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Policy Brief on Energy:

# Philippine Economic Development and the Paris Climate Change Agreement

Office of Senator Win Gatchalian

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## Introduction

The United Nations Framework Convention on Climate Change (UNFCCC) was established in 1992 to serve as a framework for international cooperation in the fight against climate change. The UNFCCC, in particular, sought to mitigate the rapid rise of global temperatures and develop strategies to respond to the impact of climate change on communities the world over.

In 1995, the UNFCCC spearheaded the formulation of the Kyoto Protocol. The Kyoto Protocol legally bound signatory countries to put forward and adhere to greenhouse gas (GHG) emission reduction targets. Its first commitment period started in 2008 and ended in 2012. Its second commitment period started in 2013 and will end in 2020.

The Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) is a subsidiary body that was established by the UNFCCC in Durban, South Africa in the 17th Session of the Conference of Parties (COP17) to develop a protocol to be adopted in the 21st session of the Conference of Parties (COP21) as the Paris Agreement and to be implemented from 2020 onwards.

The 2015 Paris Agreement could be viewed as the latest effort to strengthen the implementation of the mandates of the United Nations Framework Convention on Climate Change (UNFCCC 2015a, UNFCCC 2015c). In particular, it was designed to strengthen the global response to the urgent threat of climate change by (1) holding the increase in global average temperature below 2° above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5° above pre-industrial levels, (2) increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, and (3) making finance flows consistent with pathways towards low greenhouse gas emissions and climate-resilient development.

The focal point of the agreement would be the nationally determined contributions of signatory countries. Each signatory country is tasked to formulate and adhere to a greenhouse gas reduction pledge. The pledges typically indicate by how much the signatory country will reduce its greenhouse gas emissions in fifteen to twenty years' time – relative to projected greenhouse gas emission levels at the end of the specified transition period. For example, if a country pledges to reduce its greenhouse gas emissions by 25% by 2035, the reference year for the emissions reduction target would be its projected greenhouse gas emissions in 2035. A country's pledge thus constitutes its commitment to pursuing a lower emission development trajectory.

The agreement places emphasis on formulating a cohesive global strategy against climate change that is cognizant of the needs of countries – especially those countries that are in lower levels of development and

those countries on the cusp of industrialization. More specifically, the agreement recognizes that developing countries are still on their way towards reaching the peak of their greenhouse gas emissions. Compelling a country that does not generate considerable amounts of greenhouse gases to commit to an overly ambitious emissions reductions plan could have dire ramifications on its economic development prospects. The agreement, in essence, recognizes that increases in greenhouse gas emissions go hand-in-hand with the pursuit of industrialization, poverty eradication, and sustainable socio-economic development within the developing country context. Alternatively, it implicitly provides the space for developing countries to pursue less ambitious emission reduction targets.

