

TOWARDS A SECURE, AFFORDABLE AND CLEAN ENERGY FUTURE

JUNE 2023

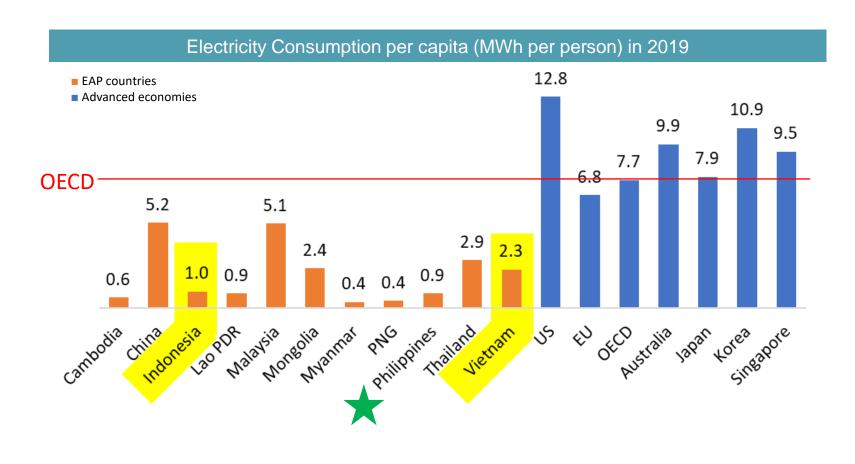


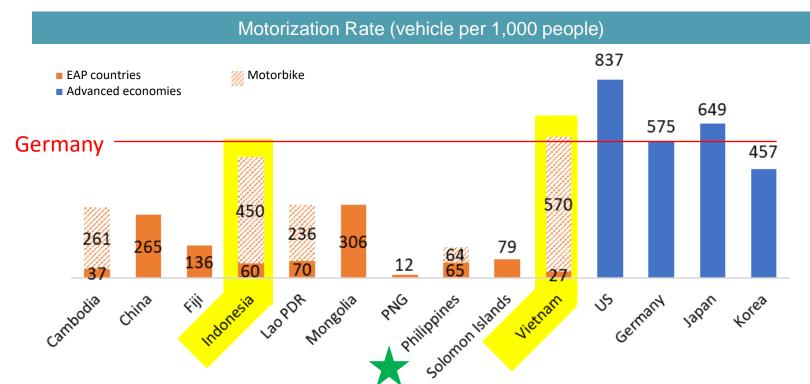
Feng Liu Senior Energy Specialist and Infrastructure Program Leader for the Philippines

