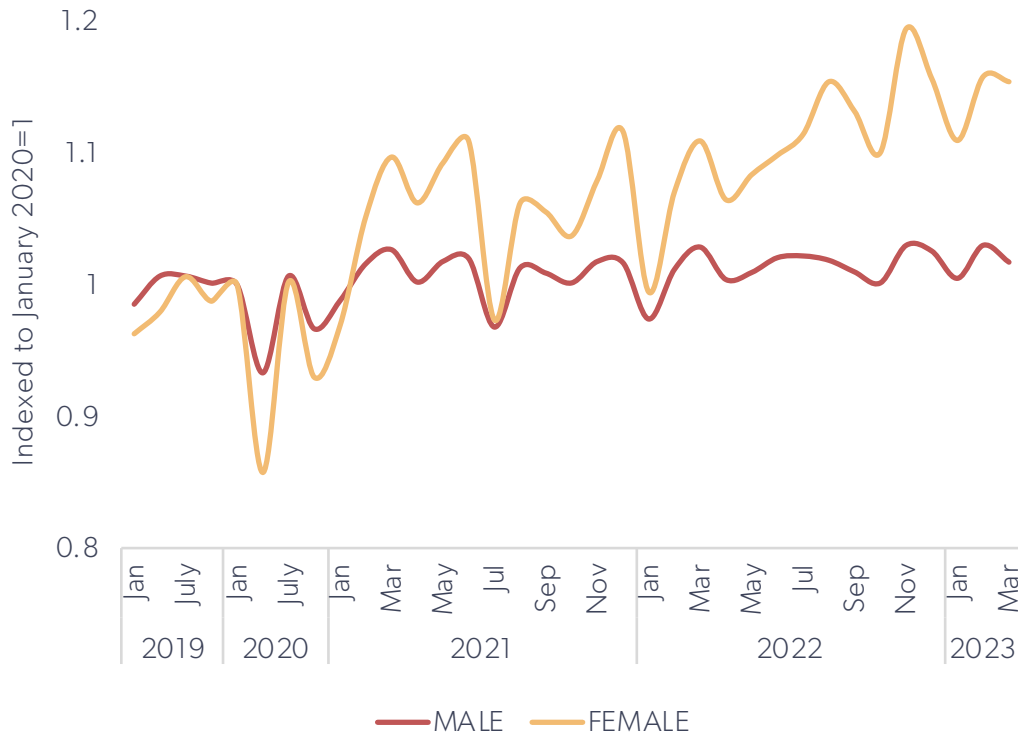
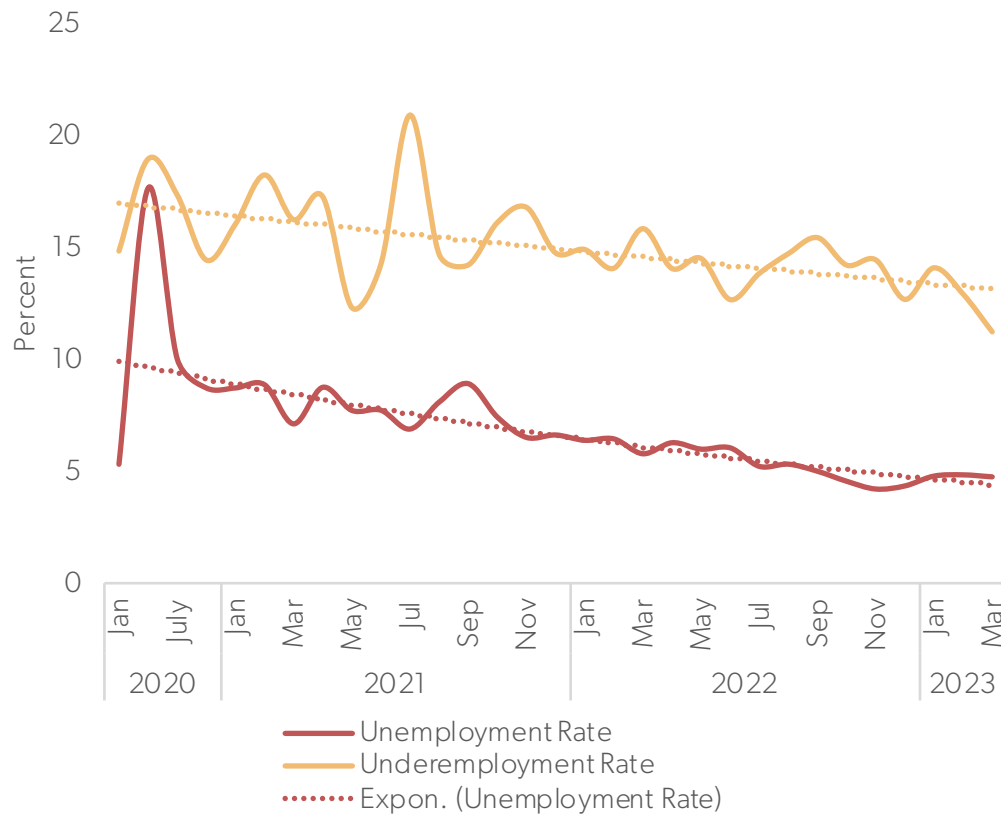


Figure 15. ... while the unemployment rate has gradually decreased.



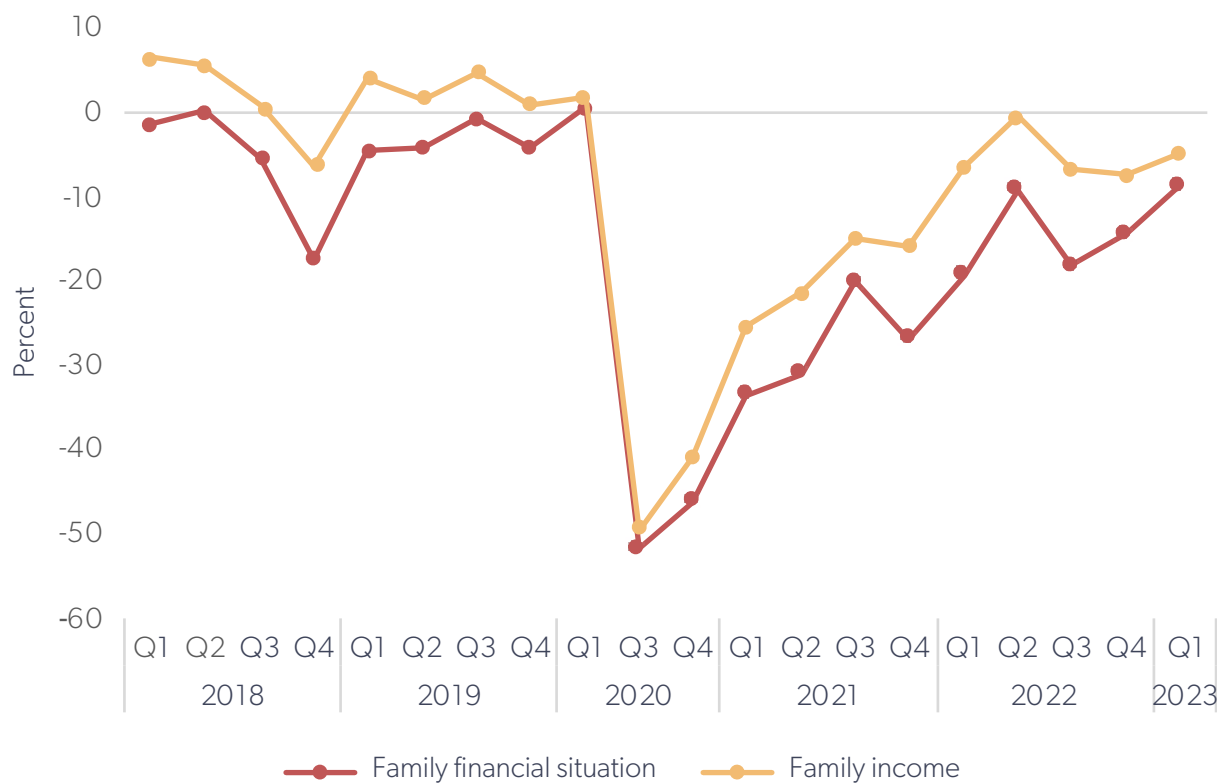
Source: PSA-Labor Force Survey (LFS) (various rounds).

Note: Starting February 2021, the LFS is conducted monthly to produce more timely data. Data show a normalized LFPR (January 2020=1).

Inflation and labor market fluctuations remain a threat to poverty reduction. Household incomes are expected to continue to recover as more household members gain employment. However, the growth in household income may be slower than before the pandemic given the proliferation of low-quality jobs and increase in self-employment. Moreover, the high cost of basic commodities and utilities easily offset the gains in household income. The average non-agriculture daily minimum wage¹⁹ increased between 2020 and 2023 across all regions, with regions 1, 6, and 8 exhibiting the highest increase (24, 23, and 19 percent, respectively). The increase in NCR was relatively lower at 6 percent. Cognizant of the impact on household incomes, the government has taken proactive measures to support poor and vulnerable households (Box 1).

Households' perception of their current finances and incomes continues to improve. Results from 2023 First Quarter Consumer Expectations Survey²⁰ show that households are less pessimistic about their current welfare status (Figure 16). The index of family income inched up from -6.3 to -4.8, while the index for family financial situation improved from -19.2 to -8.7. These changes in perception are influenced by improving labor and employment conditions as the economy continues to recover. There are, however, still more households that are pessimistic about their current situation than those that feel better off, and this is likely due to the lingering pressures from rising food and fuel prices. Details from the survey also show that higher income households are recovering faster than their less well-off counterparts, as their indices on both financial and income situation are positive at 1.4 and 4.9, respectively (from -2.1 and -4.0, respectively, in the previous quarter).

Figure 16. Households' perception of their finances and incomes is improving.



Source: First Quarter 2023 Consumer Expectations Survey, BSP.

¹⁹ Refers to the average of the upper and lower limit of the regional daily minimum wage, as reported by the National Wages and Productivity Commission: <https://nwpc.dole.gov.ph/stats/summary-of-daily-minimum-wage-rates-per-wage-order-by-region-non-agriculture-1989-present/>; <https://nwpc.dole.gov.ph/stats/summary-of-current-regional-daily-minimum-wage-rates-by-region-non-agriculture-and-agriculture/>

²⁰ A quarterly survey by the BSP of a random sample of about 5,000 households in the Philippines. Results of the Consumer Expectations Survey provide advance indication of consumer sentiments in the current and next quarters and the next 12 selected economic indicators.



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PART 2

OUTLOOK AND RISKS

2.1 Growth outlook

Resilient domestic demand will drive growth in 2023 despite high inflation and tight financial conditions. Over the medium-term, growth will be supported by the implementation of investment reforms, the government's commitment to public investment despite fiscal consolidation, and an anticipated improvement in global conditions.

Global growth is expected to slow substantially in 2023 amid subdued global demand, persistent inflationary pressure, and tighter financial conditions.²¹ Global growth is expected to slow this year, albeit at a softer pace than initially projected in the January 2023 Global Economic Prospects to reflect better-than-expected growth in the United States and the Euro Area in late 2022 and early 2023, China's economic reopening, and an improved global sentiment. From 3.1 percent in 2022, global growth is projected to moderate to 2.1 percent in 2023 (1.7 percent in the January forecast), before rising to 2.4 percent in 2024. Monetary tightening and restrictive credit conditions are tempering interest rate-sensitive activities such as private investments and construction. In advanced economies, policy rate hikes due to persistent inflationary pressures and recent bank failures have led to tighter financial conditions and a slowdown in bank lending. Meanwhile, in EMDEs excluding China, growth is anticipated to slow as both fiscal and monetary policies are likely to dampen economic activity. EMDEs with weak credit profiles are expected to experience the most subdued growth amid tight financial conditions. Global

growth is expected to modestly recover in 2024-25 due to an anticipated improvement in global conditions and global trade.

Strong domestic demand is projected to drive growth in the Philippines to 6.0 percent in 2023, before moderating to an average of 5.9 percent in 2024-25 (Figure 17). Along with the global growth upgrade in 2023²², the better-than-expected resilience of private domestic demand despite high inflation and tight financial conditions early in the year, led to the country's growth upgrade for 2023 compared to the projection in the EAP Update April 2023. On the expenditure side, private consumption growth is expected to remain robust at 6.1 percent in 2023, supported by recovering employment, improving consumer sentiment (Figure 19), a reduction of personal income tax rates beginning in 2023, and a steady inflow of remittances. Moreover, private consumption growth is projected to average 6.0 percent in 2024-25, on the strength of domestic demand as inflation returns to within the target range. However, elevated inflation will temper consumption growth as pent-up demand fades amid a drawdown in savings.²³

²¹ World Bank. 2023. June 2023 Global Economic Prospects. Washington, DC.

²² Compared to the January 2023 edition of the Global Economic Prospects.

²³ Data from the BSP's Consumer Expectations Survey suggest that the strong recovery in spending in 2022 was likely funded by a drawdown in savings.

In addition, higher interest rates may incentivize an increase in savings and discourage private borrowings. Meanwhile, the reduction in fiscal transfers to local government, and ongoing fiscal consolidation efforts will lead to slower government consumption growth in 2023.

Capital formation growth will likely moderate in 2023, but investment reforms and the government's commitment to public investment will support capital formation growth over the medium term.

Although the government will reduce public investments amid fiscal consolidation, disbursements of public capital outlays are programmed to remain above 5.0 percent of GDP in 2023–25, albeit lower than the 5.9 percent recorded in 2022. High interest rates and a subdued global environment are expected to dampen private investment growth in 2023. As a result, capital formation growth is expected to slow from 13.8 percent in 2022 to 8.6 percent in 2023. Still, improving business sentiment and the implementation of recently passed reforms, such as the amendment to the Public Service Act, Foreign Investment Act, and Retail Trade Liberalization law, will encourage private investment and attract more FDI, accelerating investment growth over the forecast horizon.

On the supply side, the post-pandemic recovery will drive services and industry growth. Services will continue to drive growth as the economic reopening will remain supportive of robust domestic demand, while improving prospects for the tourism industry will buoy contact-intensive services industries. The tourism sector will benefit from China's reopening and the recovery of global tourism demand, leading to growth in transportation services, accommodation and food services, and wholesale and retail trade services. Services growth will continue to be supported by the country's IT-BPO industry, which in turn will benefit from cost-cutting initiatives from firms abroad. Despite slower growth, the continuation of the public investment agenda will support growth in the construction sector and drive industry growth. However, manufacturing growth will moderate, as the global growth deceleration and the shift in global consumption toward more services weigh on external demand. Meanwhile, the country's vulnerability to weather-related events, along with

structural issues that lower productivity, will lead to tepid growth in the agriculture sector.

Headline inflation is projected to remain above target in 2023 as food prices remain elevated and as robust demand fuels underlying price pressures.

While global commodity prices for energy and agriculture are expected to moderate in 2023,²⁴ domestic food supply challenges have kept food prices elevated early in the year, which will weigh on headline inflation in 2023. In addition, second-round effects of high commodity prices on wages, rent, and transport prices will contribute to high core inflation in 2023. Headline inflation is projected to remain above the BSP's target range of 2–4 percent and average 5.7 percent in 2023. Meanwhile, core inflation is expected to moderate in the second half of 2023, as demand side pressures subside alongside fading pent-up demand and the impact of policy tightening. Following a year of monetary policy tightening, the BSP is expected to temper policy tightening, as headline inflation is expected to fall within the target range by the fourth quarter of 2023. Inflation is forecast to return to within the target range in 2024–25 as the BSP adjusts its policy rate and the authorities resolve domestic food supply challenges.

The CA balance will narrow over the medium-term amid the recovery in services exports, steady remittance inflows, and lower global commodity prices. External demand for merchandise exports is expected to moderate in 2023 amid a sharp slowdown in global activity, with better prospects in 2024–25, as global growth steadily improves. However, robust growth in services exports is expected to robust due to the recovery of international tourism and strong growth in the Business Process Outsourcing sector. Meanwhile, import growth is expected to decelerate in 2023 due to slower growth in investments and private consumption, and the reduction in global commodity prices. Despite the global slowdown, remittance inflows are projected to steady at around 3.0 percent in the medium term. As a result, the CA deficit is projected to narrow to 3.8 percent of GDP in 2023 and decline further to an average of 3.3 percent in 2024–25 as external demand improves. The CA deficit is expected to be financed primarily by net FDI inflows as well as net portfolio inflows and international bond issuances.

²⁴ Global energy prices are expected to decline by 25.8 percent in 2023, while global agricultural prices are expected to decline by 7.2 percent in 2023. See World Bank Commodity Markets Outlook, April 2023.

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The fiscal deficit is expected to narrow in 2023–25, contingent on the successful implementation of the government’s medium term fiscal consolidation agenda (Figure 18).

The deficit is projected to fall from 7.3 percent of GDP in 2022 to 6.0 percent in 2023. The reduction in the deficit will be driven by an expected decline in public spending by nearly 2.0 percentage points of GDP to 21.8 percent of GDP, in part due to a reduction in national tax allotments to LGUs in 2023 and the implementation of the government’s medium-term fiscal consolidation agenda. While public capital outlays are set to decline from 5.9 percent of GDP in 2022 to 5.0 percent of GDP in 2023, it is expected to remain above 5.0 percent of GDP over the forecast horizon. Moreover, the administration will continue to support public investment, complemented by increased private sector participation through Public-Private Partnerships. Recurrent spending is projected to fall from 17.4 percent of GDP in 2022 to 16.8 percent in 2023. Revenue growth is expected to moderate in 2023 amid softer GDP growth, falling commodity prices,

and lower personal income tax collections due to the implementation of the Tax Reform for Acceleration and Inclusion (TRAIN) law. Nevertheless, revenues are expected to recover to pre-pandemic levels by 2025, supported by faster growth and the passage of several tax reform bills.²⁵

The combination of fiscal consolidation and the growth recovery will keep debt levels sustainable over the medium-term.²⁶

The national government debt ratio is projected to continue to increase in the short term and peak at 61.7 percent of GDP in 2024 as financing needs will remain elevated. However, debt remains sustainable as the debt-to-GDP ratio is expected to revert to a downward trajectory beginning in 2025 owing to robust growth and the successful implementation of the medium-term fiscal consolidation agenda. Moreover, the debt composition is expected to remain stable with low shares of short-term debt and foreign-currency-denominated debt, in line with the government’s debt management strategy.

Table 1. Economic Indicators for the Baseline Projections.

	2020	2021	2022e	2023f	2024f	2025f
Real GDP growth, at constant market prices	-9.5	5.7	7.6	6.0	5.9	5.9
Private Consumption	-5.8	3.1	6.0	4.4	4.4	4.4
Government Consumption	1.3	1.1	0.7	0.7	0.7	0.8
Capital Formation	-9.1	3.9	3.0	2.0	2.2	2.4
Exports, Goods and Services	-4.7	2.2	3.0	1.4	2.3	2.6
Imports, Goods and Services	-8.7	4.5	5.2	2.6	3.8	4.4
Real GDP growth, at constat factor prices	-9.5	5.7	7.6	6.0	5.9	5.9
Agriculture	0.0	0.0	0.0	0.1	0.1	0.1
Industry	-4.0	2.5	2.0	1.3	1.4	1.5
Services	-5.5	3.3	5.6	4.5	4.4	4.3
Inflation (period average)	2.4	3.9	5.8	5.7	3.6	3.0
National government balance (% of GDP)	-7.6	-8.6	-7.3	-6.0	-5.1	-4.1
National government debt (% of GDP)	54.6	60.4	60.9	61.0	61.7	61.2
Current account balance	3.2	-1.5	-4.4	-3.8	-3.5	-3.0

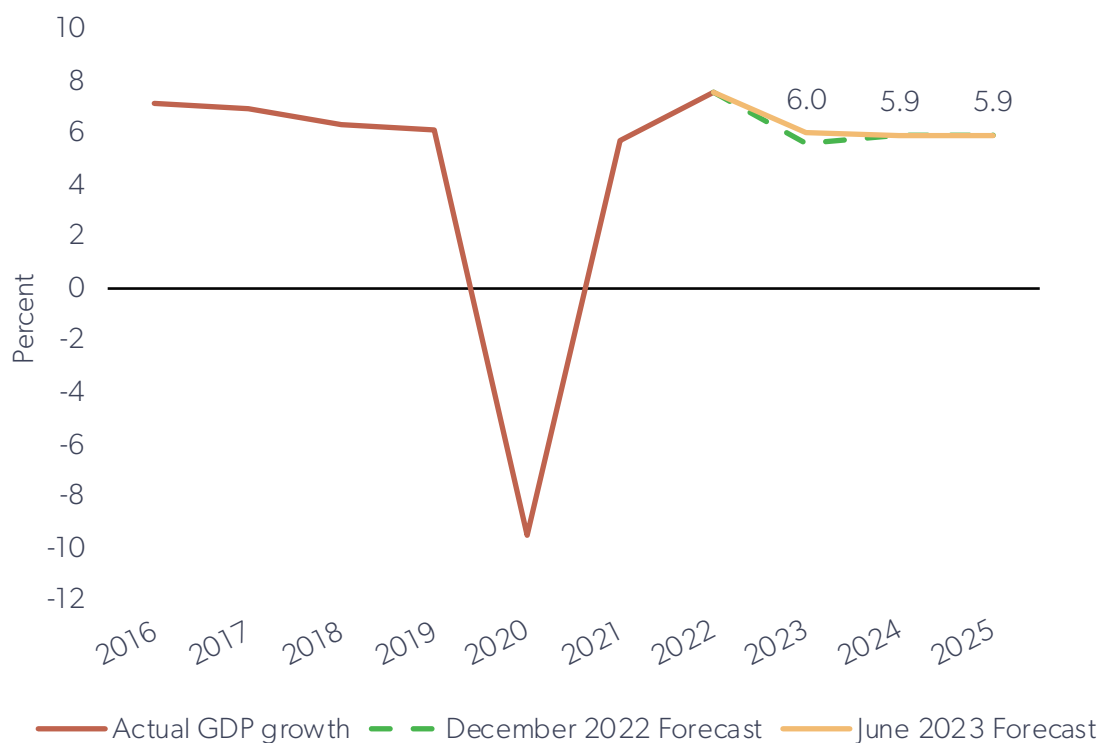
Source: PSA; BTr World Bank staff estimates.