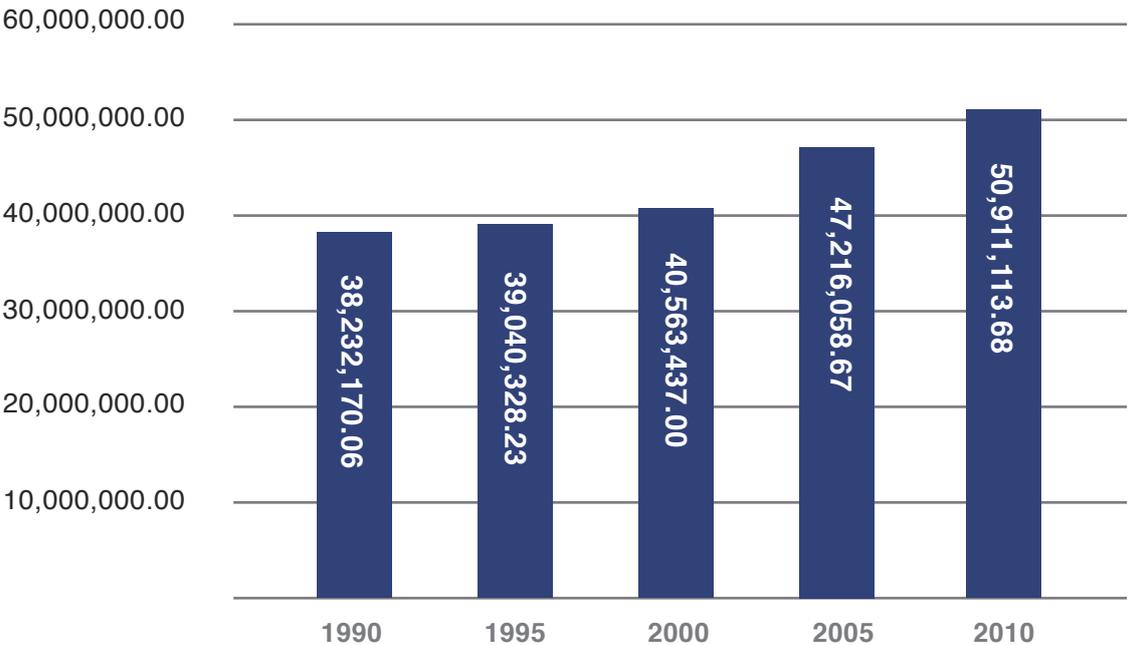
The Paris Agreement also makes it clear that developed or industrialized countries must absorb the brunt of the costs of the concerted global effort to curb the adverse impacts of climate change. The industrialization of these developed countries, after all, lent momentum to the marked increase in greenhouse gas emissions in the past century. This emphasis is indicative of the Paris Agreement's commitment to promote a sense of fairness or social justice in its pursuit of its intended goals.

The agreement also provides for the development of an aid disbursement mechanism designed to facilitate the transfer of funding from developed countries to developing countries in order for the latter to intensify efforts to reduce greenhouse gas emissions, develop carbon sinks, enhance energy efficiency, and accelerate the adoption of clean energy technologies. The agreement also put emphasis on developing results-based processes in order to maximize the impact of the funds donated by developed countries.

## Historical Emissions Data

Data collected by the European Union Emission Database for Global Atmospheric Research (EU-EDGAR) indicate that greenhouse gas emissions have been rising in the past two-and-a-half decades. Figure 1 illustrates the manner in which global greenhouse gas emissions have been rising from 1990 to 2010. It is of note that the trends implied by the figure lend insight into the source of the urgency implicit in the tone of the 2015 Paris Agreement. It could be argued that the renewed urgency to combat climate change is underpinned by the recognition that global greenhouse gas emissions are increasing. The rate at which global greenhouse gas emissions increased during the 90s hovered around the 3% mark. This rate jumped to 16.4% from 2000 to 2005. The growth in global greenhouse gas emissions retained some of its momentum from 2005 to 2010 with a registered increase of 7.83% - a figure that is still markedly larger than the rates observed during the 90s.

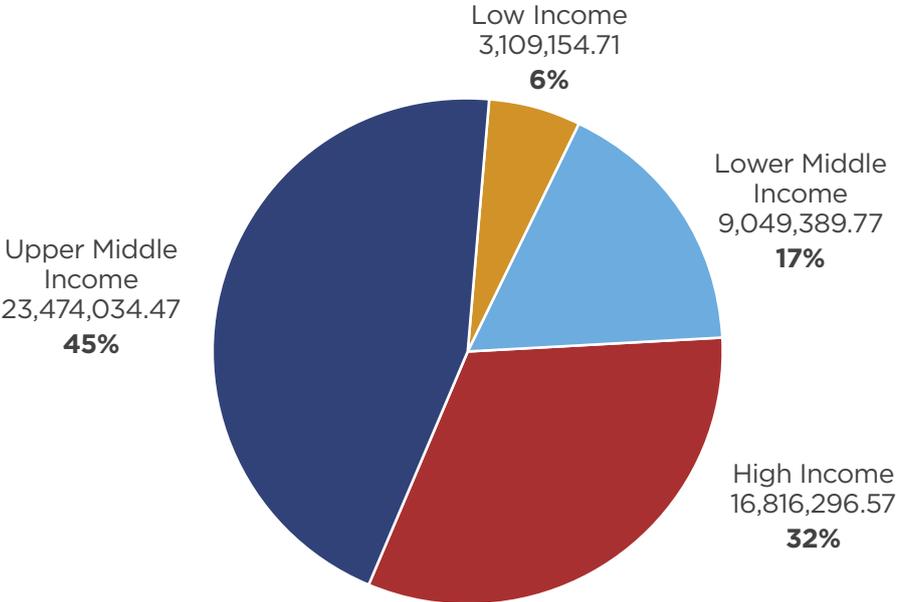
Figure 1: Global Greenhouse Gas Emissions 1990 to 2010 in Kilotons of CO<sub>2</sub> Equivalent