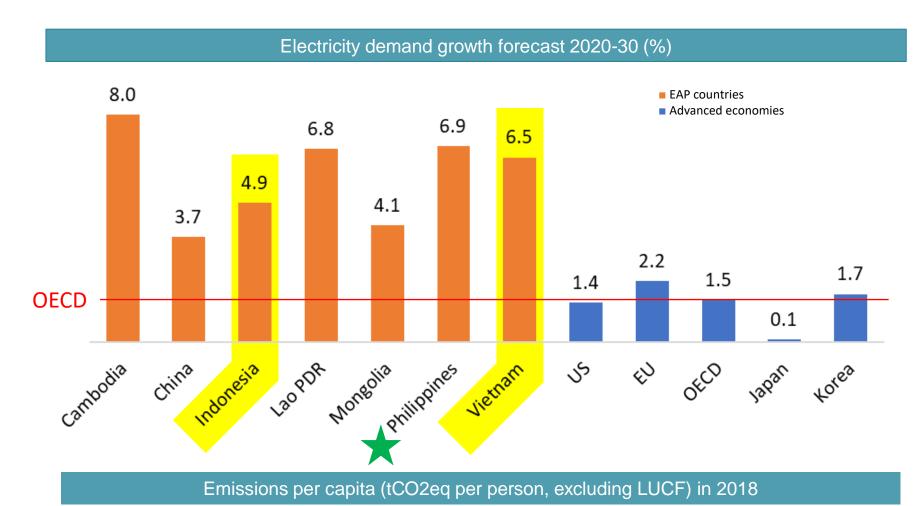


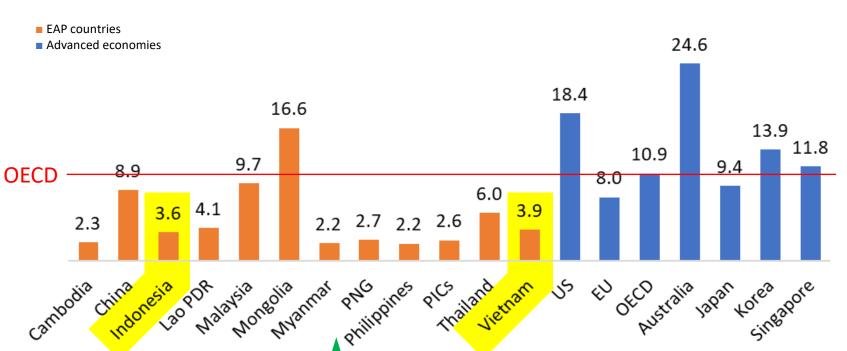
### The Philippine energy sector needs to grow rapidly to support the country's development ambition