Note: Growth subcomponents show contributions to growth.

²⁵ The proposed tax reform bills include: (i) the Passive Income and Financial Intermediary Taxation Act; (ii) a value-added tax on digital service providers; and (iii) excise taxes on single-use plastics and pre-mixed alcohols. The government is also considering additional tax reform measures such as additional excise taxes on sweetened beverages, a motor vehicle user’s tax, and a new mining fiscal regime.

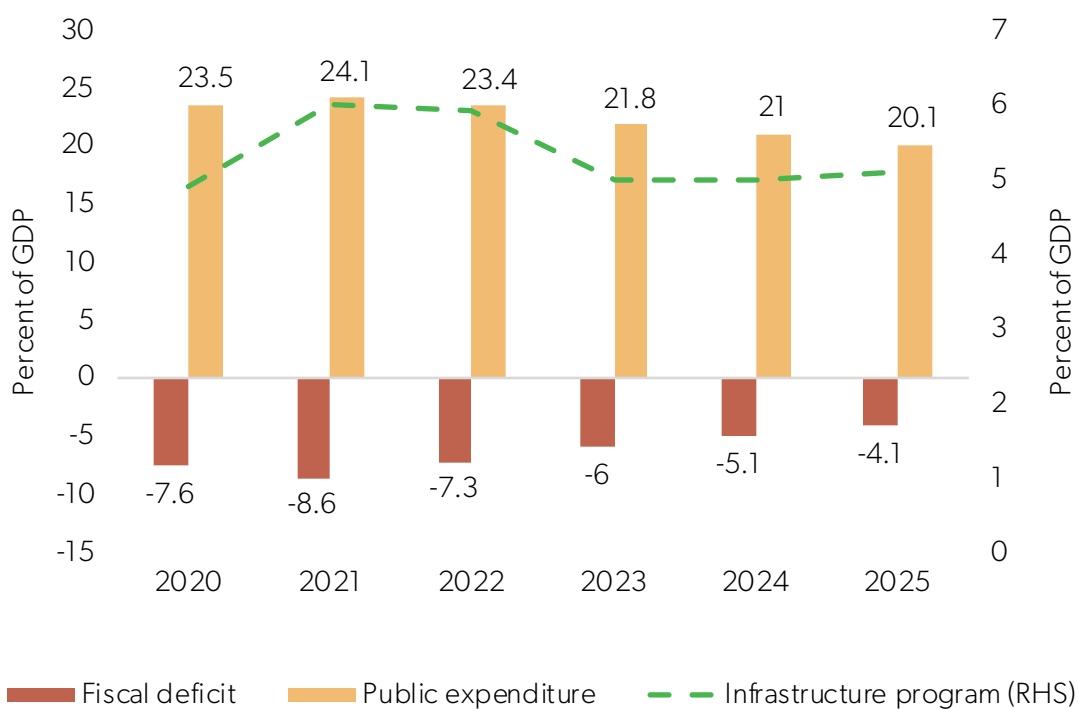
²⁶ In the debt sustainability analysis, national government debt comprises the national government’s outstanding debt from domestic and external sources. Domestic borrowings are mainly in the form of treasury bonds and treasury bills, while external borrowings are bilateral and multilateral loans, and commercial bonds such as U.S. dollar bonds, Eurobonds, Yen bonds, and peso-denominated bonds.

Figure 17. Growth prospects remain positive over the medium term.



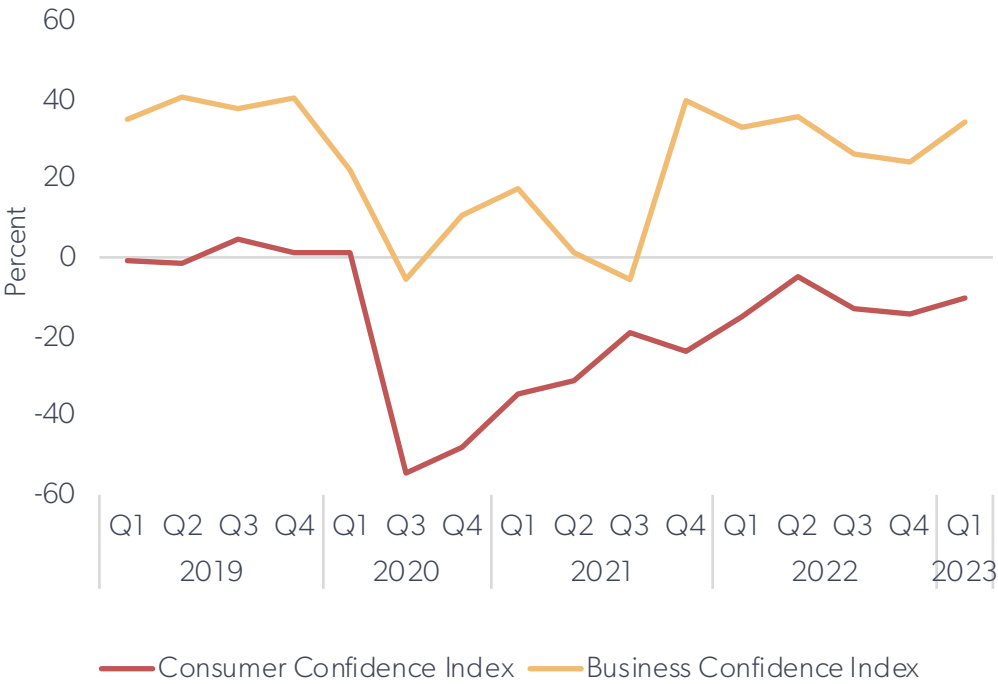
Source: PSA, and World Bank staff calculations.

Figure 18. Despite consolidation, public investment is projected to remain above 5.0 percent of GDP.



Source: BTr, World Bank staff calculations.

Figure 19. Consumer and business confidence continues to improve.



Source: BSP.



Photo by: everything possible/Shutterstock

2.2 Poverty and Shared Prosperity

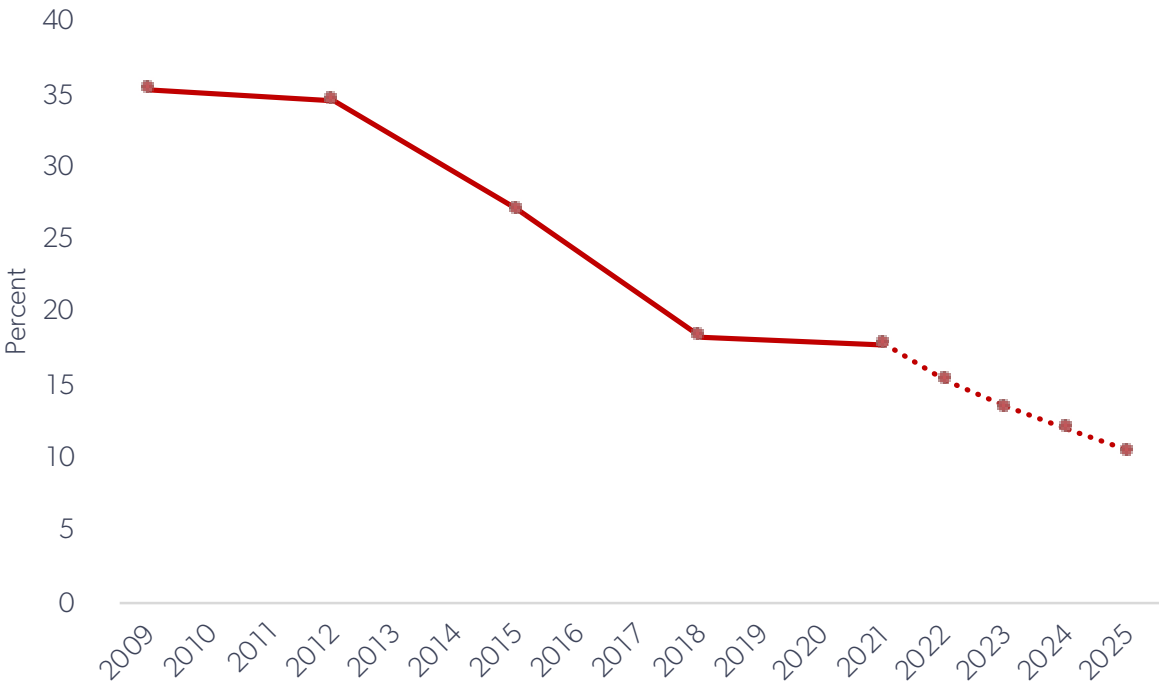
The labor market recovery will support poverty reduction, but persistent high food and energy inflation will disproportionately impact the poor and vulnerable.

Economic and labor market recovery will support poverty reduction. As the economy regains momentum and more jobs are expected to spur growth in household incomes, poverty is projected to decline faster over the forecast horizon. Poverty incidence²⁷ using the World Bank's poverty line for lower-middle income countries of US\$3.65/day, 2017 purchasing power parity (PPP) is projected to decrease from 17.8 percent in 2021 to 13.5 percent in 2023 and further to 10.5 percent in 2025 (Figure 20). However, these projections could be tempered by higher-than-expected inflation especially as higher food and energy prices can offset the increase in household incomes brought by the gains in the labor market especially among poor households.

Proactive measures implemented by the government are crucial to protect the purchasing power of the poor and vulnerable.

Given the threat of inflation and climate shocks, government needs to continue pursuing policies and interventions to mitigate the risks and ensure sufficient energy and food supply. The creation of the Interagency Committee on Inflation and Market Outlook²⁸ is an indication of the government's commitment to addressing these threats. This advisory body provides policy advice and anticipatory recommendations to manage inflation and protect the purchasing power of Filipino households.

Figure 20. Actual and projected US\$3.65-a-day poverty rates.



Source: World Bank staff estimates

²⁷ Calculations based on EAPPOV harmonization, using 2021-FIES. Actual data: 2021. Nowcast: 2022. Forecasts are from 2023 to 2025. Projection using neutral distribution (2021) with pass-through = 1 based on GDP per capita in constant LCU.

²⁸ This advisory body convened in March 2023 is cochaired by NEDA and DOF with DBM as vice chair and the line agencies DA, DTI, DOE, DOST and DILG as members. The committee functions as an advisory body on strategies to alleviate inflation and ensure food and energy security, while balancing the interests of domestic food producers, consumers, and the broader economy.

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2.3 Risks and Policy Challenges

Increased uncertainty in the global financial sector, tighter financial conditions, and persistently high inflation present the most challenging external risks. The authorities must pursue challenging yet impactful reforms while strengthening economic growth and protecting the poor and vulnerable amid limited policy space.

Risks to the global growth outlook remain tilted to the downside. The possibility of higher-than-expected global inflation, tighter global financing conditions, and escalating geopolitical tensions could cause a sharper-than-expected growth slowdown. Although headline inflation continues to decelerate in most countries due to falling commodity prices, core inflation has remained above central bank targets. Sticky core inflation, due to tight labor markets and resilient demand, could lead to further monetary tightening. A faster-than-expected and synchronous policy tightening globally could raise the cost of global financing, and could result in capital outflows from and currency depreciation in EMDEs. Meanwhile, an escalation of geopolitical tensions, mainly on Russia's invasion of Ukraine, could lead to additional food and energy supply shocks, while an intensification of US-China tensions including through the trade channel could result in increased protectionism and may dampen external demand.

The threat of financial market turmoil presents a significant risk to the global outlook. Recent episodes of financial market instability, including the collapse of certain commercial banks in advanced economies, raise concerns over potential spillovers to the global financial system. Recent banking turmoil raises the possibility of additional bank failures, which could result in banking crises with global spillovers. In turn, the deterioration in global financing conditions could increase the Philippines' borrowing costs and pressure on its public debt burden.

On the domestic front, the main short-term challenge remains containing high inflation. Although the baseline forecast assumes inflation will gradually moderate domestically, the risks to the inflation outlook remain tilted to the upside. The main upside risks to inflation include: (i) domestic food supply disruptions due to natural disasters, the threat of El Niño, and logistics challenges; (ii) elevated global commodity prices and higher input

costs amid supply disruptions or robust global demand; and (iii) currency depreciation. Higher-than-expected inflation will continue to weigh on household consumption and could lead to even more aggressive tightening of monetary policy, which could dampen investment spending and delay household spending. While the BSP has been responsive in its use of monetary policy to tame inflation, the continued implementation of non-monetary measures will be crucial to mitigate supply-side inflationary pressure. A welcome development was the formation of the Interagency Committee on Inflation and Market Outlook as an advisory body looking into measures to mitigate inflation and ensure food and energy security while balancing the interests of local food producers, consumers, and the economy.

Over the long term, the government must adopt a multi-sectoral approach to manage inflation and address food security. While short-term measures can bring transitory relief, there needs to be a broader emphasis on mitigating inflationary pressure and improving food security. Therefore, the authorities need to ensure that the agri-food system is: (i) resilient in the face of risks; (ii) inclusive in terms of the opportunities it provides and the consumers it services; (iii) competitive in domestic and international markets; and (iv) environmentally sustainable from farm to fork.²⁹ In addition, investing in climate adaptation and mitigation measures could help minimize the economic impact of climate change (Box 1), particularly in the highly vulnerable agriculture sector. Achieving these objectives will require reforms across different sectors beyond the agriculture sector, including infrastructure, logistics, and natural resource management.

The BSP is expected to continue the implementation of prudential measures and data-driven monetary policy to withstand external shocks to the financial system. The removal of temporary relief measures introduced

²⁹ The December 2022 [Philippines Economic Update Special Focus](#) on agriculture and the recently released Public Expenditure Review on Agriculture discusses these issues in more detail.

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during the COVID-19 pandemic is expected to strengthen financial sector stability. Moreover, domestic banks have capital and liquidity ratios exceeding the prudential regulatory measures set by the BSP, providing sufficient buffers to mitigate external financial sector stress. To ensure financial sector stability amid financial sector stress abroad, the BSP must remain vigilant as it closely monitors asset quality within the domestic financial system. Moving forward, the continuation of data-driven monetary policy adjustments will help anchor inflation expectations and reinforce the BSP's commitment to its price stability mandate.

Pursuing revenue-enhancing policies can enhance fiscal consolidation efforts and support growth. The Government has a political window of opportunity to implement challenging reforms early on its 6-year term. Revenue-enhancing policies could be more growth friendly if delivered through appropriate reforms. For example, the impact of the TRAIN law on growth and poverty crucially relies on the efficient use of the additional revenues towards productivity-enhancing infrastructure and human capital investments. With politically challenging reforms, early preparation and engagement with the legislative body can help generate support and ensure that the government is well placed for timely implementation of reforms. Highlighting the successes of recent tax reform initiatives in strengthening resilience and achieving inclusive growth beyond its impact on fiscal sustainability can help improve public acceptance.

Improving public spending efficiency through better targeting of social protection is essential to protect the poor and vulnerable from economic shocks amid limited fiscal space. A more efficient social protection targeting and delivery system would help protect poor and vulnerable households from the government's efforts to rebuild fiscal buffers. During the pandemic, the country demonstrated the capacity to scale up social protection programs but was hindered by implementation challenges, delays, and the sheer magnitude of the pandemic shock. Ensuring a resilient delivery of social protection measures would require the: (i) adoption of the national ID system for social protection delivery; (ii) enhancement of the targeting system; (iii) development of digital platforms and tools; (iv) continued innovation of digital government-to-person payment methods;

and (v) strengthening of contingency financing mechanisms and readiness for disaster response.

Strengthening the economic recovery and achieving the country's long-term growth ambition would require an increase in investments. Prior to the pandemic, the contribution of capital accumulation to economic growth increased substantially because of the government's commitment to public investment, while fast growth, solid macro-fiscal fundamentals, and structural reforms led to an increase in private investment. However, capital accumulation in the Philippines was still lower than in regional peers. In addition, COVID-19 caused a significant decline in both public and private investment from an average of 25.9 percent of GDP in 2016–19 to 19.3 percent of GDP in 2020–21. As a result, the country's long-term growth potential fell to a projected 5.7 percent, on average, between 2020–29, below the pre-pandemic estimate of more than 6.0 percent. Returning to the pre-pandemic level of investment spending will require a commitment to promote investment, including FDI, and facilitate stronger partnerships with the private sector. For example, the authorities could strengthen and facilitate public-private partnerships to upgrade infrastructure and maintain infrastructure investment at 5–6 percent of GDP.

An energy transition toward low- and zero-carbon alternatives will help address the energy demand to power the country's long-term growth. A cleaner energy future is expected to be more affordable, given the global trend of declining costs of deploying and integrating solar and wind power, and enhance the competitiveness of the economy. Moreover, reducing fossil fuel consumption would reduce ambient air pollution in urban areas, improving public health. The priorities in building a solid foundation for an energy transition in the Philippines are: (i) accelerating the implementation of utility-scale solar and wind projects; (ii) addressing bottlenecks in transmission and grid capacity; (iii) increasing the reliability of energy infrastructure through liquefied natural gas-to-power investments; and (iv) intensifying efforts to improve energy efficiency and demand-side management. Part 3 of the PEU investigates the state of the Philippines' energy transition, the challenges to decarbonization, and policies for a secure, affordable, and clean energy future.

Box 2. The Economywide Impact of Climate Change

Climate change will undermine the country’s development, necessitating policy actions to reduce substantial economic and human costs.

Both severe weather disturbances (e.g., typhoons and floods) and slow onset trends (e.g., sea level rise and increase in temperatures) not only hamper economic activities but also damage infrastructure and induce social disruptions, resulting in mean economic damages projected at 3.7 percent of GDP by 2030 and 11.0 percent of GDP by 2050.³⁰ The poorest households will be affected the most, as climatic shocks can damage their productive assets, increase their health expenditures, and reduce agricultural yields and their access to economic opportunities.³¹ Furthermore, the gradual increase in temperature, flood and hurricane risks, and worsening air pollution pose direct health risks, including disease or death.

Although the country is a relatively low emitter of greenhouse gas (GHG) emissions, it would still benefit from an energy transition. The concentration of harmful air pollutants, such as GHG emissions, is affected by adverse weather and worsens the risk of adverse health and socioeconomic conditions. The Philippines would therefore benefit from measures that limit activities that produce GHG emissions. Even though the country is significantly less dependent on coal and less energy intensive than its regional peers, the energy sector is still the largest contributor to these emissions, although GHG emissions from the transport sector are also rapidly increasing.³² Shifting away from fossil fuels for energy generation and transport could both contribute to global climate mitigation efforts and improve domestic energy security.³³

While investing in climate adaptation would be challenging due to high investment costs, it

could reduce economic losses by around two-thirds.

The most important adaptation measures are in agriculture and climate-proof infrastructure. If more infrastructure is robust against typhoons, the mean impact of economic damages is projected to fall to 1.2 percent by 2030 and 3.8 percent by 2050 compared to the previously mentioned scenario. Such adaptation actions do, however, incur substantial costs and could displace other productive investments.³⁴ Assuming such displacement of productive investments to other sectors could be avoided (e.g., through borrowing), GDP could increase by 0.7 percent relative to the case without investments.

Mitigation measures, especially investments in the energy sector, could marginally increase national output.

In the Philippines, climate mitigation measures could increase GDP by about 0.5 percent, offsetting any crowding-out effects. Employment could be boosted by generating nearly 80,000 jobs by 2030, with positive effects on efforts to reduce poverty and economic insecurity. While the energy transition will have a muted impact on most of the economy’s main sectors, it will greatly benefit industries involved in producing goods to transition to a low-carbon economy, including advanced manufacturing and construction. It could also facilitate future access to export markets should more countries start penalizing emissions-intensive trade.³⁵ In addition, using carbon tax revenues to increase investments in the energy sector allows for higher production through an expansion of the capital stock and could result in other domestic benefits such as lower electricity prices, reduced air pollution, and increased agricultural productivity.

Source: World Bank. 2022. Philippines: Country Climate Development Report.

³⁰ Current annual losses from typhoons are estimated between 1.2 and 4.6 percent of GDP, the latter from extreme cases such as Super Typhoon Yolanda (Haiyan) in 2013. The possible range of economic damages is wide and could reach up to 7.6 percent of GDP by 2030 and 13.6 percent of GDP by 2040.

³¹ Poor households are particularly vulnerable since they not only tend to live in riskier areas and have fewer safety nets, but also often depend on agriculture and fishing. In addition, rising food prices from lower agricultural yields due to climate shocks would affect the poor the most, as food contributes a higher share of their overall consumption. Furthermore, their access to economic opportunities will also be affected, as they would be more likely to be forced to migrate due to the negative effects of climate change.

³² It is expected that there will be a more than four-fold increase in GHG emissions from land transport owing to a more than five-fold increase in the number of vehicles by 2050.