Source: EU-EDGAR

The bulk of the greenhouse gas emissions is generated by upper middle income and high income countries. Figure 2 clearly illustrates that the aggregation of greenhouse gas emissions from higher income countries is massive compared to the aggregation of greenhouse gas emissions from lower income countries. The data indicate that low income and lower middle income countries account for less than a fourth of global emissions. It should be noted that the proportion of emissions coming from countries belonging to the lower income classifications in 2012 closely approximates the proportions of emissions coming from these countries in 1990 and 2000.

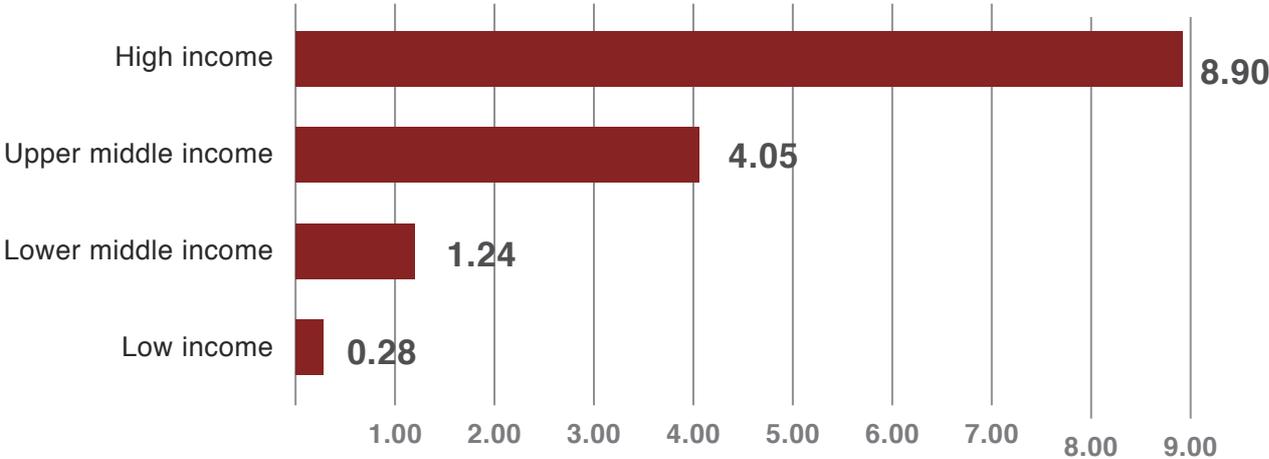
Figure 2: Global Greenhouse Gas Emissions Distribution 2012



Source: EU-EDGAR, WB Country Classifications

Per capita emissions data from EU-EDGAR are consistent with the results discussed above. Figure 3 shows that per capita carbon dioxide emissions from fossil fuel use and cement production in upper middle income countries are, on average, markedly larger than those in lower middle income and low income countries. The data suggest that per capita greenhouse gas emissions from fossil fuel use and cement production increases with per capita income.