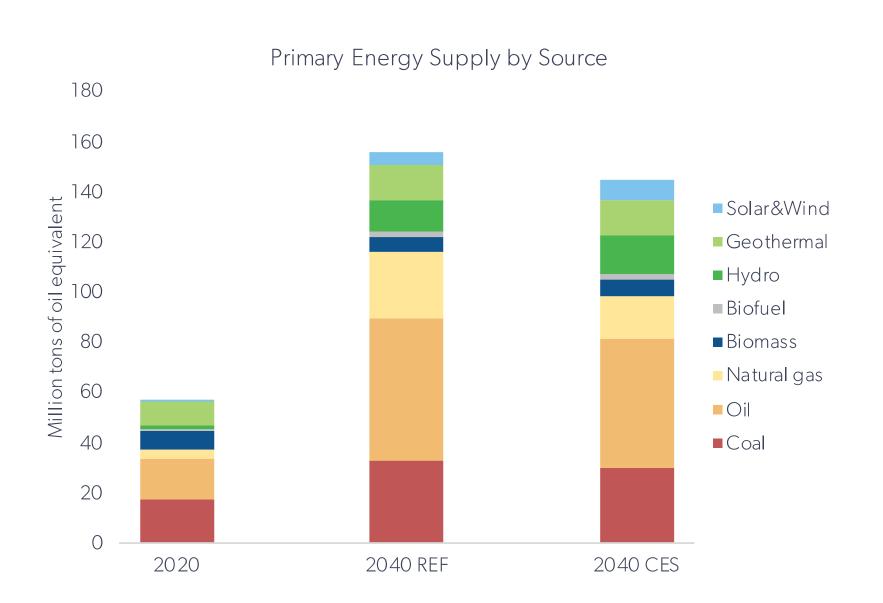


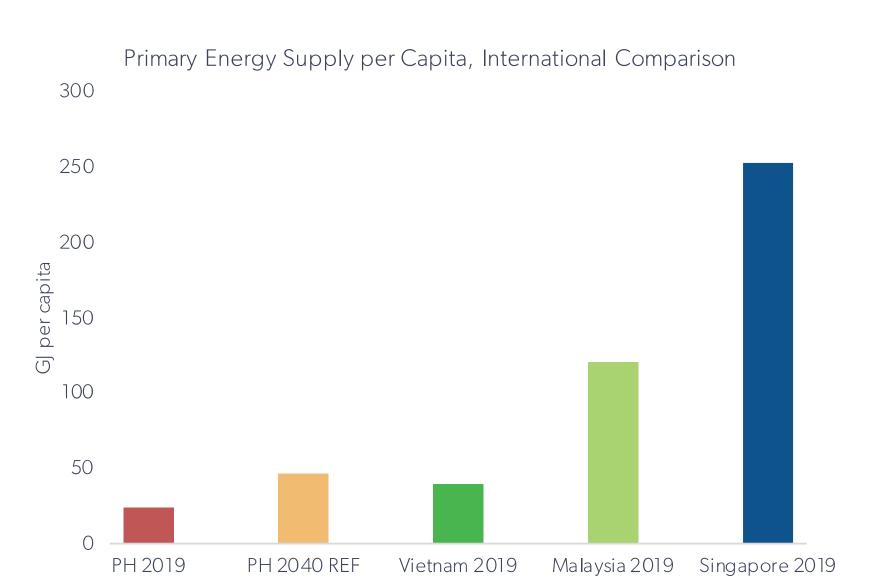




## Reliance on fossil fuels is projected to increase, but per capita energy consumption will remain low







Source: PEP2020-2040, Department of Energy

Sources: International Energy Agency Energy Statistics

### Key characteristics of the Philippine energy sector



#### Risks/Threats:

- 1. Highly reliant on imports fully dependent on imported oil, importing about 80 percent of its coal supply. The expected depletion of domestic gas reserves has triggered a rush to investing in LNG to power generation.
- 2. High energy prices, especially electricity tariffs due to geography and bureaucracy (which add to development cost), lack of competition in generation, and full cost passthrough.

### Advantages/Opportunities:

- 3. No explicit energy subsidies, except for targeted social subsidies financed by surcharges to non-subsidized ratepayers, such as the lifeline electricity tariff and subsidies for off-grid diesel power systems.
- 4. Private sector driven development all investments in the energy sector are financed by private sector except in select areas of off-grid electrification.
- **5. Abundance of renewable energy resources**, particularly in solar and onshore/offshore wind. Large-scale solar and onshore wind have become cost-competitive compared to fossil-fuel-based power.