³³ Electrifying transport would bring the largest benefits, especially if the power grid becomes carbon neutral.

³⁴ New climate-resilient infrastructure and agricultural measures to boost climate resilience are estimated to cost about 0.6 and 0.06 percent of GDP, respectively, bringing the total costs to about 0.7 percent of GDP.

³⁵ For example, the EU’s Carbon Price Adjustment Mechanism, although its currently proposed design would only have a minimal impact on the Philippines.

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			1.1	1.2	1.3	1.4	1.5	1.6		2.1	2.2	2.3		3.1	3.2	3.3	3.4

PART 3

PHILIPPINE ENERGY TRANSITION: TOWARDS A SECURE, AFFORDABLE AND CLEAN ENERGY FUTURE

The Philippine energy sector needs to grow rapidly in the next two decades to support the country's ambition of ending poverty and becoming a prosperous middle-class society by 2040. The government projects that final energy demand will triple between 2020 and 2040. Compared with ASEAN countries with significantly higher per capita GDP in 2019, the Philippines has substantially lower per capita electricity consumption at 0.9 MWh, vs. 2.8 MWh of Thailand and 5.2 MWh of Malaysia. The energy sector needs to overcome the dual challenges of meeting fast growing demand and transforming its fossil-fuel-based infrastructure while keeping energy supply secure, reliable and affordable.

The Philippines will benefit significantly from pursuing low-carbon economic growth. Transitioning the energy supply and consumption to low- or zero-carbon sources and technologies is at the core of low-carbon growth and global climate mitigation efforts. This would entail rapidly increasing the share of renewable energy (RE) in the energy mix and phasing down fossil fuels over time, which in turn would improve energy security, air quality, affordability, and competitiveness. For the Philippines, the focus is on decarbonizing power generation and transport, which together account for over 80 percent of greenhouse gas (GHG) emissions related to energy production and use.

The government is embarking on a substantial energy transition agenda. It recognizes that continuing historical trends in the energy sector would reduce energy security and deteriorate the Philippines' external economic competitiveness. The country's nationally determined contributions (NDCs) include reducing cumulative GHG emissions: unconditional target of 2.71 percent and conditional target of 75 percent below the business-as-usual baseline by 2030. The government's energy strategy includes: (1) scaling up the deployment of RE, particularly solar and onshore and offshore wind power; (2) setting a cap on the growth of coal-fired power (cap on capacity by 2025 and generation by 2030); (3) ramping up liquefied natural gas (LNG) to power investments; (4) promoting demand-side energy efficiency (EE) and electrification of transport; and (5) exploring the development of other low- or zero-carbon technologies such as nuclear power.

This chapter describes the country's energy outlook and decarbonization challenges. It explores decarbonization pathways in the power sector and their implications for an energy transition. Building a solid foundation for an energy transition in the Philippines over the medium term will be critical. The priorities include accelerating the implementation of utility-scale solar and wind projects; addressing bottlenecks in transmission and grid capacity; shoring up system reliability through LNG-to-power investments; and intensifying efforts in EE and demand-side management. The Philippines is uniquely positioned to deliver an energy transition toward an RE-dominated power system that will not only improve energy security but also enhance affordability.

3.1 Country and Energy Sector Context

Climate change poses major risks to the Philippines, which is assessed as the most vulnerable country in the World to natural disasters and calamities.³⁶ According to the estimate of the Philippines Country Climate and Development Report (CCDR) of the World Bank Group,³⁷ the economic damages of climate change in the Philippines could reach 7.6 percent of gross domestic product (GDP) by 2030 and 13.6 percent of GDP by 2040, affecting all sectors, particularly capital-intensive sectors and agriculture.

The Philippine government prioritizes climate resilience in its climate actions while also pursues a deliberate energy transition agenda. The government has put in place policies and regulations to increase RE share in power generation from 21 percent in 2020 to 35 percent in 2030 and 50 percent in 2040, while pushing down the share of coal-based generation from 57 to 45 and 23 percent during the same period. As a result, power sector GHG emissions will begin to level off by 2030, but without abating toward 2040. This is ambitious given the growth patterns of the energy sector in the past decade or so.

While the energy sector has anchored economic growth through improved energy productivity, it has also posed challenges due to high energy costs. Between 2010 and 2019, the primary energy supply increased by 1.5 times, with GDP growth increasing by 1.7 times, and the total electricity supply expanded by 1.6 times. In broad terms, the Philippine economy has expanded with the help of improved energy productivity, as reflected by the smaller increment of both primary energy and electricity than that of GDP from 2010 to 2019. Due

in large part to the removal of energy subsidies, energy prices in the Philippines are also among the highest in Southeast Asia, putting pressure on the country's external competitiveness.

The Philippine economy is significantly less energy intensive and less dependent on coal than that of regional peers. The primary energy intensity of the Philippines' GDP, which has been falling since 2000, was 6.5 GJ/thousand 2015 USD in 2019, lower than 9.6 in Indonesia and 15.2 in Vietnam. The share of coal in the primary energy supply, which has been steadily increasing, was 29 percent in 2019, compared with 29 in Indonesia and 51 percent in Vietnam. Nevertheless, coal is used much less in final energy consumption, averaging 6 percent in 2019, much lower than 15 and 26 percent in Indonesia and Vietnam, respectively.³⁸ Still, final energy consumption has a significantly higher share of oil products and biomass in the Philippines than those in both Indonesia and Vietnam, underscoring the outsized role of transport in fossil fuel demand and the large rural population, which still relies on biomass.

There has been a marked shift toward fossil fuels in the primary energy mix over the past decade. The share of fossil fuels in the primary energy supply increased from 60 percent in 2010 to 67 percent in 2020, due to a large increase in coal-fired power generation and sustained growth in oil demand from the transport sector (Figure 21). This trend highlights the fast-growing carbon footprint of energy production and consumption, which is the largest contributor to GHG emissions in the Philippines, accounting for 59 percent of total GHG emissions in the country in 2019, up from 50 percent in 2010.³⁹



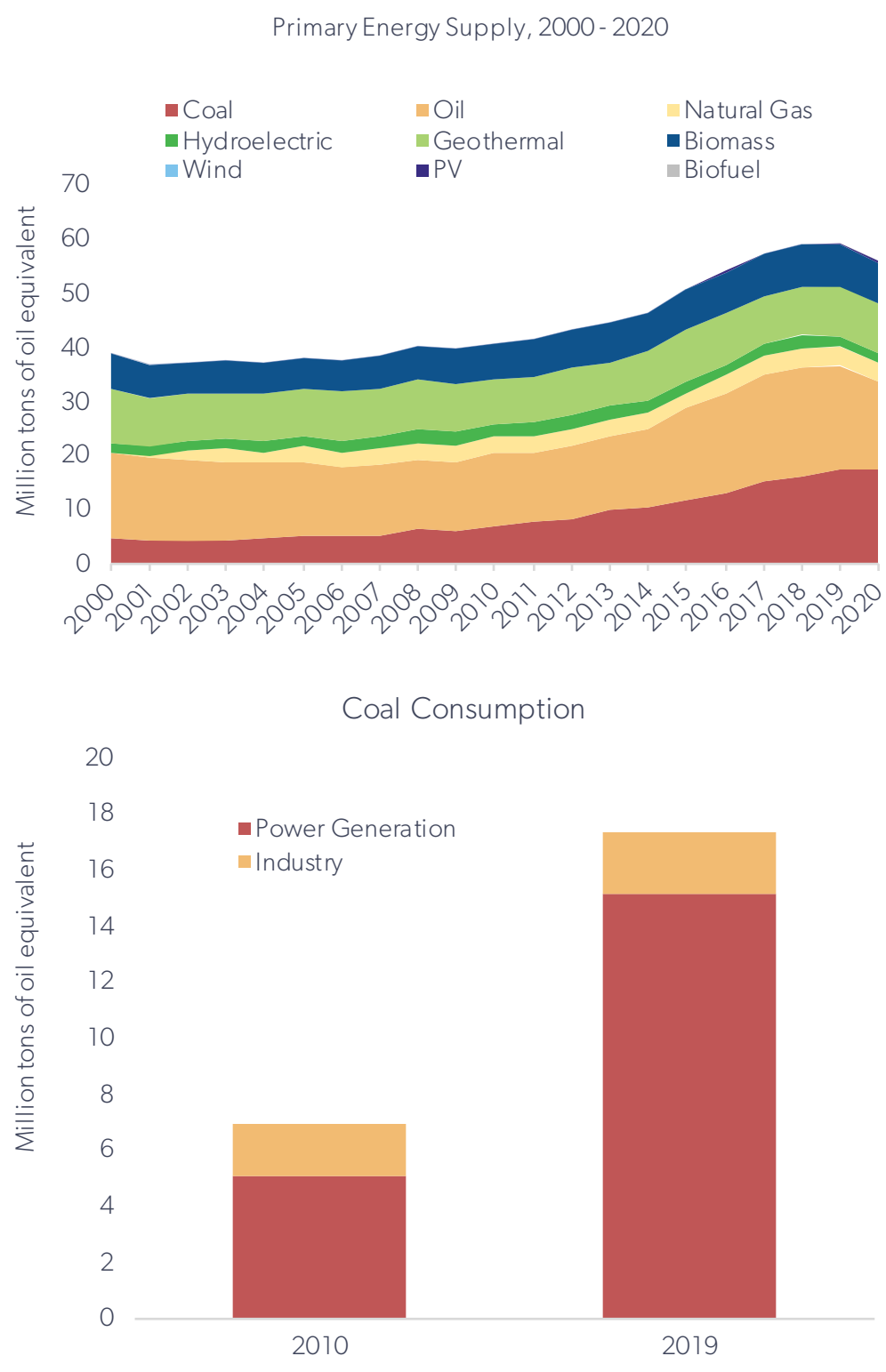
³⁶ World Risk Report 2022. Bündnis Entwicklung Hilft, Ruhr University Bochum – Institute for International Law of Peace and Conflict 2022. <https://weltrisikobericht.de/weltrisikobericht-2022-e>.

³⁷ Philippines Country Climate and Development Report, the World Bank Group, 2022. <https://www.worldbank.org/en/country/philippines/publication/philippines-country-climate-and-development-report>.

³⁸ Data are from the International Energy Agency, Energy Statistics Data Browser. Values for 2019 are used for benchmarking because 2020 values are abnormal due to the economic contraction caused by the COVID-19 pandemic.

³⁹ Climate Watch 2020.

Figure 21. Power generation and transport have been driving the increase in fossil fuel consumption.



Source: Philippine Energy Statistics, Department of Energy (DOE).

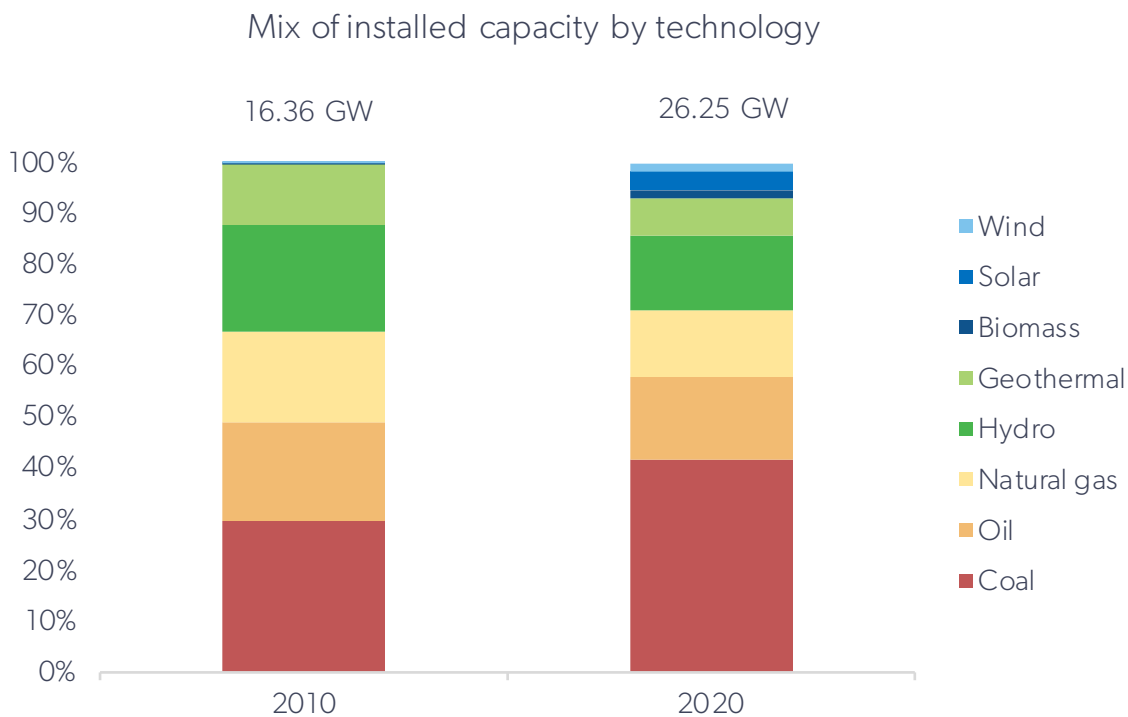
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The energy supply in the Philippines is highly reliant on imported oil and coal, and it will soon be reliant on imported LNG due to dwindling domestic gas production. The Philippines is almost fully dependent on imported oil, while it imports about 80 percent of its coal consumption, predominantly for power generation. Natural gas, which accounts for about 6 percent of the primary energy supply and predominantly used for power generation, comes almost exclusively from the Malampaya gas field, which is rapidly approaching its end of life (92 percent of proven reserves are depleted) and may cease production by 2027. Until additional domestic gas production is developed, imported LNG is necessary for the country's gas-fired power generation. Given such reliance on imported fossil fuels and the recurrent volatility of the international energy market, energy security figures prominently in the government's energy strategy.

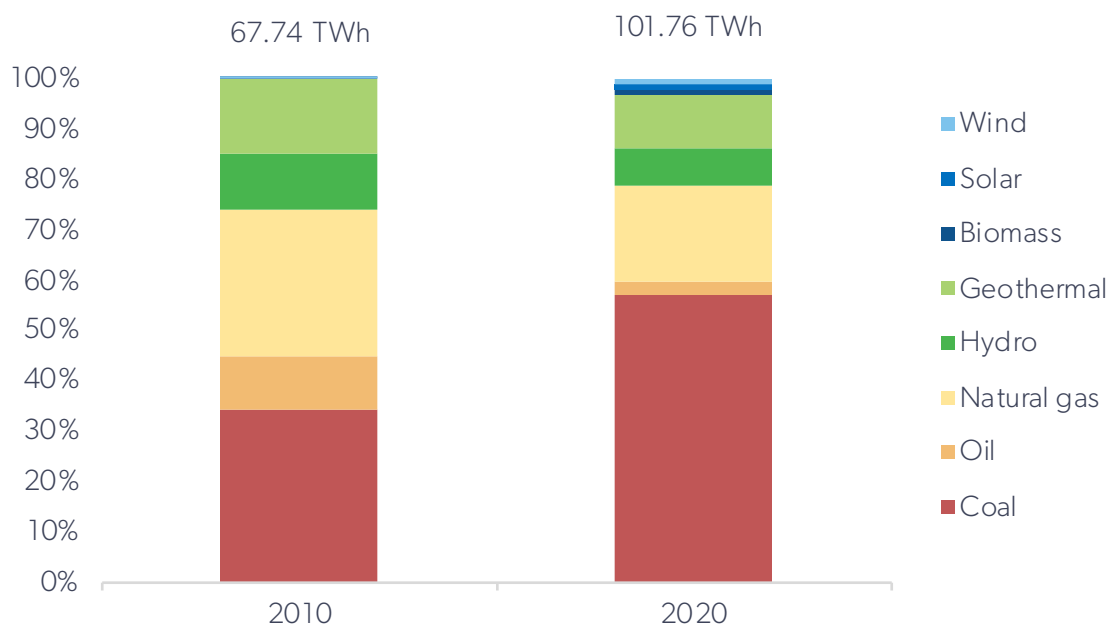
The Philippines is a rarity among developing economies in having an energy sector generally free of market-distorting subsidies. The energy sector reforms started in the 1990s had eliminated most of energy subsidies within a decade, except for a few targeted social subsidies such as lifeline subsidies for low-income households and price subsidies for households relying on diesel-powered mini grids on remote islands. Such social subsidies are generally financed by those who pay the non-subsidized rate.

The Philippine power sector has undergone important institutional reforms and technological changes in the past 20 years. Following severe energy supply shortages in the late 1980s and the Asian Financial crisis of 1997, the government enacted the Electric Power Industry Reform Act (EPIRA) in 2001 to improve the quality of service and reduce electricity costs by introducing private participation and competition in wholesale and retail markets. The EPIRA reforms were mostly completed by 2013, making the Philippine power market one of the freest in the region. These reforms unleashed a period of strong growth in private financing of power generation assets, lifting the total installed generation capacity from 16GW in 2010 to over 26GW in 2020. Boosted by the government's 'technology neutral' policy, coal-fired power increased from 30 percent of total installed generation capacity in 2010 to about 42 percent in 2020, and from 34 percent of total electricity produced in 2010 to 57 percent in 2020 (Figure 22). Solar and onshore wind energy also made inroads, accounting for 15 percent of the capacity installed in the same period, growing from zero in 2010 to about 1.5 GW in 2020. But the overall share of renewables (consisting primarily of hydro and geothermal power) in electricity generation shrank from 26 percent in 2010 to 21 percent in 2020 due to the rapid growth of coal-fired power.

Figure 22. Coal has become the dominant source of power generation over the last decade.



Mix of generation by technology



Source: Philippine Energy Statistics, DOE.

Retail electricity tariffs in the Philippines remain among the highest in the Association of Southeast Asian Nations, constraining economic competitiveness.

Reforms in the power sector did not lead to reduction in electricity tariffs, as initially hoped. The average retail tariff in the Philippines in early 2021 was US\$15/kWh, higher than US\$8/kWh in Indonesia and US\$11/kWh in Thailand.⁴⁰ While subsidies (or lack thereof) explain much of the difference, studies also point to factors such as domestic taxation, limited competition in power generation lack of competition at the retail level, and other inefficiencies in the sector. They also suggest that the sustained high cost of electricity in the Philippines may have contributed to the premature decline in the share of industry in the economy and suppressed the growth of industries, for which electricity is an important production factor.⁴¹ An important challenge to any energy transition is to avoid harming the competitiveness of the economy by further increasing the cost of energy.

Last mile rural electrification remains a short-to-medium-term priority of the government.

As of

December 2020, the country's overall electrification rate stood at 94.5 percent. While Luzon has almost achieved full electrification at 98.4 percent, Mindanao lags significantly behind at 83.6 percent, with the poorest parts of Mindanao having an access rate of around 40 percent. There are still over 1 million households without access to electricity in the Philippines, and about two-thirds of them are in Mindanao. The government has adopted a customized approach for last mile electrification that involves both off-grid (primarily based on RE) and grid-extension (when economically viable) solutions.

The Philippines has substantial RE resources, particularly solar and wind, but they are underdeveloped and underutilized.

Out of the 26.25 GW total installed generation capacity in 2020, hydro, geothermal, biomass, and solar/wind accounted for 3.78, 1.93, 0.45, and 1.46 GW, respectively, of the combined share of 29 percent. There is total untapped hydro power of 13.1 GW in the country,⁴² while the estimated geothermal potential is 4.4 GW. Wind and solar have the greatest potential but so far are the least developed. The total

⁴⁰ Philippine Energy Plan 2020-2040, Department of Energy

⁴¹ Ravago, M.V., J. Roumasset, and R. Danao. 2018, "Electricity Policy in the Philippines: Overview and Synthesis," in M.V Ravago, J. Roumasset, and R. Danao (eds.), Powering the Philippine Economy: Electricity Economics and Policy. Quezon City: University of the Philippines Press; and Ravago, M.-L.V., A.Z. Brucal, J. Roumasset, and J.C. Punongbayand. 2019, "The role of power prices in structural transformation: Evidence from the Philippines." Journal of Asian Economics, 61:20-33.

⁴² <https://www.doe.gov.ph/hydropower?withshield=1>

onshore wind electric potential from areas with good to excellent wind is estimated at 76 GW of technical potential,⁴³ while the technical potential of offshore wind is estimated at 178 GW.⁴⁴ Average solar radiation ranges from 128 to 203 watts per square meter, which translates to potential power generating capacity of 4.5–5.5 kWh per square meter per day.⁴⁵ Despite having introduced the Renewable Energy Act in 2008, the country lags behind regional leaders such as Vietnam and Thailand in installed solar and wind capacity by a significant margin due to a relatively small and cautious feed-in-tariff (FiT) program out of cost concerns and the complicated and lengthy permitting process. The recently launched Green Energy Auction Program (GEAP), along with the implementation of the Renewable Portfolio Standard (RPS), is expected to unlock significant private financing for scaling up grid-connected solar and wind while reducing cost through competitive bidding. The complex permitting process is being streamlined by the introduction of the Energy Virtual One-Stop-Shop (EVOSS) online system in 2019, although it may take some time to see its effects in practice.⁴⁶

Transmission development has become a bottleneck to the government's RE ambition. The existing grid infrastructure is already strained to ensure reliable supply of electricity and has limited spare capacity to absorb the expected large increase in RE generation in the next few years. Delays in grid expansion projects have already caused stranding of new RE generation assets. The criticality of timely investments in transmission capacity is well recognized. But the existing arrangements for transmission development planning and investments have not demonstrated effectiveness in addressing the expansion needs.