Figure 3: Average Per Capita CO<sub>2</sub> Emissions (In Tons) from Fossil Fuel Use and Cement Production by Country Classification in 2014



Source: EU-EDGAR, WB Country Classifications

# Discussion

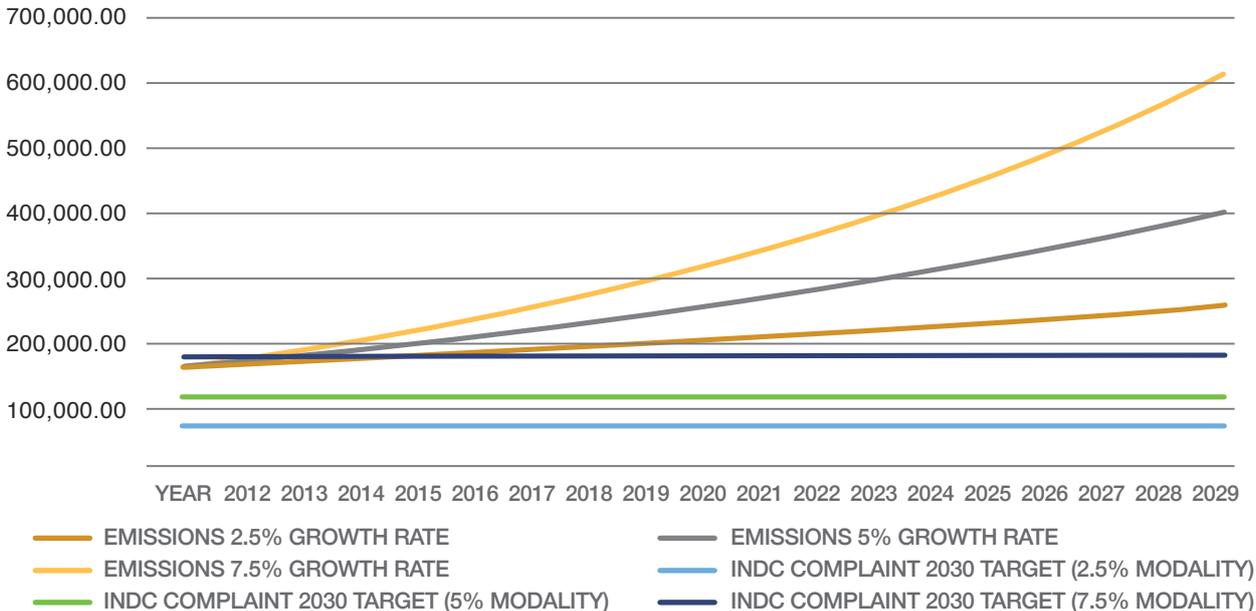
## The Challenge of Committing to the Paris Agreement 2015

According to the UNFCCC, the Philippines has pledged to reduce its greenhouse gas emissions by about 70% relative to its business-as-usual (BAU) scenario of 2000 to 2030 (UNFCCC 2015b) – provided that it receives sufficient aid. Put simply, if the Philippines receives sufficient external aid for its emissions reductions programs then the Philippines must register an emissions level in 2030 that is 70% lower than the level at which it will presumably reach given that its growth follows the trajectory established by available data and current trends. It is of note that the INDC of the Philippines is one of the most ambitious pledges put forward in the wake of the Paris Agreement 2015 – dwarfing the emission reduction targets of its neighbors and high income industrialized countries.

According to its Independent Nationally Determined Contributions (INDC) document, the Philippines intends to achieve this goal by reducing emissions from energy generation, waste management, transportation, forestry activities, and its industries. At this junction it is important to stress that the capacity of the Philippines to meet its intended emissions reduction targets is contingent on the availability of external funding, the accessibility of new technologies, and the efficacy of capacity building initiatives.

Latest available data from the EU-EDGAR indicate that the Philippines emitted 167,297.55 kilotons of greenhouse gases in 2012 – approximately 0.31% of the greenhouse gases produced by the world in the same year. A preliminary illustrative analysis of the time series emissions data from 1990 to 2012 indicates reveals that the compound annual growth rate (CAGR) of greenhouse gas emissions in the Philippines in the specified time period is approximately 2.5%. Given this rate, Philippine greenhouse gas emissions will reach 260,927.08 kilotons in 2030 (402,621.5 under a 5% modality and 614, 953.02 under a 7.5% modality). To satisfy its INDC of 70% under the 2.5% modality, the Philippines must therefore reach an emissions level of 78,278.12 in 2030 which is less than half its 2012 emissions level (120,786 under a 5% modality – 72% of the 2012 level, 184,485 under a 7.5% modality – 110% of the 2012 level). Figure 4 provides a simplified illustration of the growth of Philippine greenhouse gas emissions and the magnitude of the 70% reduction pledge given the aforementioned modalities.