### The Government of Philippines is embarking on a substantial energy transition agenda



The government's current goal is to achieve 35% share of renewables in power generation by 2030 and 50% by 2040. The broad strategy of the government is to (1) scale up renewable energy deployment, particularly solar and wind (onshore and offshore); (2) cap the growth of coal-fired power; (3) ramp up LNG to power investment; (4) promote energy efficiency and demand-side management; and (5) open to developing other low-carbon technologies, such as nuclear power. □ Updated National Renewable Energy Program 2020-2040 set new targets and increased mandatory Renewable Portfolio Standard ☐ The Moratorium on Endorsement of Greenfield Coal-fired Power Projects announced in 2020, reflected in Philippine Energy Plan 2020-2040, and upheld by the current administration. □ New Natural Gas Development Plan (completed in 2022) aims to attract investments in the country's downstream natural gas industry □ First National Energy Efficiency and Conservation Plan (to be issued in 2023) will set energy efficiency targets and strengthen regulations and enforcement ☐ Feasibility of nuclear power is being assessed per EO No.164, s.2022, Adopting a National Position for a Nuclear Energy Program, and for Other Purposes



### Decarbonizing the power sector is key to energy transition in the Philippines



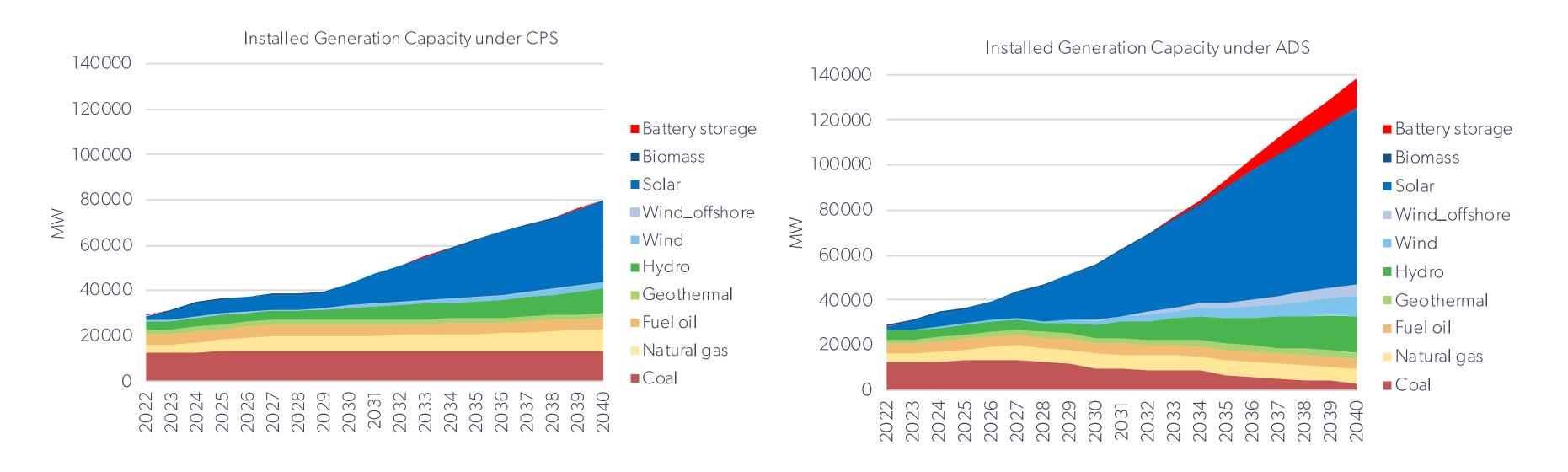
To inform the discussion on energy transition pathways, the World Bank conducted an exploratory analysis of the decarbonization of the power sector:

- Business-as-usual (BAU) scenario is similar to the REF in PEP 2020-2040, but at a lower GDP growth rate (thus a
  corresponding lower power demand growth rate).
- Current policy scenario (CPS) is similar to the CES in PEP 2020-2040 but also adjusted to a lower GDP growth
  rate. It represents the government's current ambitions in improving energy efficiency and developing e-mobility
  on the demand side and in scaling up renewable energy on the supply side.
- Accelerated decarbonization scenario (ADS) analyzes how power system expansion needs to adapt to achieving the goal of reducing annual  $CO_2$  emissions by 80 percent by 2040, compared with BAU, in response to the same electricity demand growth as in CPS.

The ADS, with a deep emissions reduction target in 2040, provides useful analytical insights for achieving net zero emissions in the power sector beyond 2040.

## Accelerated decarbonization would result in substantial changes in the mix of power generation technologies ...

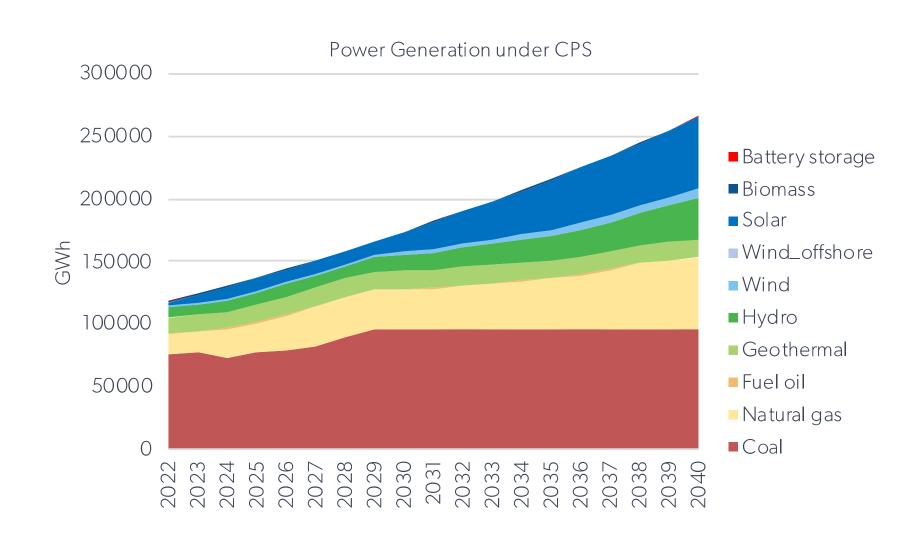


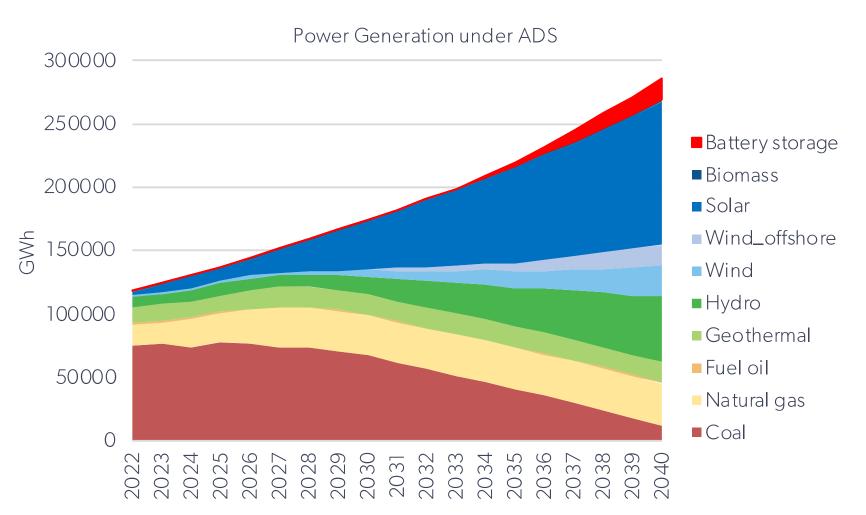


Source: World Bank staff estimates

### ...and sources of energy





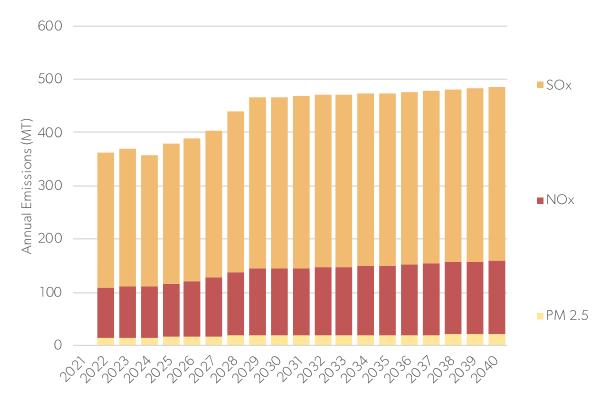


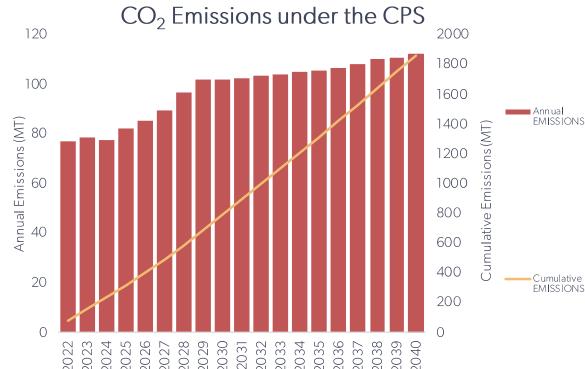
Source: World Bank staff estimates

# The ADS pathway would lead to large reduction in emissions of CO<sub>2</sub> and air pollutants



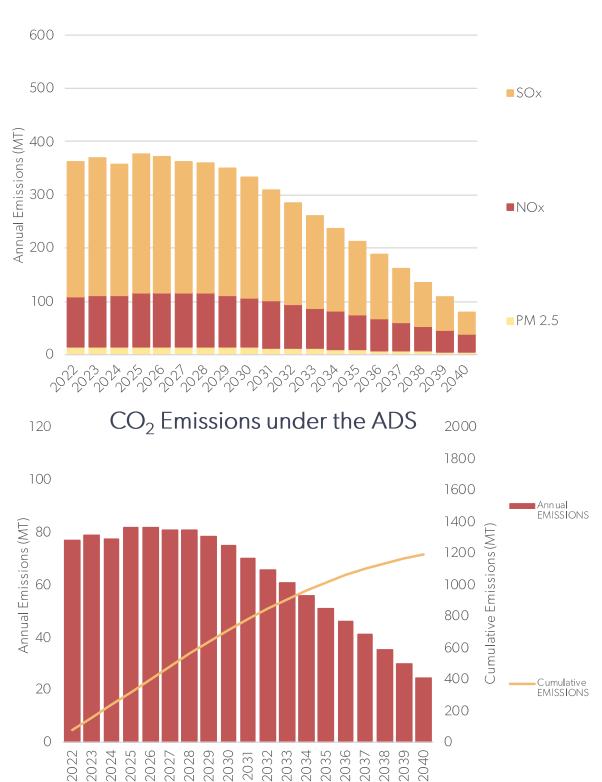
#### Annual Emissions of Air Pollutants under the CPS