The government has also demonstrated a strong commitment to EE. The Energy Efficiency and Conservation Act (EECA) was made effective in April 2019, followed by the issuance of its implementation rules and regulations in November 2019, and provides the legal and regulatory underpinnings for a

wide spectrum of EE requirements, such as minimum energy performance standards, energy reporting of significant energy consumers, and the government energy management program, and includes support for energy service companies. While the energy intensity of GDP in the Philippines is low compared to its peers (in part due to its service-oriented economy and relatively small manufacturing sector), some key energy end-uses remain inefficient despite high energy prices. For example, over 80 percent of new window air conditioner (AC) units and 20 percent of new split AC units sold in the market in 2019 were still using fixed speed compressors, which usually have an energy efficiency ratio 25–40 percent lower than those using inverter technology, which allows compressors to operate at variable speed.⁴⁷ Another area of significant energy saving potential is the incorporation and enforcement of energy efficiency codes in the permitting and construction inspection process. While having a Green Building Code (GBC) as a referral code of the National Building Code, as well as guidelines for energy conserving design of buildings and utility systems issued by the DOE, there is insufficient evidence about the actual enforcement of the GBC in the Philippines, especially in residential buildings.

The government is actively engaged with the international community on climate change and energy transition discussions, although it has not announced a timeline for achieving carbon neutrality or phasing down coal-fired power. The first nationally determined contribution (NDC) was submitted on April 15, 2021, committing the Philippines to a 75 percent reduction in cumulative emissions (excluding land-use change and forestry) in 2020–2030, relative to projected business as usual cumulative emissions of 3,340 MtCO₂e. However, only 2.71 percent of this proposed reduction is unconditional. In October 2020, the DOE announced a moratorium on endorsing new greenfield coal-fired power plants. At COP26, the Philippines partially endorsed the Global Coal to Clean Power Transition Statement aiming to phase down the use of coal for power generation.⁴⁸

⁴³ <https://www.nrel.gov/docs/fy01osti/28903.pdf>

⁴⁴ <https://documents1.worldbank.org/curated/en/099225004192234223/pdf/P1750040b777da0c30935a0e2aa346f4e26.pdf>

⁴⁵ GIZ, It's More Sun in the Philippines, <https://www.doe.gov.ph/sites/default/files/pdf/netmeter/policy-brief-its-more-sun-in-the-philippines-V3.pdf>

⁴⁶ <https://www.evoss.ph/Home/DisplayFaq/6>

⁴⁷ <https://www.clasp.ngo/research/all/philippines-rac-market-assessment-and-policy-options-analysis-2019/>

⁴⁸ The Philippines has endorsed clause 1 (rapidly scaling up clean power generation and EE) and partially endorsed clauses 2 (rapidly scaling up technologies and policies to transition away from coal power generation) and 4 (strengthening efforts for a just and inclusive transition away from coal).

3.2 The Philippine Energy Outlook and Decarbonization Challenges

The government projects sustained strong growth in energy demand in the next two decades as a result of expected strong economic growth and significant population growth.⁴⁹ Final energy demand (i.e., the aggregate energy consumption of all economic sectors and households) is projected to triple in the baseline reference scenario (REF) of the Philippine Energy Plan (PEP) 2020–2040, while it is expected to moderate slightly in the clean energy scenario (CES), which assumes greater economy-wide EE improvements (Figure 23, left panel). With a moderate penetration of electric vehicles (EVs), demand for oil products will soar, while increased cement production will drive up coal demand significantly (Figure 23, right panel).

The primary energy supply is expected to become more reliant on fossil fuels while per capita energy consumption will remain low. The share of coal in the primary energy supply is projected to decrease under both the REF and CES, but the overall share of fossil fuels is expected to grow due to increased shares of oil and natural gas (Figure 24, left panel). The large increase in natural gas consumption is due to the switching of power generation fuel, as the government intends to cap coal-fired power generation capacity after 2025. The Philippines starts from a low level of energy consumption: the Philippines' projected primary energy supply per capita in 2040 will still be far lower than that of

Malaysia and Singapore in 2019 (Figure 24, right panel).

The economy's carbon footprint is projected to triple under the REF, driven by the consumption of fossil fuels in transport and power generation.

Future increases in GHG emissions will be dominated by power generation and transport, while industrial emissions will also increase (Figure 25). Given their emissions reduction impact and technology readiness decarbonization efforts should focus on power generation and transport.

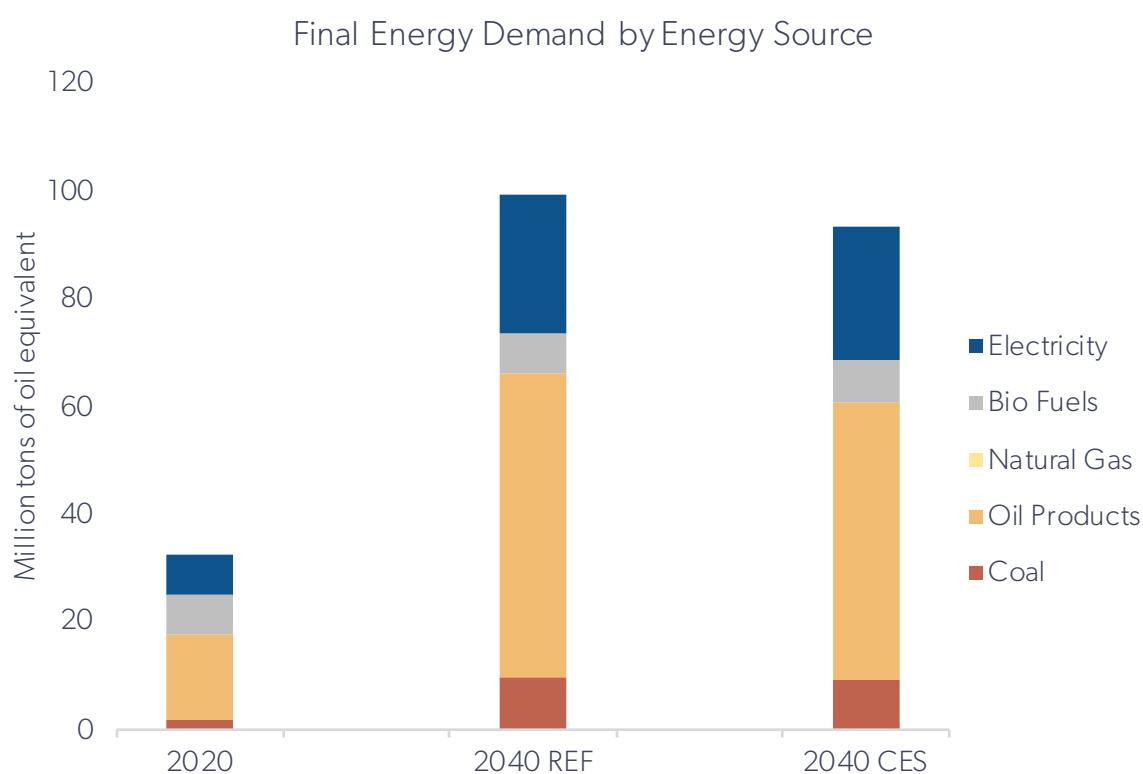
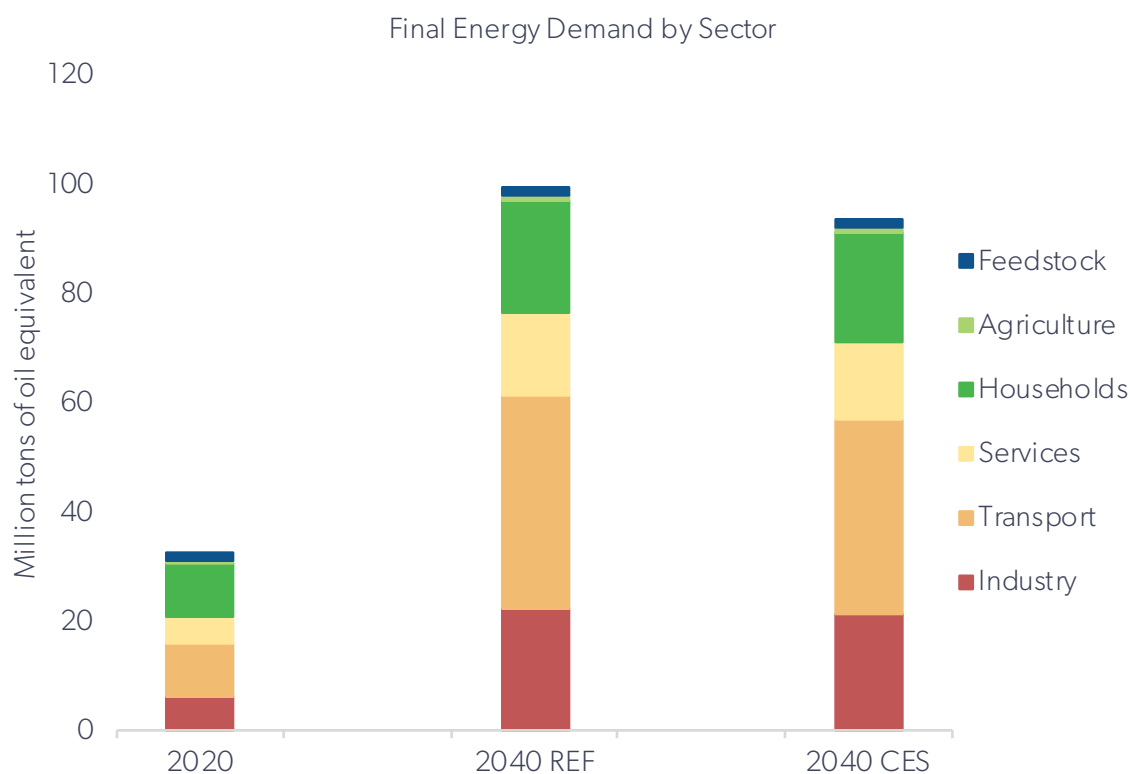
In the PEP 2020–2040, installed coal-fired power capacity will levels off after 2025 under both the REF and CES (Figure 26). The capping of coal-fired power capacity not only reflects the government's intention to stay firm on the moratorium on the approval of green-field coal-fired power plants (CFPPs), it also implies that a significant number of projects in the pipeline have been shelved. Additional CFPPs worth 2.64 GW only include projects that are already at different stages of implementation. The PEP 2020–2040 does not envision a phase-down of coal-fired generation capacity, although the CES envisions coal-fired generation peaking by 2030. The leveling-off of coal-fired generation is expected to be counterbalanced by the expansion of natural gas-fired power and RE sources, particularly solar and hydropower.



Photo by: MintImages/Shutterstock

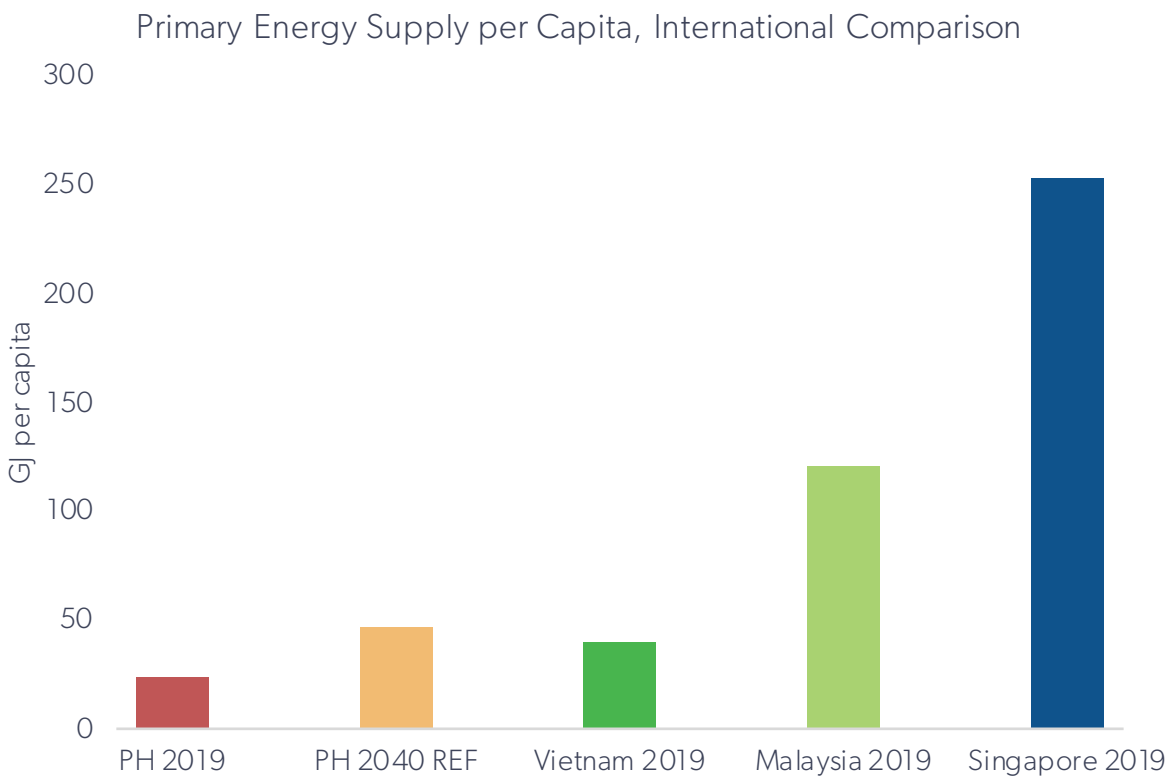
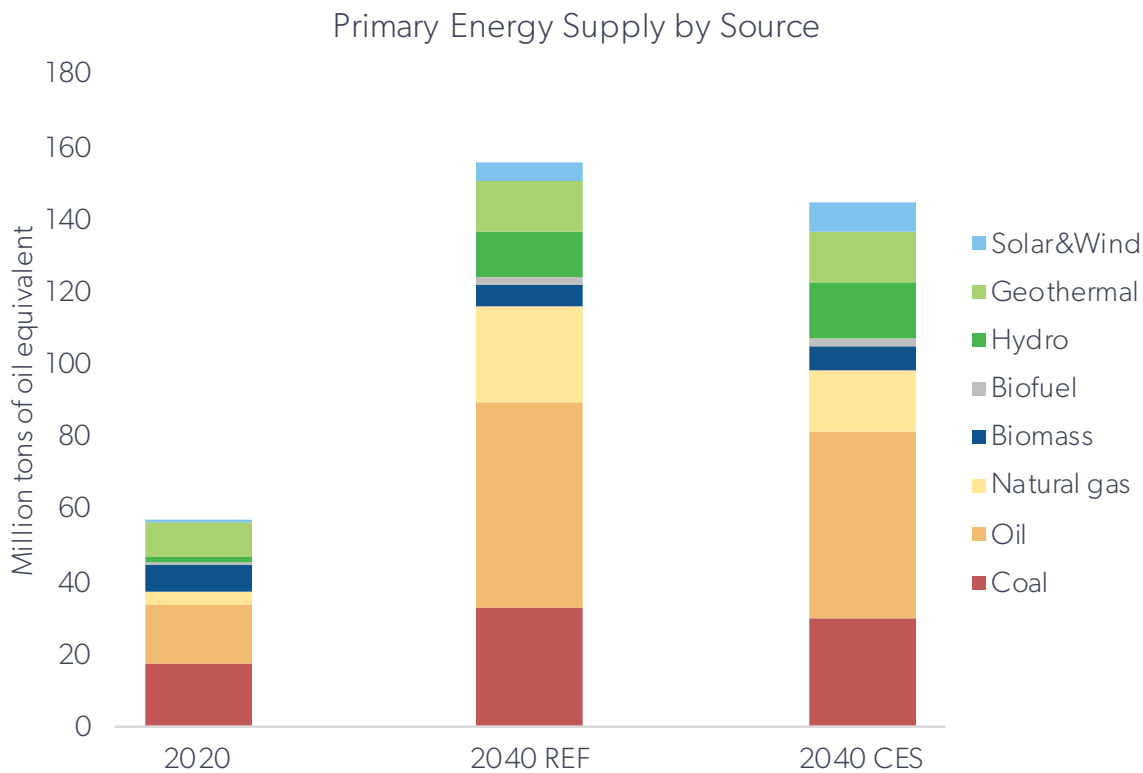
⁴⁹ Philippine Energy Plan 2020–2040. Real GDP growth is projected to average 7.2 percent per annum in 2020–2040.

Figure 23. Energy demand is projected to grow rapidly, particularly in transport, industry, and services.



Source: Philippine Energy Plan (PEP) 2020–2040, DOE.

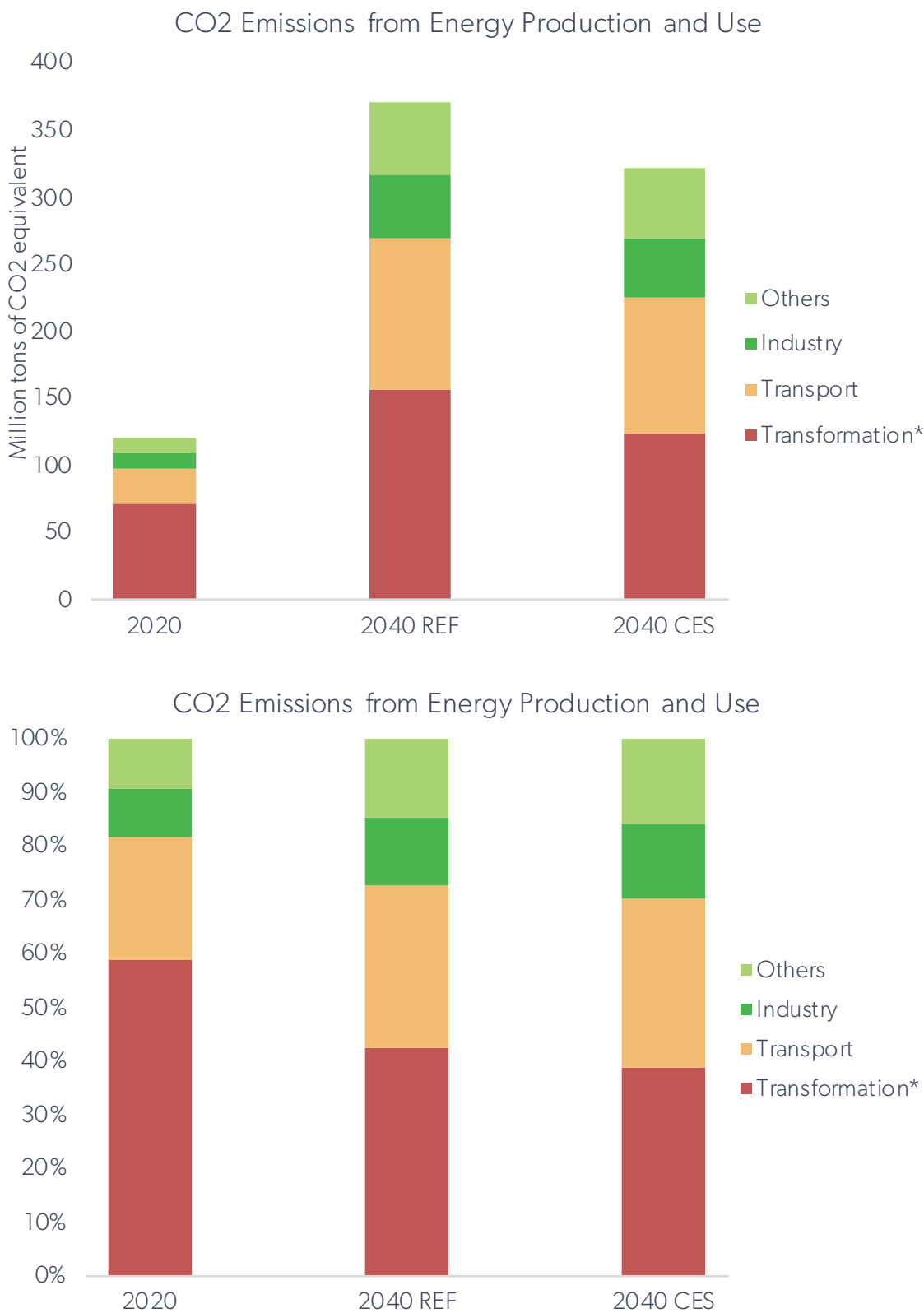
Figure 24. The primary energy supply is expected to rely more on fossil fuels, driven by power generation and transport.



Source: PEP 2020-2040, DOE International Energy Agency.⁵⁰

⁵⁰ <https://www.iea.org/countries>.

Figure 25. Decarbonization efforts need to focus on power generation and transport.