Figure 4: Philippine Greenhouse Gas CAGR Growth Estimates 2012 to 2030



Source: EU-EDGAR

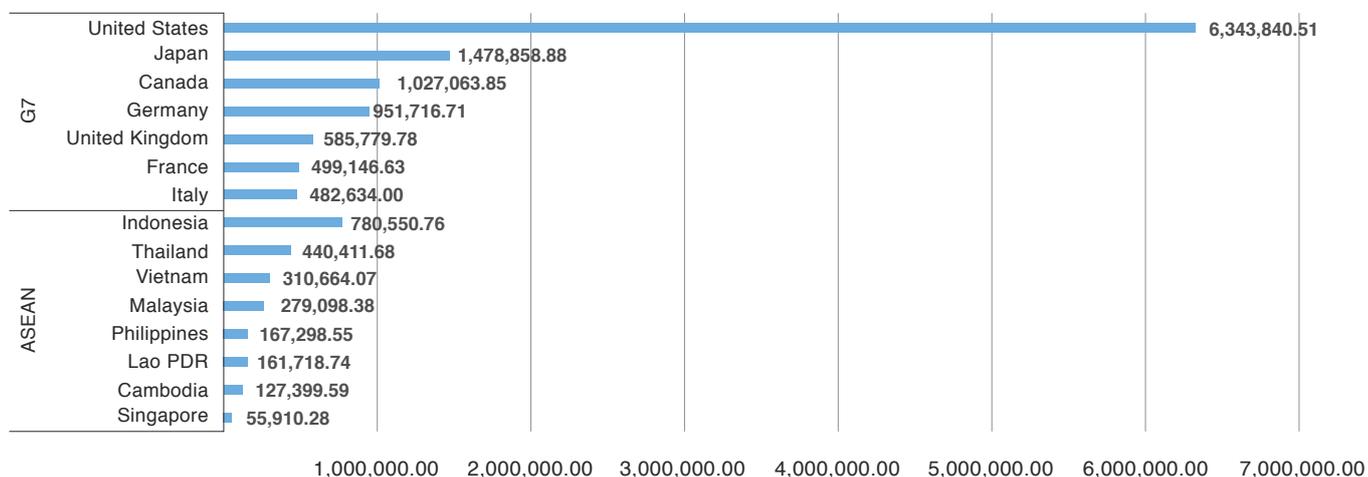
Table 1 provides a summary of per capita carbon dioxide emissions from fossil fuel use and cement production of selected ASEAN, industrialized, and least developed countries (LDCs) in Africa as well as their associated pledges. The Philippines' pledge could be viewed to be massive when compared with the pledges of its ASEAN neighbors Malaysia, Indonesia, Thailand, and Vietnam and countries in the G7— countries with considerably higher per capita and aggregate emissions than the Philippines (See Figure 5). It is also of note that the per capita emissions level of the Philippines is closer to the levels registered by Angola, Congo, and Yemen – than to the levels registered by Malaysia, Thailand, Vietnam, and Indonesia. The Philippines emissions reduction target is also markedly larger than the targets of countries belonging to the Organization for Economic Cooperation and Development (OECD). The preceding discussion suggests that the Philippines is attempting to further reduce its (relatively) miniscule carbon emissions footprint.