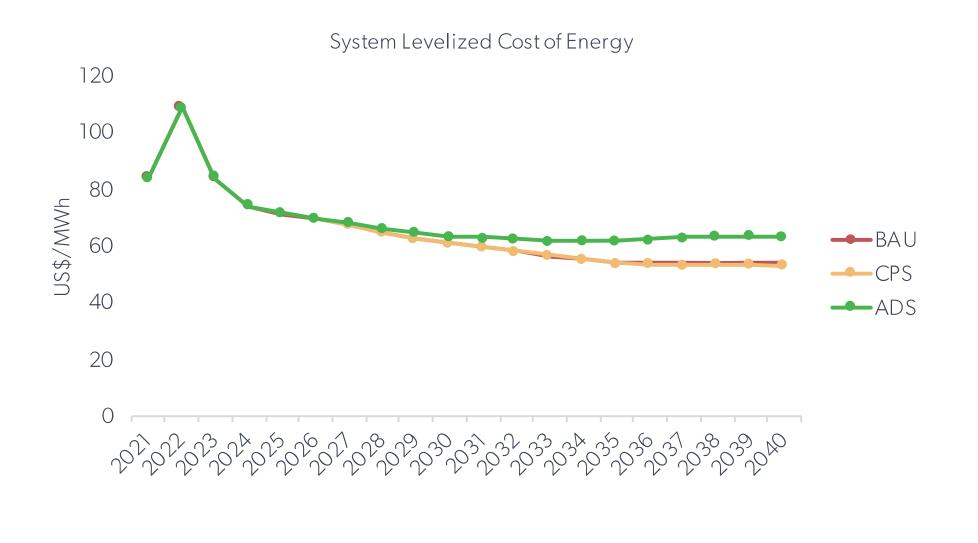
Source: World Bank staff estimates

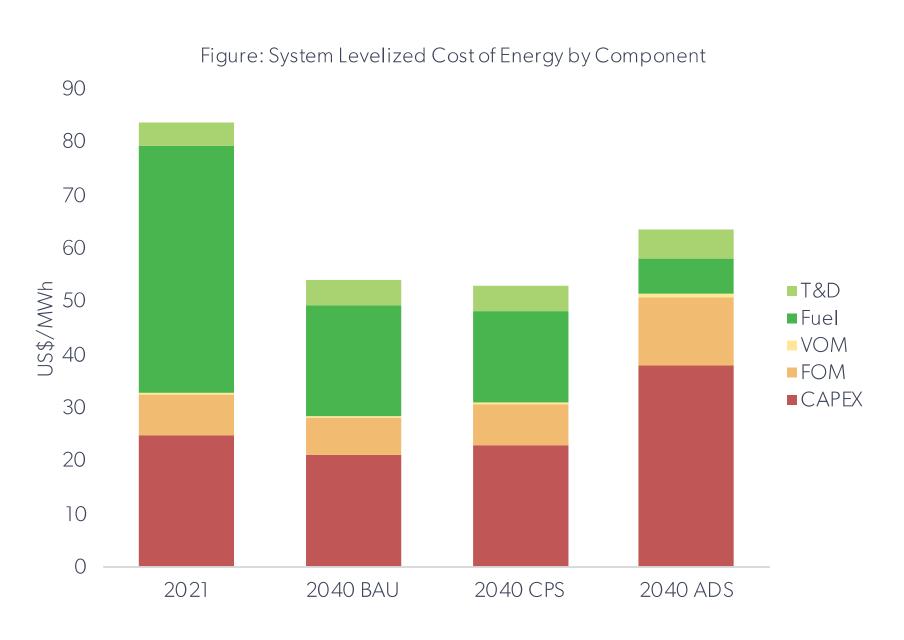
#### Annual Emissions of Air Pollutants under the ADS