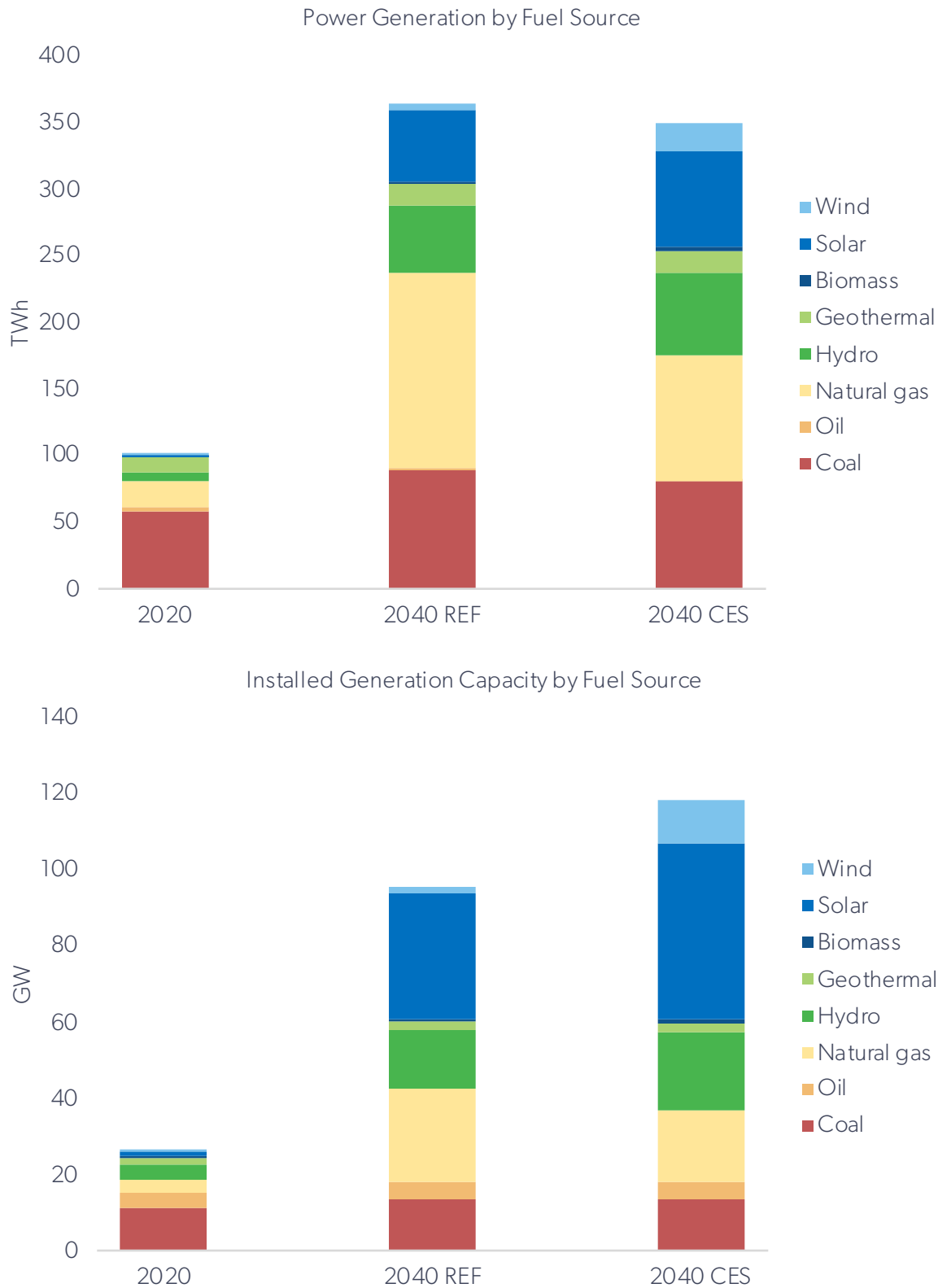


Source: PEP 2020-2040, DOE.

Note: *Energy transformation is predominantly power generation. Other sectors include services, households, and agriculture.

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Figure 26. The share of coal in power generation is expected to fall significantly.



Source: PEP 2020-2040, DOE, International Energy Agency.

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The Philippines is pivoting toward natural gas for power generation in a time when domestic production is dwindling and international market prices for LNG have skyrocketed. The government has approved six LNG terminal and regasification projects to be financed by domestic and international private investors. Three of them, with a combined capacity of 11.26 million ton per annum (equivalent to 15.5 billion cubic meter per annum natural gas capacity), are expected to be completed in 2023, providing ample capacity for existing power plants relying on the Malampaya gas field. The additional terminals are at different stages of development and will be able to accommodate the planned increase in gas-fired power capacity up to 2035. The main short-term challenge for the Philippines is securing LNG supplies at reasonable prices in a tightening global LNG market. Although the LNG benchmark price (Japan/Korea Marker) for spot cargoes has come down substantially from the August 2022 high, it remains elevated compared with pre-pandemic levels. An inability to source LNG at competitive prices and in sufficient quantity could result in significantly higher electricity rates or potential shortfalls in generation.

The government's ambition to scale up RE deployment is reflected in the CES, in which the share of electricity generation from RE sources is expected to grow from 21 percent in 2020 to 50 percent by 2040. This target was made official in the updated National Renewable Energy Program (NREP) 2020–2040. To give the target a firm backing, the NREP also increased the mandatory RE market share in the RPS from a minimum annual increment of 1.0 to 2.52 percent by 2023 and onwards. The GEAP successfully auctioned about 1.6 GW of solar and onshore wind power in June 2022 at significantly lower prices than the prevailing FiT, a major step forward in moving to competitive bidding for large-scale grid-connected solar and wind power projects. The private sector has shown great interest in developing RE projects. According to the DOE, indicative solar and onshore wind projects for 2022–2027 top 13 and 6 GW, respectively, on pace with the CES trajectory for solar and far more than what the CES expected for onshore wind.⁵¹ Moreover, with World Bank Group assistance, the DOE launched the Philippine Offshore Wind Roadmap in April 2022, setting in motion efforts to develop the Philippines' large offshore wind

resources. Despite being at a very early phase of development, local and international investors have already obtained service contracts for developing about 50 GW of offshore wind power as of April 2023.

This note addresses whether the Philippines should adopt a more ambitious energy transition agenda, with more RE and less coal in power generation than what the government has planned for. It evaluates what this increased ambition would entail in terms of costs, benefits, financing, and implementation challenges, and how these issues could be addressed. For the government, the choice of pathways toward a clean energy future and the pace of energy transition are bound by the following key concerns:

- **Ensuring energy security and affordability.** These are the two fundamental principles underlying the government's energy transition strategy. While energy transition promotes national energy security and affordability in the long term, achieving these outcomes, especially in the short to medium term, requires the convergence of multiple supporting factors, most crucial among them a stable and benign external environment and sustained economic growth, which are essential for reducing technology and capital costs.
- **Mobilizing adequate and timely financing.** Financing the process to scale up RE will become more challenging due to the high level of necessary investments and the need to increase the participation of both small developers and international investors. RE investment has so far been financed by large investors. The country's largest banks have mostly financed RE projects of major developers linked with conglomerates while continuing to shun smaller independent power producers due to perceived risks. Historical foreign ownership restrictions also constrain international capital for solar and wind projects.
- **Expediting implementation and project delivery.** An inability to deliver procured RE capacity at the expected time will seriously affect the achievement of the RE target and potentially cause supply constraints. The development

⁵¹ https://www.doe.gov.ph/sites/default/files/pdf/electric_power/private_sector_initiated_power_projects/%5Bb-04%5D_summary_indicative_lop-sipp_31-july-2022.pdf

period of solar and wind projects in the Philippines has been historically long due to the lengthy permitting process. The operationalization of EVOSS is an ongoing process and its effect in reducing the time for obtaining a construction permit remains to be seen.

- **Maintaining the capacity and reliability of the power grid.** With the rapid expansion of on-grid variable renewable energy (VRE), constraints in transmission and lack of energy storage systems, as well as the need for technological interventions to improve grid flexibility, must be addressed to avoid curtailment of VRE and ensure the reliability of the power supply. Existing grid infrastructure has limited capacity to dispatch newly built solar and wind farms due to delays in needed grid expansion projects. Despite the current small footprint of solar and wind power, there are already reports of curtailments.
- **Managing strong and sustained demand growth.** The fast-growing demand for electricity

is a major challenge to the energy transition, as it may force difficult trade-offs between growth and transition and lead to suboptimal solutions. For example, short-term security decisions may lead to overinvesting in fossil fuel assets. Sustained and intensified EE and conservation efforts would help moderate electricity demand across sectors and reduce potential needs to expand power supply capacity.

- **Managing the socioeconomic risks of the coal transition.** The phasing down of coal-fired power requires long-term planning and coordinated efforts across various government agencies. While the Philippines does not have a large coal mining sector, and current coal mining operations are largely concentrated on one island, the value chain of CFPPs is still extensive and highly critical because of its foundational contribution to the economy. Efforts to lessen the dependence on coal-fired power are transformational, in terms of not only technology but also socioeconomic development.



Photo by: jennagenio/Shutterstock

3.3 Power Sector Decarbonization Pathways and Implications

Decarbonizing the power sector holds the key to a successful clean energy transition in the Philippines. Power generation is the largest source of GHG emissions. The transition to low- or zero-carbon technologies also enables the decarbonization of transport through electrification and green hydrogen in the longer term. This would effectively address most of the GHG emissions from energy production and consumption (80 percent in 2020 and 70 percent in 2040 under the CES in the PEP 2020–2040).

The World Bank conducted an exploratory analysis of decarbonization in the power sector to inform the discussion on clean energy transition pathways. PLEXOS, a power system least-cost planning software, was used to analyze the impact of different levels of emissions reductions on the expansion of the power system, given assumptions about demand growth and available technologies. The results, while not plans or forecasts, are indicative projections of the scale and speed of interventions needed to achieve certain decarbonization objectives while ensuring energy security and affordability. The analysis included four scenarios, two of them replicating the REF and CES in the PEP 2020–2040 using the World Bank’s long-term projection of GDP growth.⁵²

- **Business-as-usual (BAU) scenario**, which is the baseline, similar to the REF in the PEP 2020–2040 but assumes a lower GDP growth rate (with a corresponding lower power demand growth

rate). This scenario includes the cap on coal-fired generation capacity from 2026 onwards but does not have an explicit emissions reduction target.

- **Current policy scenario (CPS)**, which is similar to the CES in the PEP 2020–2040 but adjusted to a lower GDP growth rate. It represents the government’s current ambition to improve EE and develop e-mobility on the demand side and scale up RE on the supply side. The emissions reduction target is implicit in efforts to peak coal consumption in power generation by 2030 (supply side) as well as in the energy savings target (demand side).
- **Accelerated decarbonization scenario (ADS)**, which analyzes how the expansion of the power system needs to adapt to reach the goal of reducing annual CO2 emissions by 80 percent by 2040, compared with the BAU, in response to the same electricity demand growth as in CPS. The ADS, which includes an ambitious emissions reduction target by 2040, provides useful analytical insights for achieving net zero emissions in the power sector beyond 2040.
- **Moderate decarbonization scenario (MDS)**, which targets reducing annual CO2 emissions by 40 percent by 2040. This scenario is analyzed but not discussed in this note to simplify the presentation and highlight the key shifts under the ADS. The MDS would bring annual emissions back to the level of 2020 by 2040.⁵³



Photo by: ShernielynDelaCruz/Shutterstock

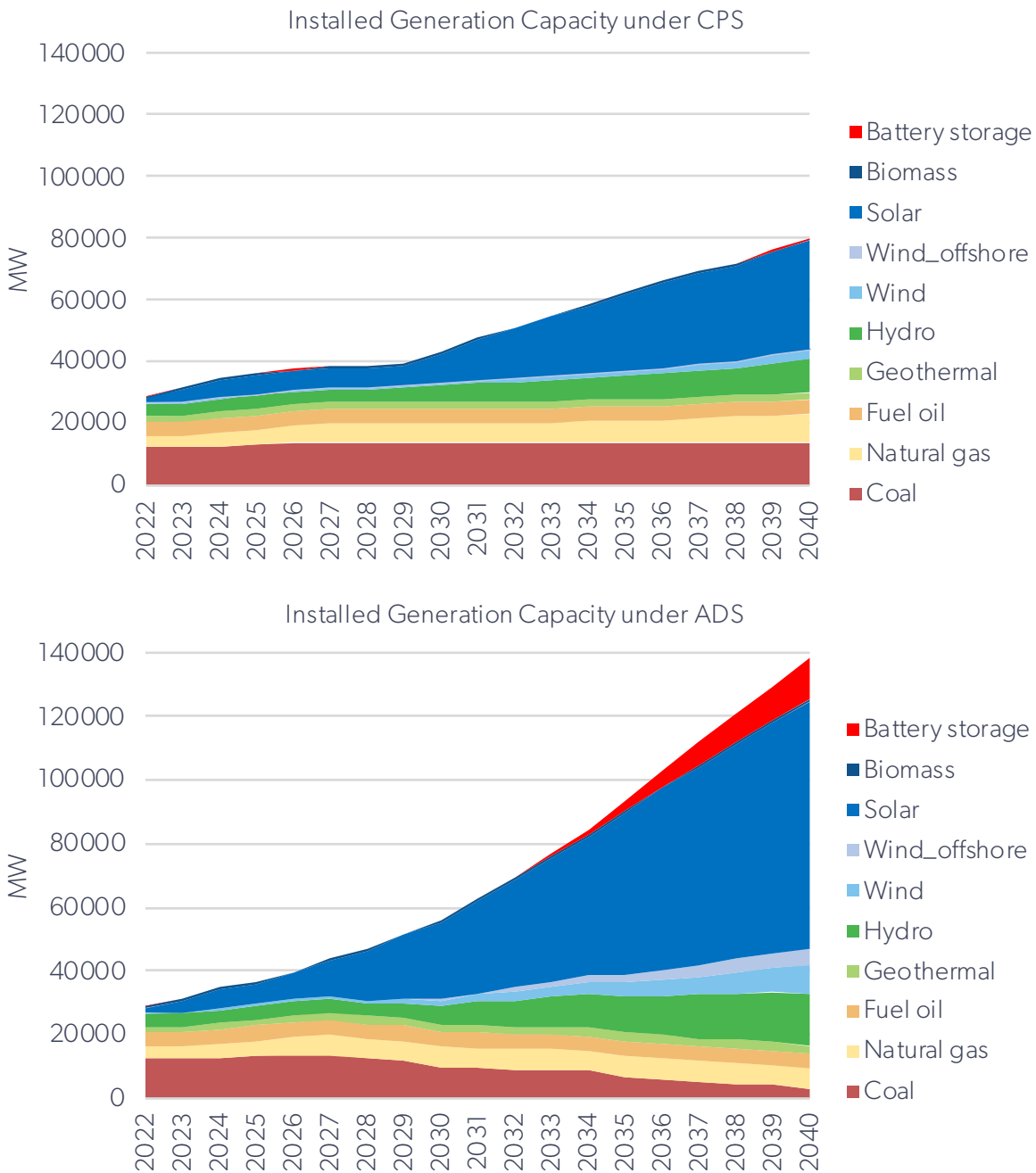
⁵² The World Bank has a more conservative projection of long-term GDP growth than the Government of the Philippines. While the short- to medium-term outlook (next 3 years) is similar to that of the government, long-term growth is more conservative but still robust in World Bank projections, with GDP growth averaging 5.4 percent per year in 2022–040, lower than 7.2 percent used in the PEP 2020–2040.

⁵³ The annex on power sector modeling includes the results of the MDS.

Pursuing accelerated decarbonization envisioned in the ADS would require substantially more and a faster shift toward RE, particularly solar, wind, and hydropower, resulting in an RE-dominated power system by 2040. A comparison of the projected mix of installed capacity and energy generation between the CPS and ADS reveals that coal-fired power generation under the ADS would

peak at about 78 TWh in 2025, before falling to 12 TWh by 2040 (Figure 27). Under the ADS, Solar photovoltaics would become the dominant technology, accounting for 56 percent of total installed capacity and 41 percent of total generation by 2040,⁵⁴ compared to 44 and 21 percent, respectively, under the CPS. Other RE technologies, including onshore and offshore wind and

Figure 27. An energy transition would result in substantial changes in the mix of power generation technologies and energy sources.

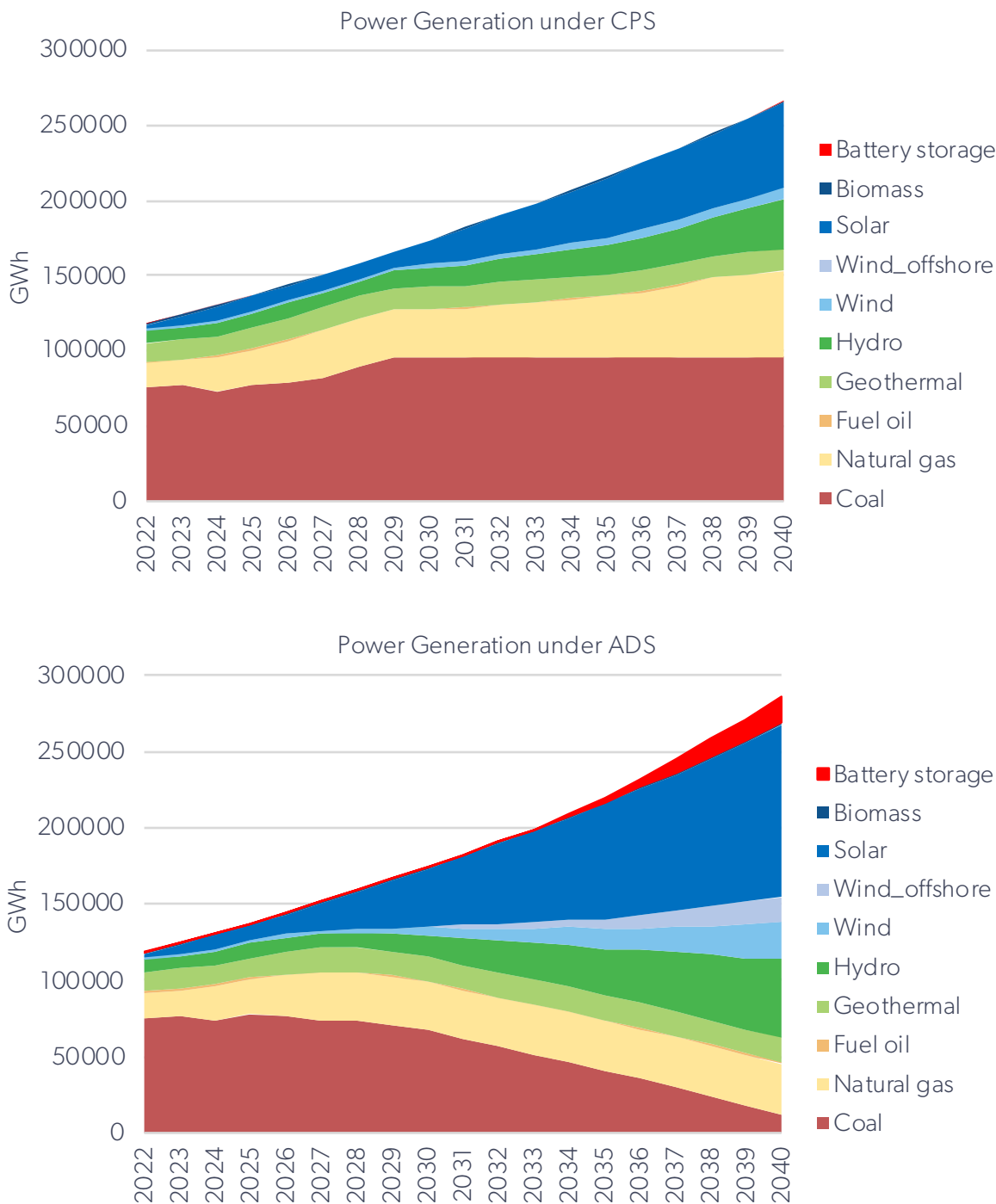


Source: World Bank staff estimates.

⁵⁴ Availability of land is the main constraint to the large-scale deployment of solar power in the Philippines. The land area needed for solar power installation by 2040 under the ADS is estimated at about 0.5 percent of the land area of the Philippines and less than 3 percent of arable land area, assuming 2 hectares per 1 MW peak power (information from existing projects in the Philippines indicate about 2 hectares per 1 MW peak power). Large-scale deployment of floating solar and rooftop solar can significantly cut the demand for land.

hydropower, are expected to grow substantially, as would the battery storage needed for the integration of VRE. Natural gas would still play an important role in supporting the integration of VRE and firm power supply, and as a transition fuel until other clean technologies for firm power become cost efficient. Under the ADS, the share of RE in power generation

would reach 83 percent by 2040, compared with 42 percent under the CPS.⁵⁵ Continuing on the ADS pathway, with the help of new technologies that will become cost-effective (e.g. carbon capture and storage for gas-fired power plants), could lead to a carbon-neutral power sector by 2050.