Table 1: Per Capita Emissions and Indicative INDC Pledges of Selected Countries

REGION	COUNTRY	2014 PER CAPITA EMISSIONS	INDICATIVE INDC PLEDGE
ASEAN & CHINA	Philippines	1.00	70%
ASEAN & CHINA	Malaysia	7.50	35%
ASEAN & CHINA	Thailand	4.00	20%
ASEAN & CHINA	Viet Nam	2.10	8%
ASEAN & CHINA	Singapore	8.66	36%
ASEAN & CHINA	Indonesia	1.80	29%
ASEAN & CHINA	China	7.60	60-65%
G7 - Major Developed	United States	16.50	26-28%
G7 - Major Developed	Canada	15.90	30%
G7 - Major Developed	France	5.00	40%
G7 - Major Developed	Germany	9.30	40%
G7 - Major Developed	Italy	5.50	40%
G7 - Major Developed	Japan	10.10	26%
G7 - Major Developed	United Kingdom	6.50	40%
Africa - Least Developed	Angola	1.10	35%
Africa - Least Developed	Congo	1.11	55%
Africa - Least Developed	Djibouti	1.63	40%
Africa - Least Developed	Yemen	0.90	1%
Africa - Least Developed	United Republic of Tanzania	0.20	10-20%
Africa - Least Developed	Burkina Faso	0.10	7%

Source: EU-EDGAR, WB Country Classifications, UNFCC

Figure 5: Greenhouse Gas Emissions of G7 and ASEAN Countries in Kilotons 2012

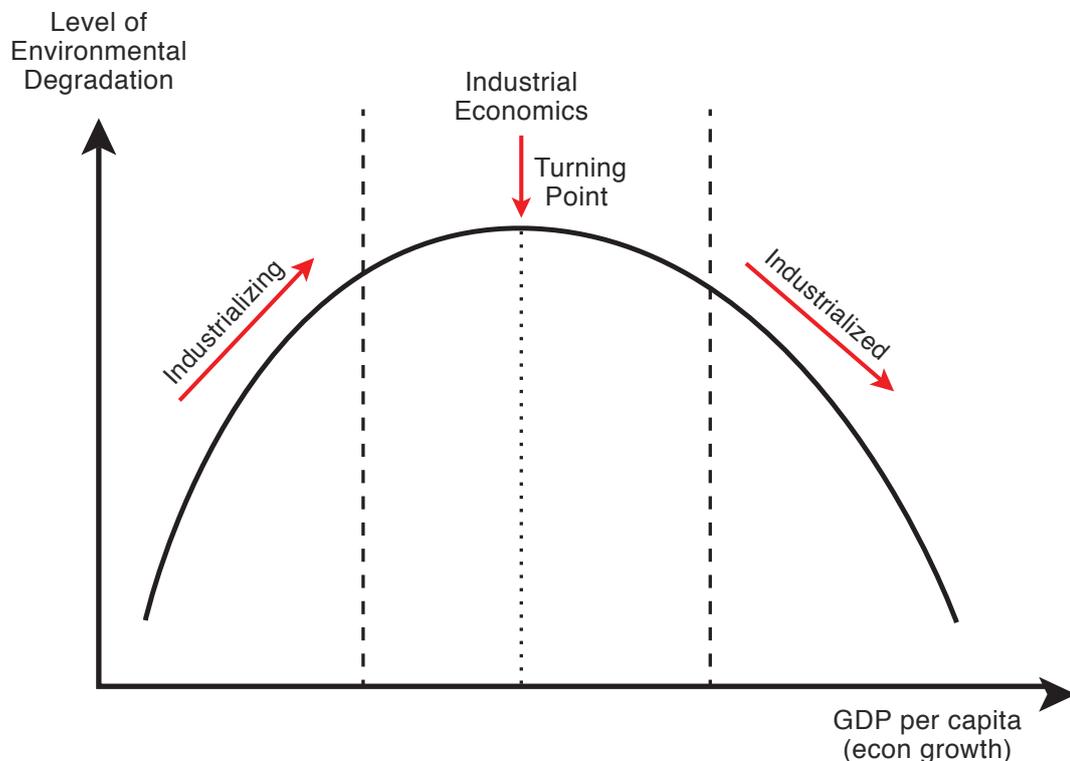


Source: EU-EDGAR

At this juncture, it is important to ask the following question: What is the relationship between economic growth and greenhouse gas emissions? The feasibility of undertaking the task of reducing our prospective 2030 BAU emissions has to be assessed from an economic perspective. The discussion has to be underpinned by an understanding of the empirical relationship between economic growth and greenhouse gas emissions – in order to ensure that the government is putting forward strategies that will not be detrimental to the welfare of the Filipino people both now and in the future.