### System levelized cost of electricity is projected to decline





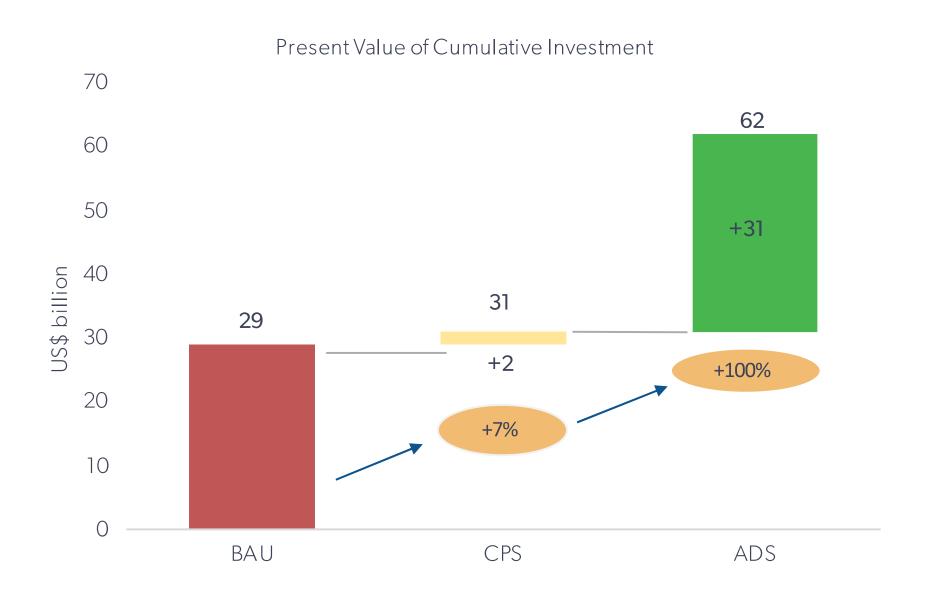


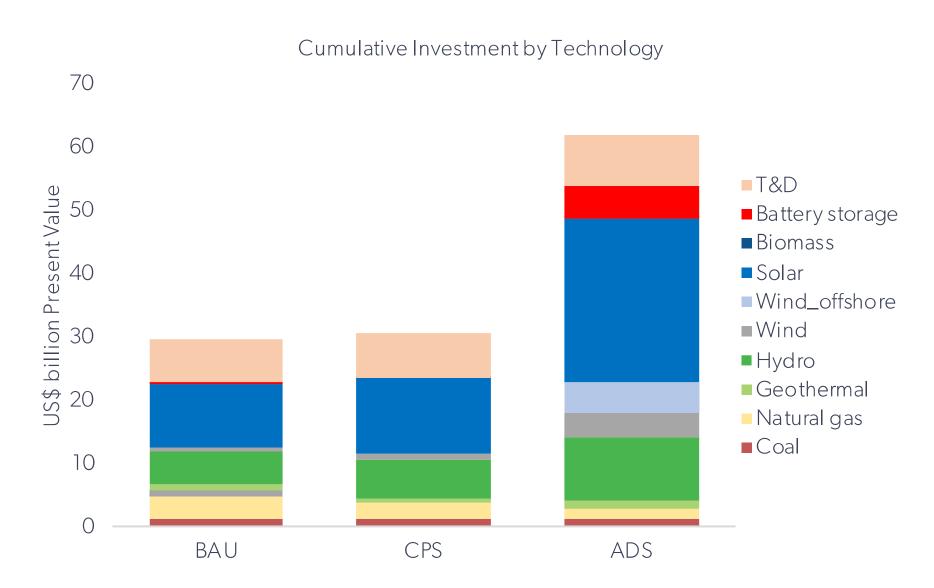
Source: World Bank staff estimates.

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

## ADS would require a substantial increase in capital spending for renewable energy scale-up and integration







Source: World Bank staff estimates

Non-discounted cumulative investment by 2040 in 2021 prices:

BAU – US\$52 billion

CPS – US\$57 billion

ADS – US\$127 billion

### Does accelerated decarbonization make sense? Comparing the cost of 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.

The broad conclusion of this analysis is that in order to raise the ambition of Philippines' decarbonization efforts to bring about additional local and global environmental benefits commensurate international assistance in cost sharing would be needed.



## Building a foundation for energy transition in the next five years



- 1. Increase the implementation of utility-scale solar and wind power projects to bring variable renewable energy sources to a tipping point in power generation
- 2. Prioritize planning and investments in transmission capacity and grid flexibility
- 3. Prudently pursue the LNG-to-power program to secure reliable power supply and increase the system flexibility for integrating variable renewable energy
- 4. Prioritize energy efficiency and demand-side management for buildings and industries
- 5. Improve power system planning to better guide energy transition investment decisions
- 6. Consider the use of an appropriate carbon pricing instrument to level the playing field between RE and fossil fuels while generating revenues
- 7. Establish a framework for addressing the early retirement of coal-fired power plants and ensuring a just energy transition