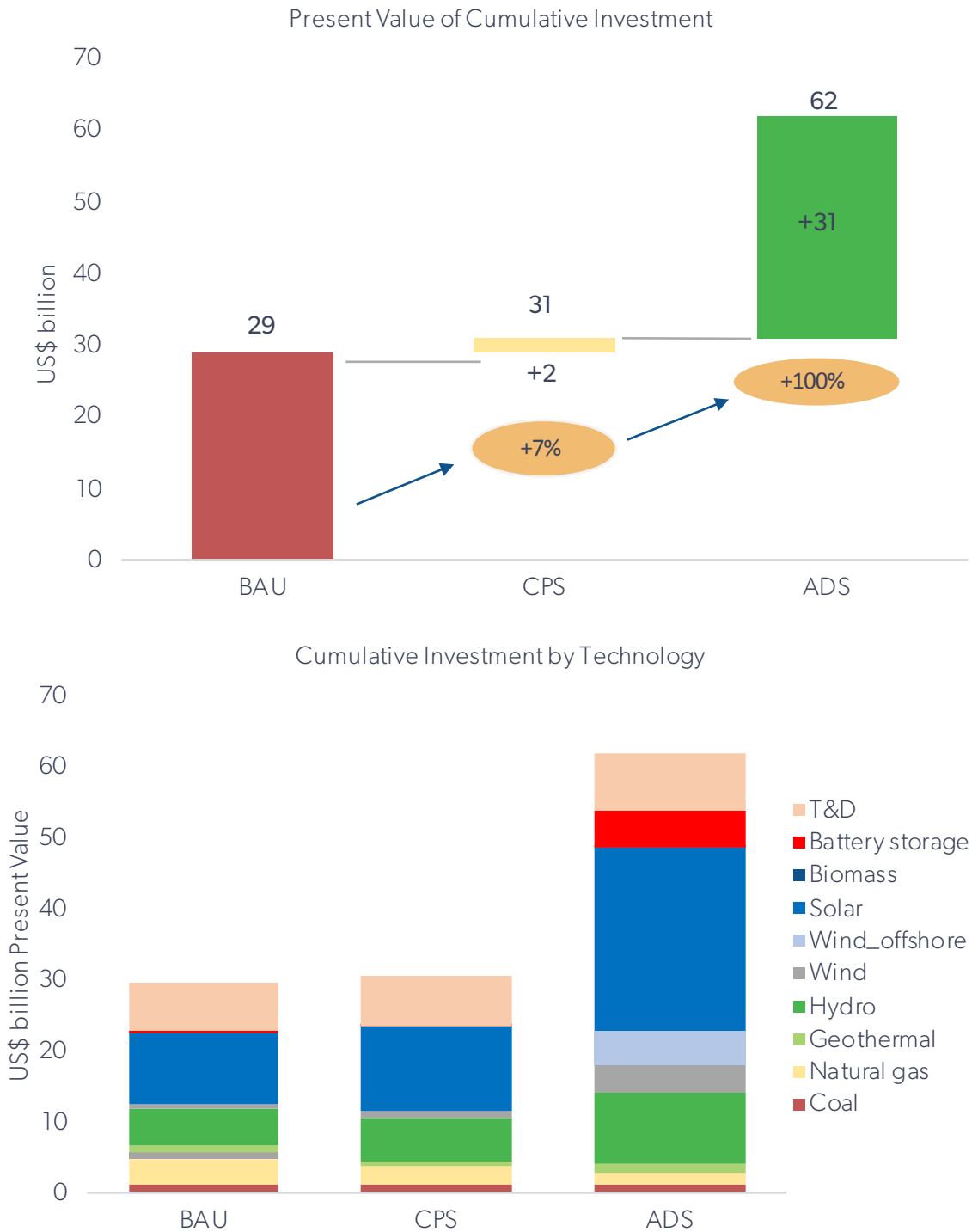
Source: World Bank staff estimates.

⁵⁵ Under the CES in the PEP 2020–2040, which the CPS resembles, the share of RE would reach 50 percent. The lower RE share under the CPS is due to the lower growth rate of power demand assumed in the World Bank modeling. Thus, other things being equal, it would take a few more years for the CPS to reach an RE share of 50 percent.

The ADS would require a substantial increase in capital spending to scale up and integrate RE compared to the CPS. The present value of cumulative capital investments required for the ADS by 2040 would be double that of the CPS based on current estimates of cost trends of technologies. The

net increase in cumulative investment in the ADS vis-à-vis the CPS is entirely accounted for by increased investment in RE. Solar, battery storage, and offshore wind have the highest increments, followed by hydro and onshore wind (Figure 28).

Figure 28. The cumulative investment cost of the ADS would be twice that of the CPS.



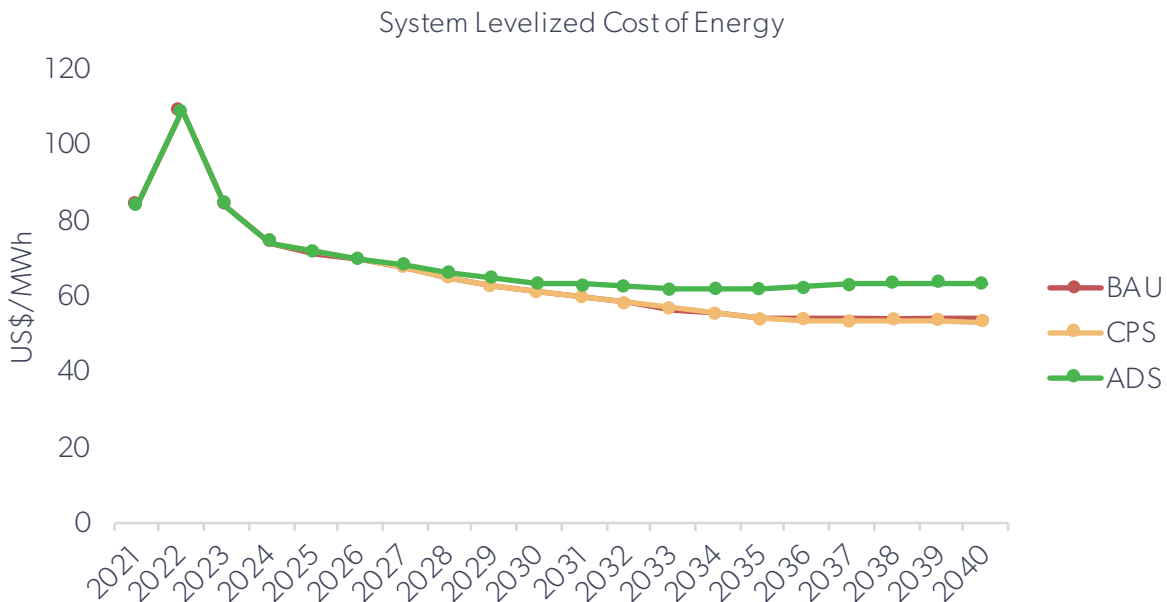
Source: World Bank staff estimates.

Phasing down coal-fired power would result in substantial stranded assets. Less than 3 GW of CFPPs would be in operation in 2040 under the ADS, compared with about 14 GW under the CPS. The present value of the financial losses due to stranded CFPPs is about US\$10 billion under the ADS.⁵⁶ Current CFPPs (11 GW in 2020) in the Philippines are relatively young, most of them having been commissioned no early than 2010. Phasing down the country's coal-fired power capacity would take place from 2028 to 2040 under the ADS, requiring effective solutions to address the financial cost of the stranded assets of privately owned CFPPs.

The power system's levelized cost of electricity (LCOE) is projected to decline during most of

modeling period due to savings of fossil fuel costs, the expected long-term stabilization of fossil fuel prices, and the expected declining cost of deploying and integrating VRE. While accelerated decarbonization will lead to higher LCOE than under the BAU and CPS, there is general decline in LCOE under all three scenarios relative to 2021 (Figure 29). The LCOE starts to increase again under the ADS toward the end of the period due to the uptake of more costly technologies such as offshore wind and battery storage. The power system's LCOE reflects the core of the overall cost of electricity and could be considered as indicative of the potential trend in the level of average tariff in present value terms.

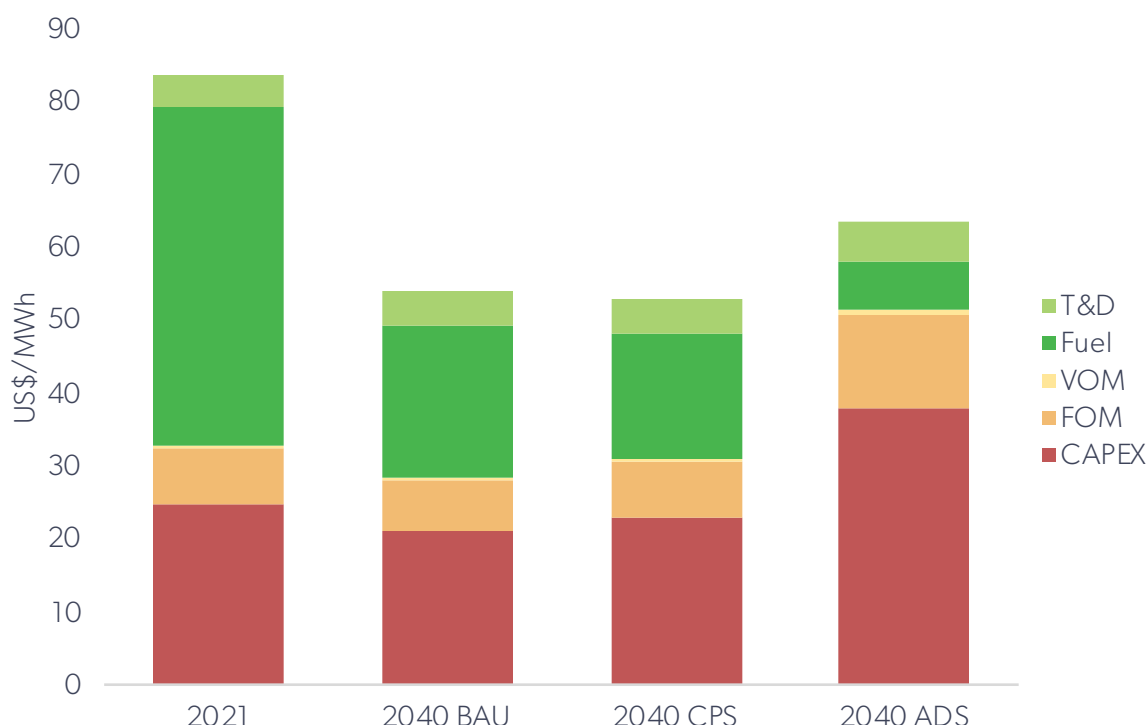
Figure 29. The power system's levelized cost of electricity is projected to decline.



⁵⁶ The cost of stranded coal-fired power generation assets is estimated based on the discounted net revenue drop compared with the CPS level and applies estimated market prices. The retirement schedule is based on power system least cost planning to achieve the desired emission reduction goal and predefined techno-economic parameters for retirement.

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			1.1	1.2	1.3	1.4	1.5	1.6		2.1	2.2	2.3		3.1	3.2	3.3	3.4

Figure: System Levelized Cost of Energy by Component



Source: World Bank staff estimates.

Note: CAPEX = capital expenditure, FOM = fixed operation and maintenance, VOM = variable operation and maintenance, T&D = transmission and distribution.

The transition to a RE-dominated power system would result in significant national benefits such as reduced air pollution as well as global benefits such as reduced GHG emissions (Figure 30).

The phasing down of coal-fired power and reduced need for natural gas-fired power in the ADS will significantly reduce the emissions of SO, NO, and PM2.5, which are main ambient air pollutants. Using the air pollution damage assessment values adopted by the International Monetary Fund in its assessment

of global fossil fuel subsidies,⁵⁷ the present value of the annual air pollution damage costs under the ADS is estimated at US\$9.8 billion, lower than US\$14.5 billion under the CPS, representing a US\$4.7 billion (or 32 percent) damage reduction. Using the World Bank's lower-bound of the shadow price for CO₂,⁵⁸ the ADS would generate global benefits through the avoidance of CO₂ emissions worth an estimated US\$16 billion compared to the CPS.

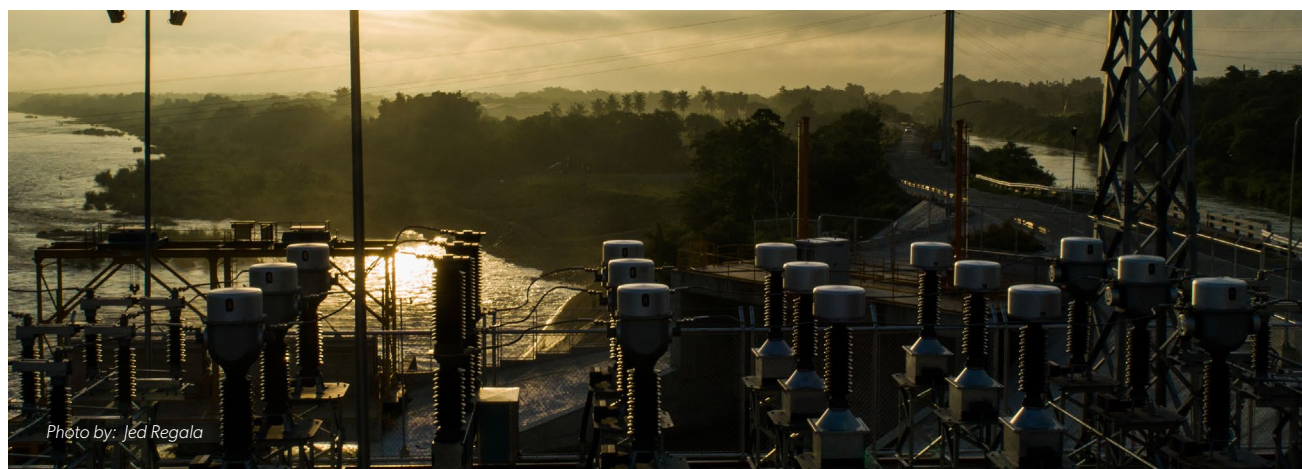


Photo by: Jed Regala

⁵⁷ <https://www.imf.org/en/Topics/climate-change/energy-subsidies>

⁵⁸ <https://documents1.worldbank.org/curated/en/621721519940107694/pdf/2017-Shadow-Price-of-Carbon-Guidance-Note.pdf>

Figure 30. The ADS pathway would lead to a substantial reduction of CO₂ emissions and air pollutants.

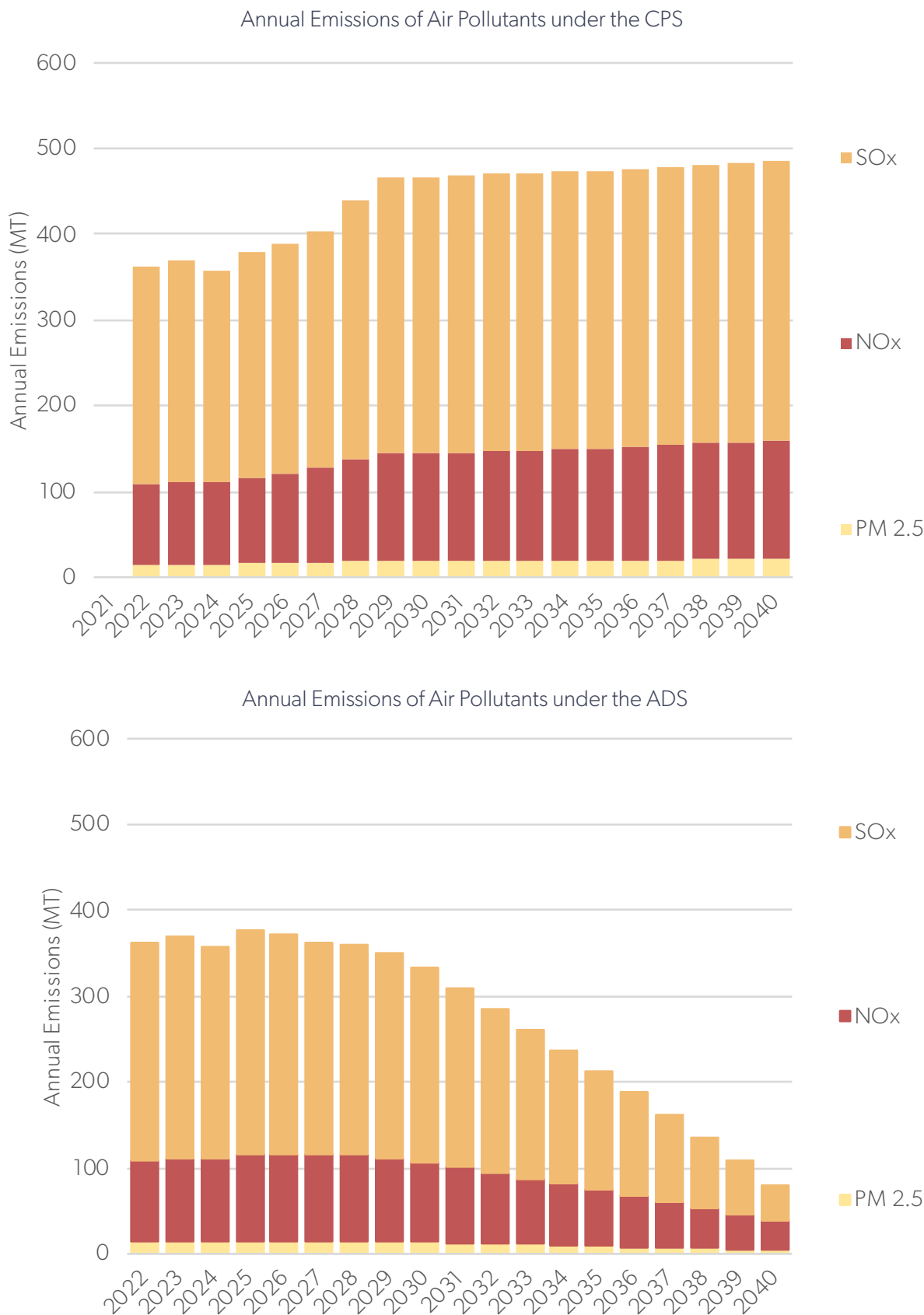
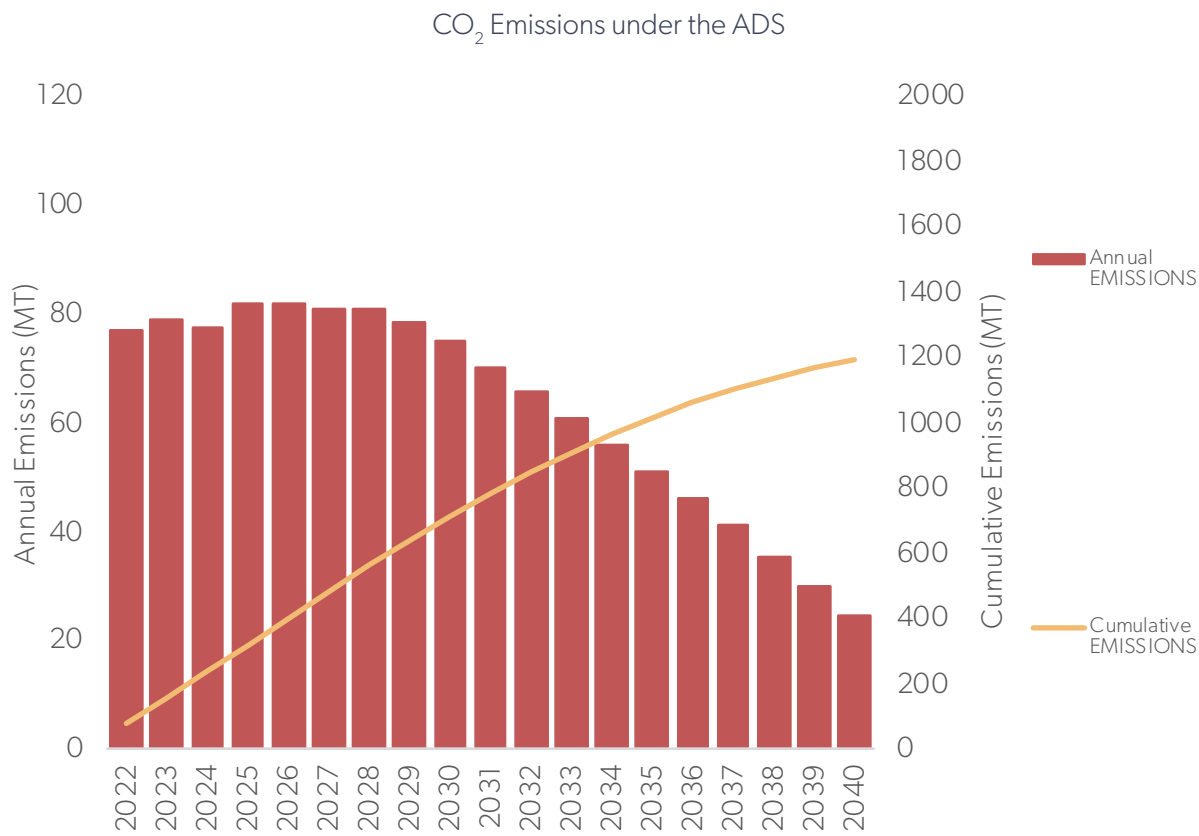
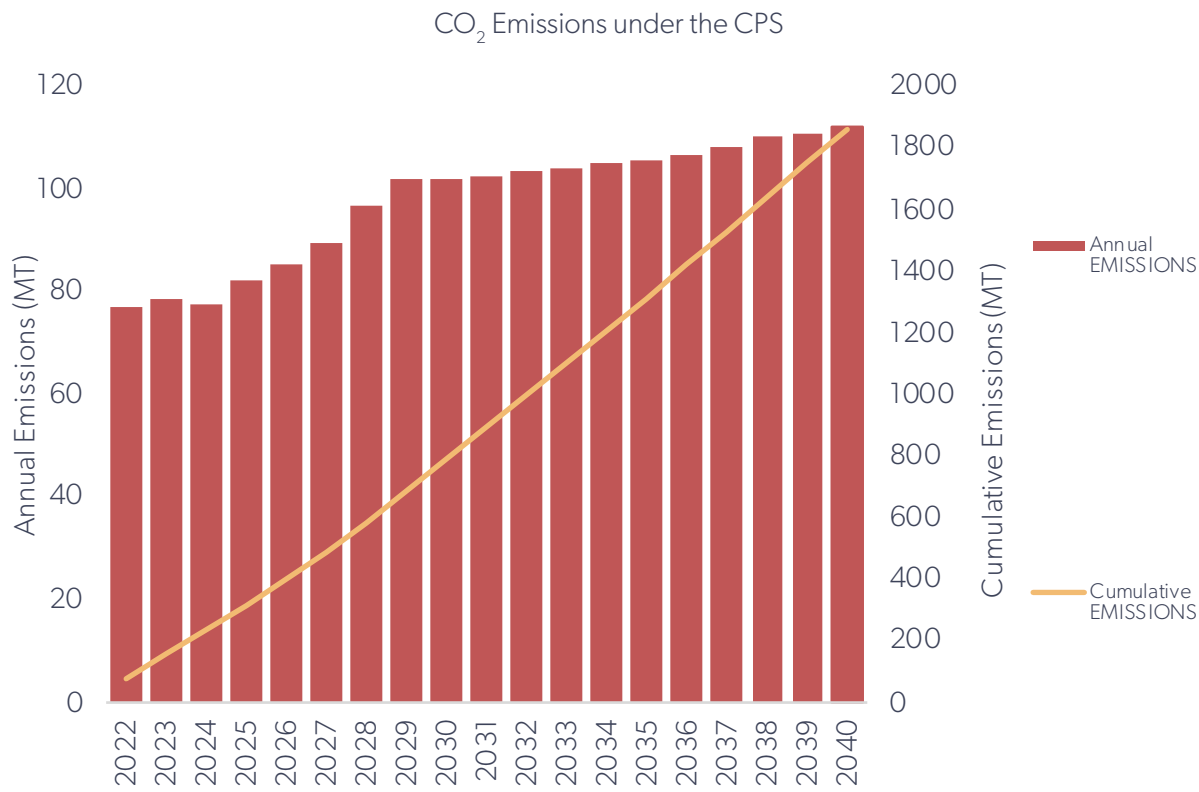


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Source: World Bank staff estimates.

Pursuing an accelerated decarbonization pathway like the ADS could benefit both the Philippines and the global community if a proper cost-sharing mechanism could be devised to defuse the national burden of elevated costs while capturing the additional global benefit of reduced GHG emissions. From a lifetime system cost perspective, the ADS is only 6 percent more expensive than the CPS. While reduced local

environmental damages do not have a market-based monetary value, reduced global environmental damages could be monetized through the sale of carbon credits. Therefore, there is potential that the cost of stranded assets due to the early retirement of CFPPs could at least be partially addressed through international purchases of carbon credits. If local and global environmental benefits are included, the ADS would have a net advantage over the CPS (Table 2).⁵⁹

Table 2. Comparing the Cost of the ADS and CPS, 2022–2040

(US\$ billion Present Value)

	CPS	ADS	Deviation	Change
Capital costs for new generation and storage	23.5	53.9	30.4	129%
Grid network expansion and upgrade costs	7.1	7.8	0.7	10%
Capital costs of existing generation and grid assets *	23.7	5.3	-18.4	-78%
Variable operational and maintenance costs	0.6	0.9	0.3	50%
Fixed operational and maintenance costs	14.2	17.3	3.1	22%
Fuel costs	56.3	47.8	-8.5	-15%
TOTAL SYSTEM COST	125.4	133	7.6	6%
Cost of stranded assets	0	10	10	NA
Local environmental damage costs	14.5	9.8	-4.7	-32%
Global environmental damage costs	51	35	-16	-31%
NET COST	190.9	187.8	-3.1	-2%

Source: World Bank staff estimates

Note: NA = Not applicable. * The large reduction of capital expenditure from existing generation and grid assets under the ADS is due to the decommissioning of CFPPs.



⁵⁹ A sensitivity analysis of key variables suggests that the broad trends and directions revealed by this power system decarbonization analysis are generally robust. Also, this analysis did not consider the full spectrum of potential technology choices, in part to limit the higher uncertainties of technologies that are still early stages of development, such as carbon capture and storage and green hydrogen, and in part to maintain consistency with the government's current energy plan (e.g., nuclear power is not included in the PEP 2020–2040).

Raising the ambition of the Philippines’ decarbonization efforts and bringing about additional local and global environmental benefits would require commensurate international assistance and cost-sharing arrangements. Without monetizing the global benefits of reduced GHG emissions, pursuing accelerated decarbonization appears suboptimal from a national perspective. Recent international efforts through the Just Energy Transition Partnership (JETP) in Indonesia and Vietnam show that a more ambitious decarbonization agenda for fast growing developing economies is possible with concerted support from development partners.

The following are areas in need of additional assessment to inform decarbonization policies and actions:

- **Impact of accelerated electrification of the transport sector.** The pace of electrification in the road transport sector could have a significant impact on overall power demand and system operations. While the CES includes a 10 percent EV penetration rate by 2040, transport-related decarbonization and the accelerated shift of the global auto industry toward EVs could significantly increase EV penetration in the Philippines, which presents a risk and opportunity that need to be analyzed in terms of long-term power system planning. A higher share of EVs could significantly raise the demand for electricity, and require extensive rehabilitation of power distribution networks increasing investment needs in power supply. For example, 15 percent higher electricity demand by 2040 would increase the present value of cumulative capital investments by 20 percent under the ADS. Still, a significant increase in EVs would create opportunities for innovative energy storage solutions.
- **The impact of an energy transition on resilience.** Some aspects of the transition seem likely to increase resilience, while others may reduce it. Given the frequency and strength of tropical storms in the Philippines, investment in the storm-hardening of solar and wind farms need to be mainstreamed, which could significantly increase the investment cost of

solar and wind power. Large-scale solar and wind plants are usually located far from urban areas, and transmission lines are subject to interruptions. Nevertheless, the wide distribution of solar and wind plants could reduce the portion of total power generation affected by a given storm. Distributed solar power with battery storage could partially maintain the local power supply if transmission lines are interrupted. Greater understanding of the geo-spatial nature of climate risks and their impact on efforts to expand the power system as well as the costs and benefits of strengthening resilience would help enhance power system planning and implement appropriate risk-mitigation measures. Climate resilience planning needs to cover a broad set of climate impacts on power system expansion planning, from extreme weather events to temperature changes and sea level rise.

- **Understanding the requisite financing needs for an energy transition and the allocation of risks between the private and public sector.**⁶⁰ Insights into the different sources of capital with differing degrees of concessionality would help avoid unnecessary delays and costs of inaction by informing: (i) the government of the necessary interventions to remove barriers to private financing and where concessional funding could be used most efficiently; and (ii) the international community of the Philippines’ capital needs to complete its energy transition.
- **Analytics that could help improve the planning and execution of RE and EE initiatives.** It would be useful to undertake an assessment of the needs and gaps for implementing the National Renewable Energy Program to identify critical bottlenecks (transmission capacity and grid flexibility, land use, permits, labor, and skills needs, equipment standards, procurement rules, financing constraints, etc.). Given the importance of maintaining a reliable electricity supply while planning the retirement of some CFPPs, the authorities need to urgently identify specific measures to increase EE and energy conservation.
- **Carbon pricing as an instrument for**

⁶⁰ The World Bank recently published Scaling Up to Phase Down: Financing Energy Transition in Developing Countries (<https://www.worldbank.org/en/topic/energy/publication/scaling-up-to-phase-down>), which provides a useful guidance for developing countries to identify financing challenges and develop a comprehensive financing approach.

supporting the energy transition. Introducing carbon pricing, either through a carbon tax or an emissions trading system, could incentivize firms and individuals to adopt low-carbon technologies while raising revenues, which could be used to support the energy transition. The World Bank assisted the government in assessing carbon pricing instruments in 2019. Carbon pricing may be worth revisiting in a future evaluation of potential financing instruments to support the energy transition.

- **The socioeconomic impact of phasing down coal-fired power in the Philippines.** The authorities need conduct a better assessment of the economic, social, and financial risks of stranded assets (not only coal but also natural gas infrastructure). While the Philippines has limited domestic production of coal, coal mines as well

as the existing 30 or so CFPPs will need to be gradually retired to achieve the net-zero goal. CFPPs directly employ relatively few people, but more people indirectly rely on them for their livelihood (including across the supply chain and service sector), resulting in the larger community being potentially adversely impacted by their closing. While RE production will result in employment opportunities, labor market misalignments will likely arise (e.g., temporary job losses from closing CFPPs). Moreover, labor gains from RE may not happen in parallel. RE jobs may be created in different areas of the country, and the existing labor force may not move with the new jobs. Retraining efforts can help people transition into RE jobs, but skills from vanishing jobs do not necessarily match the occupational needs of new job opportunities.⁶¹



Photo by: Antonio V. Oquias/Shutterstock

⁶¹ Measuring the Socio-economics of Transition: Focus on Jobs, International Renewable Energy Agency 2020.

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3.4 Policies for a Secure, Affordable and Clean Energy Future

The Philippines would benefit from an energy transition toward low- and zero-carbon alternatives. A clean energy transition would substantially increase the use of indigenous and RE resources such as hydropower, solar, and wind while reducing the country's reliance on imported fossil fuels, thereby enhancing energy security. A cleaner energy future is expected to be more affordable, given the savings and in fuel costs and the global trends of declining costs related to deploying and integrating solar and wind power, enhancing the competitiveness of the economy. Reducing fossil fuel consumption, particularly by electrifying urban transport and reducing the use of coal in power generation, would reduce ambient air pollution in urban areas, improving public health. Given that an increasing number of multinational firms are setting their own net-zero targets and examining their supply chains to achieve their climate commitments, greening the power supply through an energy transition would help the Philippines stay competitive and attract foreign investments. An energy transition could also help the country meet its commitments under the Paris Agreement.

The government has a keen interest in leveraging a clean energy transition for sustainable and inclusive economic development. In his first State of the Nation Address, President Marcos Jr. called for the transformation of the energy sector to achieve energy security and affordability and take advantage of the best available technologies, especially related to RE.⁶²

Building a solid foundation for the country's energy transition, regardless of which pathway is pursued, will be critical over the medium term. The priorities are: (1) accelerating the implementation of utility-scale solar and wind projects; (2) addressing bottlenecks in transmission and grid capacity; (3) shoring up system reliability through LNG-to-power investments; and (4) intensifying efforts in EE and demand-side management.

To accelerate the energy transition, the authorities should consider:

- **Increasing the implementation of utility-scale solar and wind power projects to bring VRE sources to a tipping point in power generation.**⁶³ It took 17 years for solar and wind to reach a 2.5 percent share of power generation in the Philippines in 2021. This share needs to be quadrupled by 2025 to help achieve the government's goal of increasing the share of RE in power generation to 35 percent in 2030. Since all new generation assets are financed by the private sector, there is a robust pipeline of solar and on-shore wind projects in the country, and key policies are already in place. The government's focus should therefore be on speeding up implementation by removing constraints to procuring, financing, and delivering solar and wind projects. Short- to medium-term measures include:
 - **Scaling up the Green Energy Auction Program (GEAP) with demand pull of the Renewable Portfolio Standards (RPS).** The first GEAP was successfully held in June 2022, with 1.43 GW of solar and wind auctioned, marking the transition from a FiT-based to a competitive procurement program. An estimated 18 GW of grid-connected solar and wind capacity will need to be procured between 2023 and 2028 to meet the 2030 target. GEAP needs to be planned out over a multi-year period and conducted on an annual basis with rigorous qualification requirements to ensure project delivery is predictable and reliable. The government also raised the mandatory market share of RE for distribution utilities through the updated RPS in 2022 to ensure the Philippines can reach the 2030 RE target. This would require, however, that the RPS scheme is complied with and effective in securing power supply agreements.

⁶² <https://pia.gov.ph/publications/2022/07/25/transcript-president-ferdinand-r-marcos-jrs-first-state-of-the-nation-address-speech-as-delivered>

⁶³ Based on international experience, the tipping point for solar and wind power is when their share in power generation reaches 5 percent, beyond which their deployment accelerates (<https://www.bloomberg.com/graphics/2022-clean-energy-electric-cars-tipping-points/>).

o **Streamlining the permitting process.**

With the expected dramatic increase of projects awarded under GEAP in the coming years, it will be critical to streamline the permitting process. The process for issuing permits, which involves hundreds of reviews and approvals, has been a main impediment to the implementation and delivery of RE projects in the Philippines. The EVOSS Act was signed into law in 2019, but its implementation has been limited to processes handled by the DOE. The full operationalization of EVOSS needs to be sped up to cover all concerned national agencies and local government units and will require all parties' commitment to enforceable and shortened permitting timeframes.

o **Removing barriers to financing, particularly in high-risk projects such as offshore wind and floating solar projects.** The government has removed restrictions on foreign ownership in all renewable energy projects, a long-standing constraint to RE financing in the Philippines, by issuing an amendment to the Implementation Rules and Regulations of the Renewable Energy Act in November 2022. This is expected to attract increased foreign investment in solar and wind projects. Still, more needs to be done to de-risk investments in offshore wind and floating solar projects, as they reduce the need for arable or forest land for land-based solar and wind. For example, offshore wind would need a specially designed auction program to address its distinctive development challenges and financial risks.

- **Prioritizing planning and investments in transmission capacity and grid flexibility.** The Philippines need firm- plans for and investments in upgrading and modernizing the power grid and new transmission lines and substations to not only accommodate the anticipated large increase in VRE generation capacity by 2030, but also to de-risk investments in generation assets. Given past delays in transmission investments, the government will need to intervene to ensure the preparation and execution of the transmission development plan is efficiently aligned with load growth patterns and generation capacity procured through GEAP. Government intervention is also needed to keep transmission projects procured and delivered on time. In addition, the provision of ancillary services and investments in grid flexibility (e.g.,

energy storage systems) needs to be incentivized through proper pricing mechanisms.

- **Prudently pursuing the LNG-to-power program to ensure the reliability of the power system and greater flexibility in integrating solar and wind power.** Due to the anticipated depletion of the Malampaya gas field, it is critical for the Philippines to complete its current LNG-to-power program as planned, which will provide more than enough LNG for the existing fleet of gas-fired power plants. Additional LNG capacity should be carefully assessed based on the needs for maintaining the reliability of the power system, given the VRE capacity target for 2040, including potentially large additional offshore wind capacity and the early retirement of CFPPs. Under the ADS, gas-fired generation capacity would double between 2021 and 2040.
- **Prioritizing EE and demand-side management for buildings and industries.** Improving EE in residential, commercial, and public buildings through regulations (e.g., enforcing energy efficient building codes and minimum energy performance standards for air conditioners and major appliances) and incentives (e.g., rebates for purchasing high-efficiency appliances and accelerated permitting process for high-class green buildings) would help moderate future electricity demand. Demand-side management and demand response should be incentivized through time-of-use tariffs and interruptible supply contracts to further enhance grid flexibility.
- **Improving power system planning to better guide energy transition investment decisions.** To align future investments with decarbonization and energy security and affordability goals in the power sector, the commonly used least-cost planning tools need to consider the costs of carbon and local air pollution as well as stranded assets. The authorities need keep a dynamic view of technological changes and enhance the government's capability to assess the viability of emerging technologies, such as hydrogen and carbon capture and storage, and maximize RE while managing the cost of services. This approach could help the Philippines avoid a costly long-term carbon lock-in that is not aligned with climate and development objectives.

- **Considering the use of an appropriate carbon pricing instrument to level the playing field between RE and fossil fuels while generating revenues.** For example, setting a moderate price on carbon of up to US\$5/tCO₂ could incentivize firms and individuals to adopt low carbon technologies while raising revenues of up to 0.4 percent of GDP. The revenues could be used to mitigate the short-term negative poverty impact of introducing a carbon tax on income as well as reskill workers affected by decarbonization.⁶⁴
- **Establishing a framework for addressing the retirement of coal-fired power plants and ensuring a just energy transition.** Based on the ADS analysis, the Philippines needs to start phasing down coal-fired generation by the late 2020s to move toward net-zero carbon alternatives by mid-century. The early retirement of CFPPs could result in significant stranded assets. The authorities will need to emphasize the principles of competition and transparency in discovering the price for the early closure of CFPPs to minimize cost. Moreover, a comprehensive cross-sectoral approach will be required to properly prepare a framework for a just energy transition process in the Philippines, and key stakeholders, including the government, private sector, and communities in affected areas, need to be involved early in the consultative planning process. The just transition process should include three focus

areas: (i) institutional governance; (ii) people and communities; and (iii) environmental remediation. The Philippines is a pilot country under the Accelerating Coal Transition Program of the Climate Investment Funds, supported by the Asian Development Bank, World Bank, and International Finance Corporation. This pilot could be used to help design a just transition framework for phasing down CFPPs.

The Philippines is uniquely positioned to transition toward an RE-dominated power system that will not only improve energy security but also enhance affordability through primarily private financing. This will, however, require overcoming unprecedented challenges in capital mobilization, implementation, and ensuring a just transition. Although the Philippines has important policies and institutions in place to support an energy transition, the government will need to adjust strategies, devise new policies, and strengthen planning and execution capacity across sectors and jurisdictions. The private sector, which has been driving developments and investments in the energy sector over the past decade, will need to take on more risks and hasten the pace of adoption of new technologies and innovations as the power system pivots to VRE sources. The Philippines' development partners will also be called upon to do more, especially in facilitating the flow of concessional climate investment funds and technology transfers.



⁶⁴ Philippines Country Climate and Development Report, the World Bank Group, 2022

Annex: Power Sector Decarbonization Analysis

Decarbonization pathways in the power sector were analyzed to assess the impact of sector-specific policies and technology choices as well as their implications for power system expansion, reliability, investment needs, and electricity affordability.

PLEXOS, a power system least-cost planning software platform, was used to understand the impact of different levels of emissions reductions on the capacity and generation mix given assumptions about demand growth and available technologies. The results should not be interpreted as forecasts but as projections of the scale and speed of necessary interventions. Four power system expansion scenarios were analyzed, each corresponding to a different electricity demand scenario:

Business As Usual (BAU). The BAU is used as a baseline, which corresponds to the REF of the PEP 2020–2040, but it is re-timed to match an adjusted demand projection due to a lower GDP growth rate assumed by the CCDR.

Clean Policy Scenario (CPS). The CPS, which corresponds to the CES of the PEP 2020–2040, is also re-timed to match the adjusted demand projection of the CCDR.

Moderate Decarbonization Scenario (MDS). The MDS, which assumes the same demand as in the CPS, models a target of 40 percent abatement of annual emissions by 2040 relative to the BAU and scaled linearly starting in 2025. Existing plants may retire on

an economic basis, leaving a cost of stranded assets.

Accelerated Decarbonization Scenario (ADS). The ADS, which assumes the same demand as in CPS, models a target of 80 percent abatement of annual emissions by 2040 relative to the BAU and scaled linearly starting in 2025. Existing plants may retire on an economic basis, leaving a cost of stranded assets.

Energy demand was forecasted by a simple linear model, with assumed intensity, elasticity factor from the PEP 2020–2040, and World Bank GDP growth rate projections. The peak demand forecast was derived from electricity demand as sold and is based on 70.25 percent historical load factor for Luzon, 72 percent for Visayas, and 67.69 percent for Mindanao. Adjustments for technical losses assumptions were made based on the PEP: 8.63 percent in Luzon, 10.63 percent in Visayas, and 12.14 percent in Mindanao.

The assumed capital expenditure values of different generation technologies for 2021 are based on the World Energy Outlook 2021 and the 2021 Vietnam Technology.

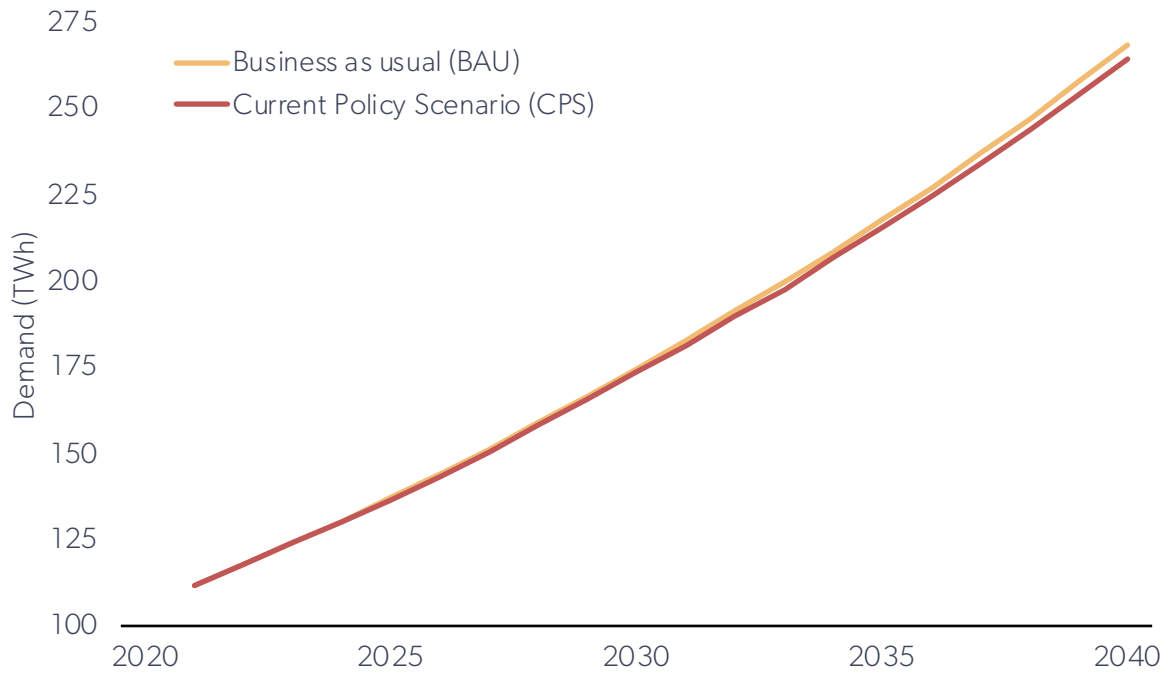
Fuel prices are expressed in 2019 USD, as delivered fuel prices and are based on the World Bank commodity forecast from April 11, 2022. The figure below shows a short term spike in coal, fuel oil, and gas in 2021–2024, followed by a gradual reduction until the end of the period. Gas averaged US\$7.04/GJ and coal US\$2.98/GJ between 2024 and 2040.



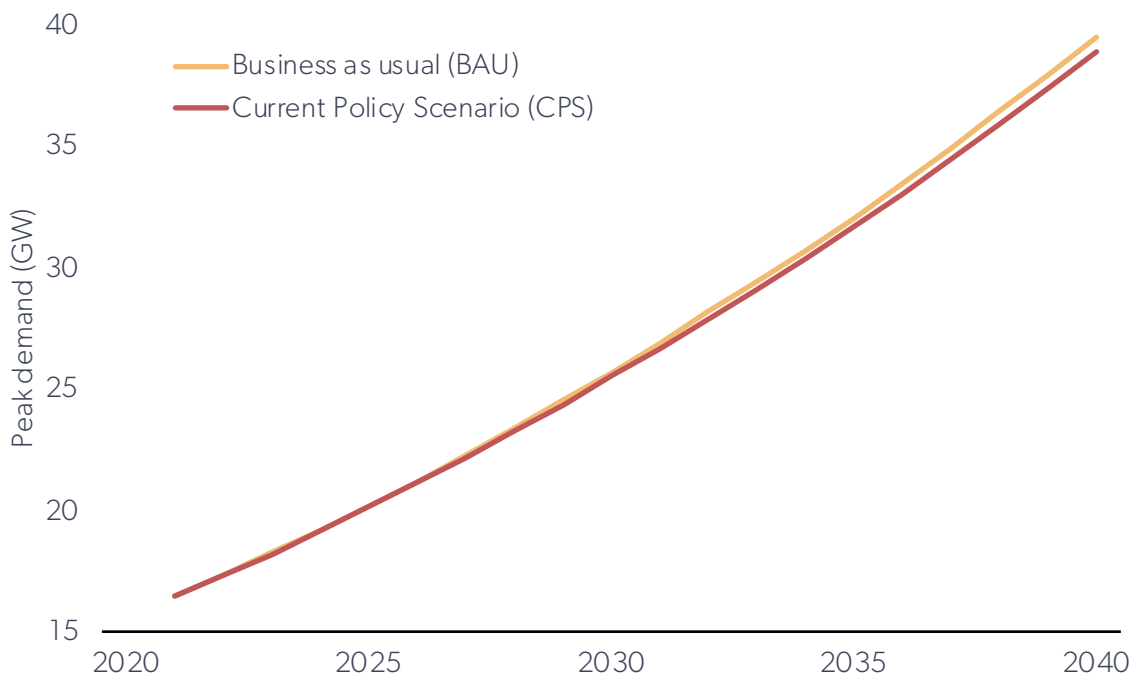
Photo by: aldarinho/Shutterstock

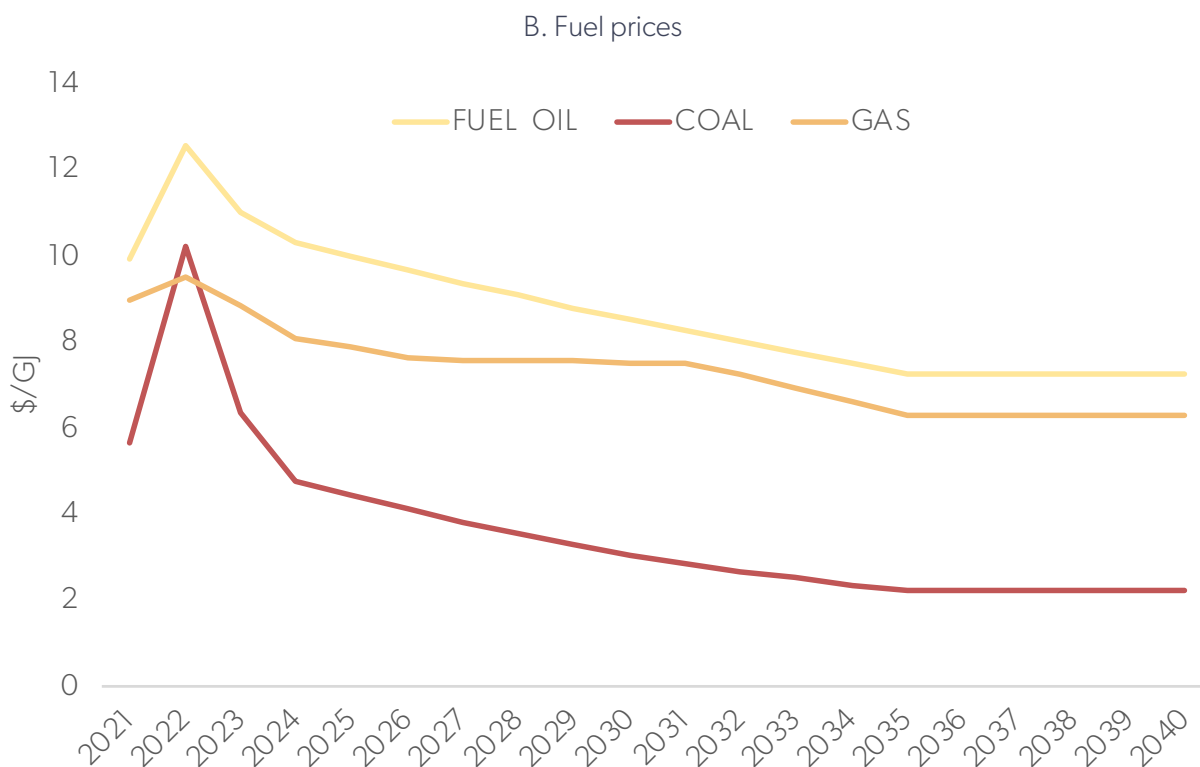
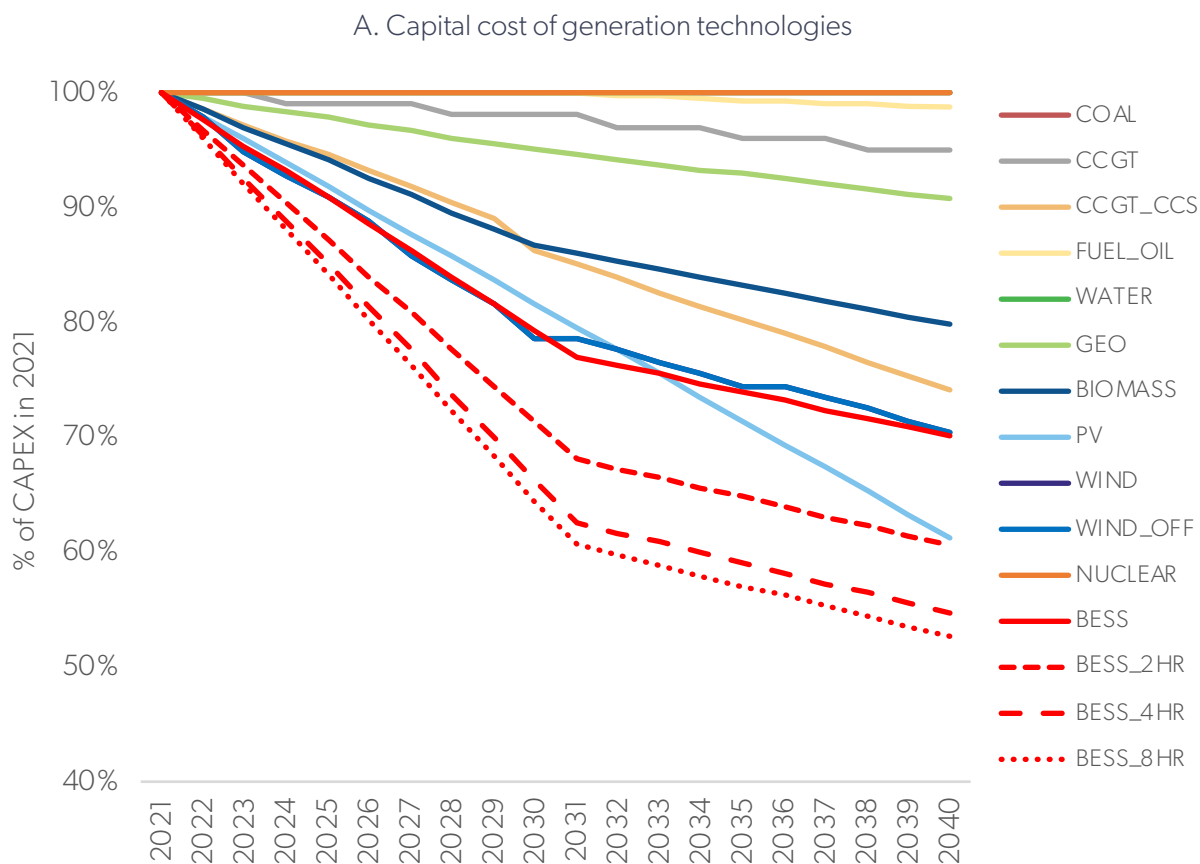
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			1.1	1.2	1.3	1.4	1.5	1.6		2.1	2.2	2.3		3.1	3.2	3.3	3.4

A. Electricity Demand



B. Peak Demand



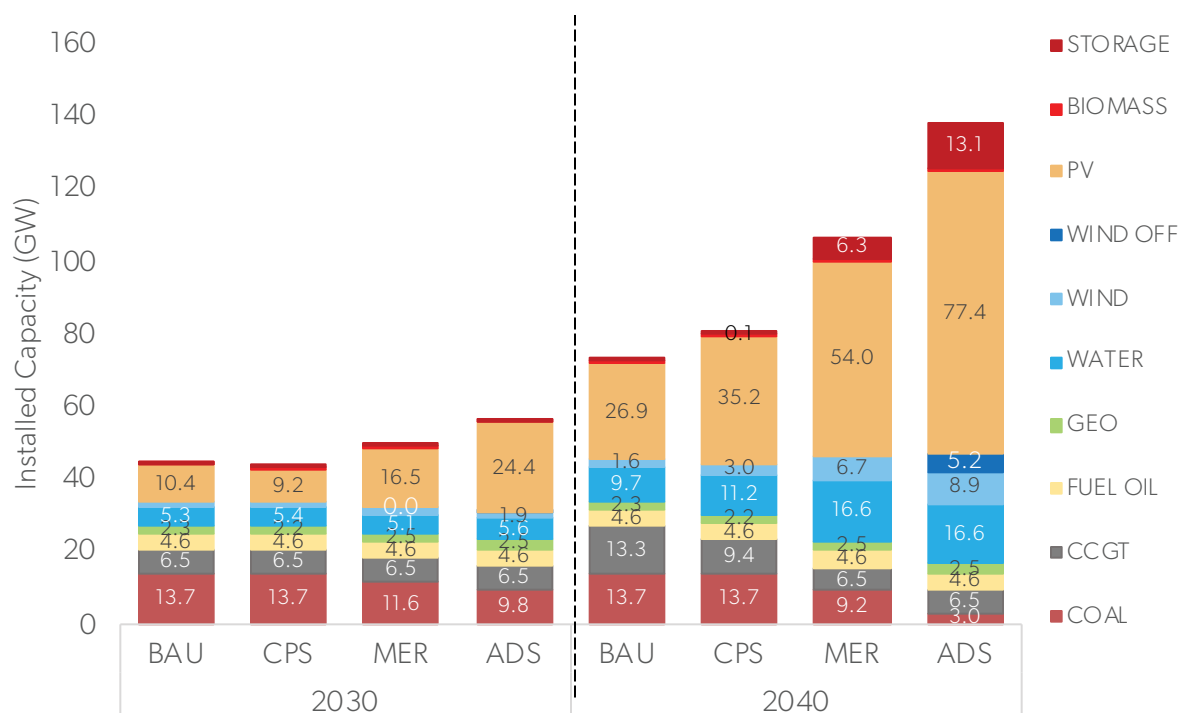


NOTE: CCGT: Combined cycle gas turbine; CCS: Carbon capture and storage; Water: Hydropower; Geo: Geothermal; PV: Photovoltaic/Solar; WIND: Onshore wind; WIND_OFF: Offshore wind; BESS: Battery energy storage system; xhr: duration, in hours
Sources: See text.

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Select Modeling Results:

Comparison of installed generation capacity



Comparison of generation mix

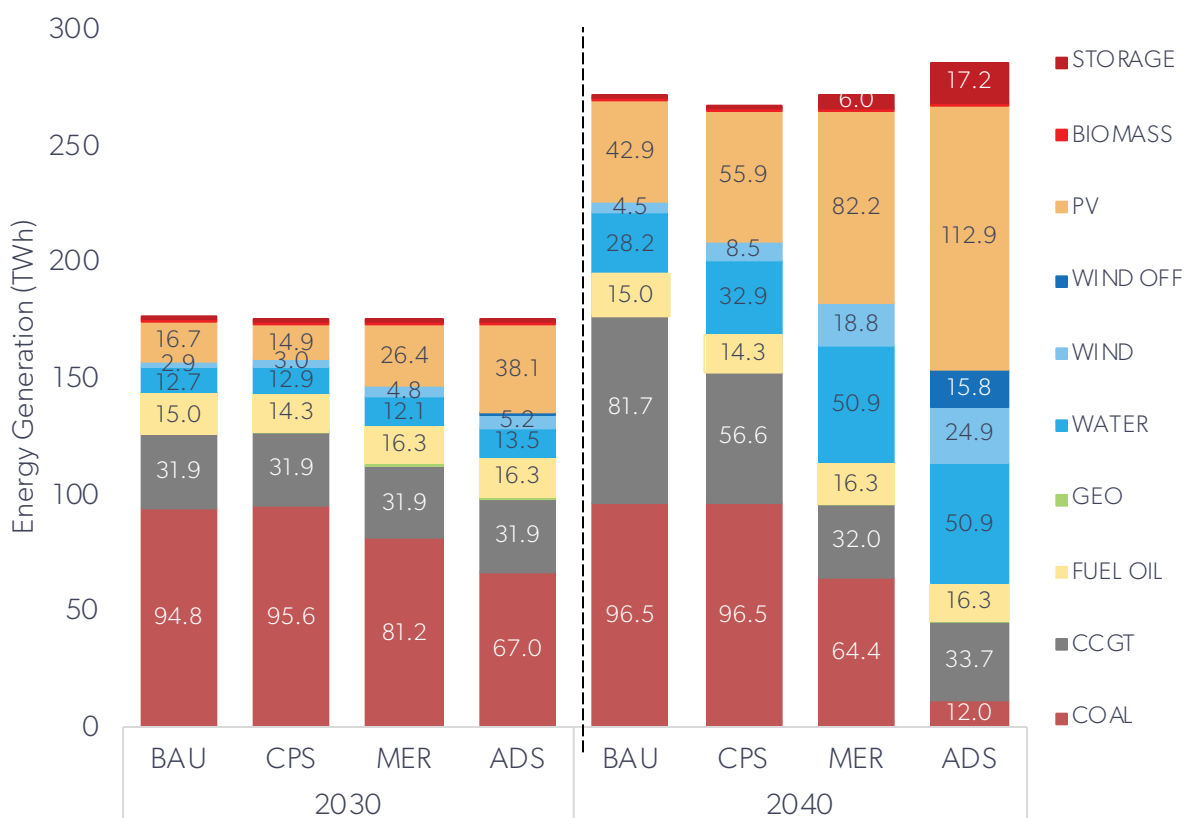
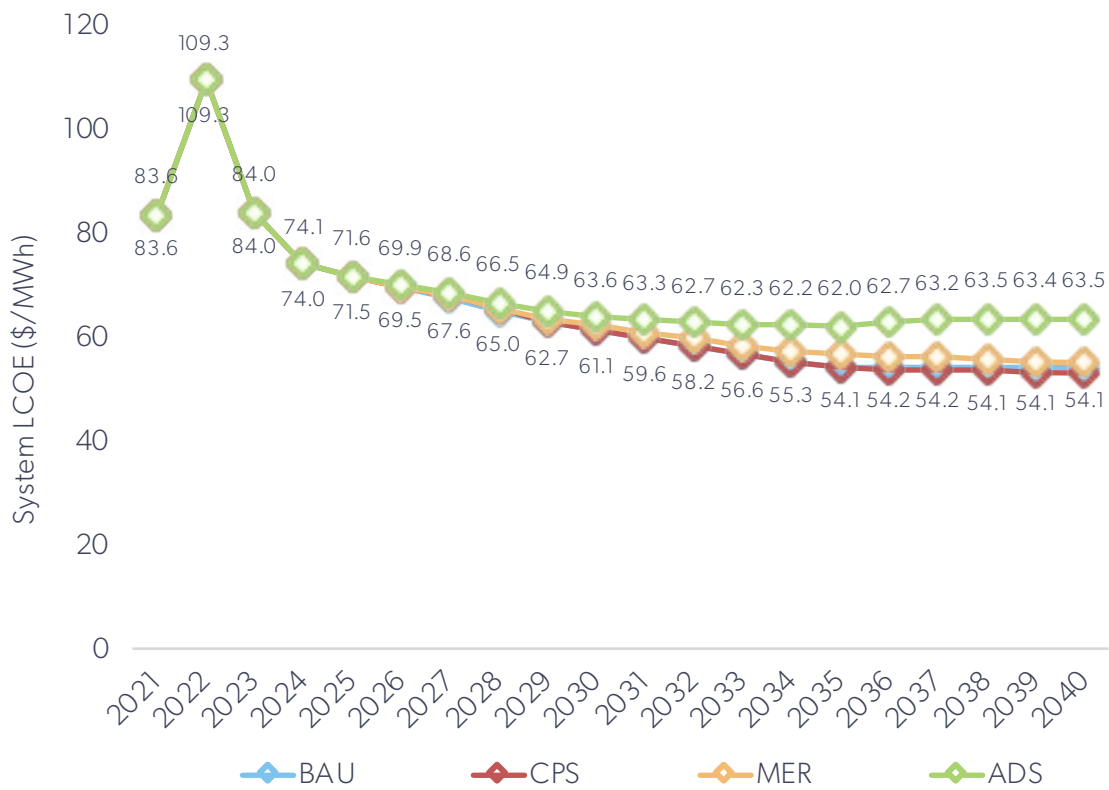


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Comparison of system levelized cost of electricity



Annual CO2 emissions

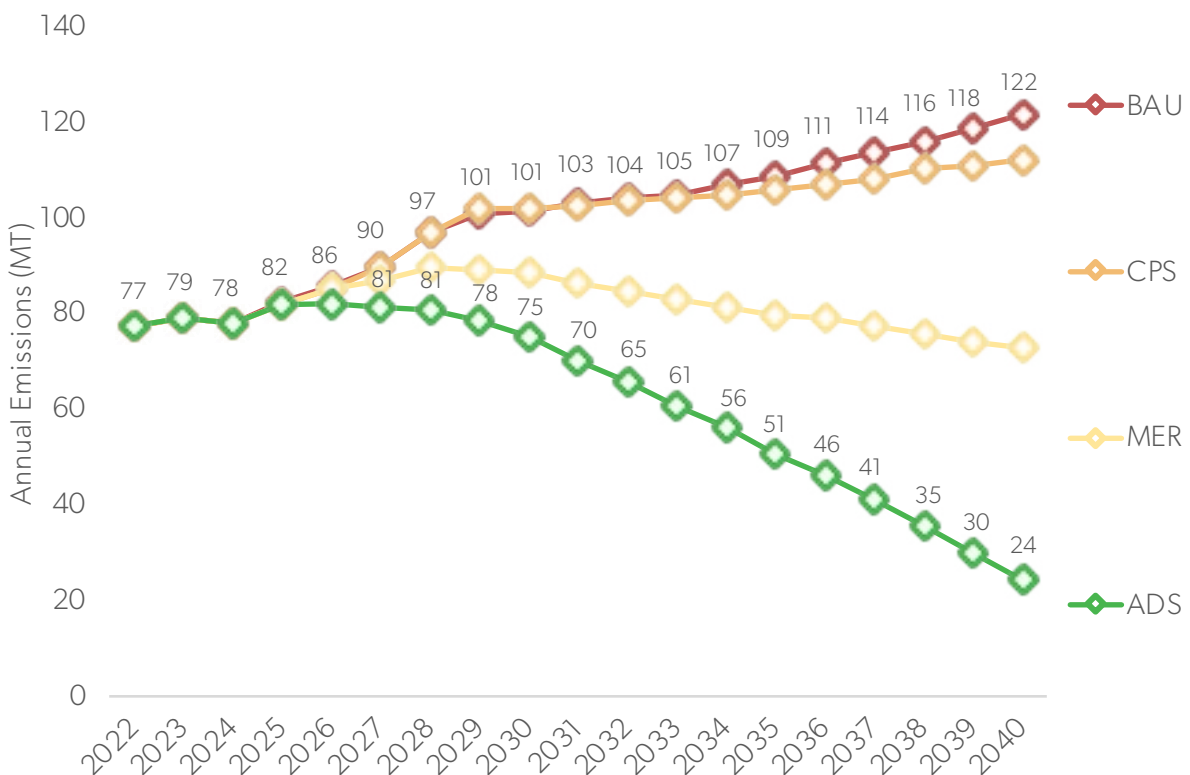


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