The Environmental Kuznets Curve (EKC) as illustrated in Figure 6 can be viewed as a useful theoretical anchor for the investigation of the impact of economic activity on greenhouse gas emissions (Narayan and Narayan 2009, Wang, Zhou, Zhou, and Wang 2011, Ozturk and Acaravi 2010). The EKC suggests that economic activity places tremendous pressure on the environment during earlier stages of development or industrialization. The adverse impact of economic activity on the environment, however, is argued to taper over time – presumably as the economy (1) shifts away from pollutant heavy industries and towards high-value services, (2) acquires the capacity to invest in programs for environmental preservation and rehabilitation, and/or (3) adopts ‘cleaner’ technologies and/or modes of production. The result is that carbon emissions exhibit an inverted-U shape over time. Given the Philippines’ current level of development and its INDC, it is important to determine whether or not the Philippines follows the hypothesized EKC or not. If prevailing trends indicate that the Philippines will follow the EKC then the Philippines emissions can be expected to taper after it completes its industrialization – and have the increased potential to satisfy its INDC pledge. Moreover, if the Philippines does indeed follow the EKC then it is important to determine the projected time period before the Philippines reaches the peak of its EKC. If the Philippines has yet to reach its hypothesized peak emissions level then reducing its emissions could prove especially challenging.

Figure 6: The Environmental Kuznets Curve (EKC)



Source: International Labor Office

Panel data evidence using information culled from countries in the Middle East, South Asia, Latin America, Africa, and East Asia suggests that the Philippines and several of its ASEAN neighbors (Indonesia, Malaysia, and Thailand in particular) have not reached the peak of their respective EKC curves (Narayan and Narayan 2009). The evidence indicates that the forecasted short-run and long-run income elasticities of carbon emissions are both positive for these countries. This, in turn, implies that carbon emissions are not expected to trend downwards in these countries for the foreseeable future. In the Philippine case, the short-run income elasticity was estimated to be 1.03 – indicating an almost one-is-to-one correspondence between income growth and the growth of carbon emissions. Shifting to the long-run, the income elasticity increases to 1.73 – indicating that a one percent increase in income translates to a 1.73 percent increase in carbon emissions. Put simply, existing empirical evidence suggests that the Philippines is expected to increase its emissions as it works its way to the peak of its EKC curve and proceeds through its developmental trajectory.

The preceding discussion underlines a critical linkage between economic growth and carbon emissions – and implicitly between job generation and carbon emissions. It can be inferred that the promotion of industrialization-led inclusive or job-generating growth to sustain economic development will result in marked increases in carbon emissions. Rising incomes through the increased availability and quality of employment will translate to rising consumer demands. Rising consumer demands, in turn, will lead to increased carbon emissions in transportation, energy generation, industrial activities, and agricultural production. It could thus be hypothesized that there exists an implicit tradeoff between

industrialization-led inclusive growth and maintaining current levels of carbon emissions.

Evidence gleaned from an analysis of the impact of economic activity on greenhouse gas emissions in China could be instructive – given China’s reliance on coal energy and the Philippines growing reliance on coal energy. Evidence indicates that the relationship between carbon dioxide emissions and economic growth in China can be characterized by a U-shaped curve (Wang, Zhou, Zhou, and Wang 2011). Estimates indicate that China has reached the bottom of the curve and, as such, would be expected to increase its emissions in the coming decades. This structure has been partly attributed to its coal-dominated energy sector and its energy-intensive industrialization strategy. This is consistent with the observation that increased GDP growth or increased energy consumption stimulates carbon dioxide emissions in China (Chang 2010). The preceding discussion suggests that if the Philippines initiates an intensive industrialization effort and continues to rely heavily on coal-energy then its emissions would be expected to increase over time – and, most likely, go above existing BAU estimates. Viewed differently, the evidence suggests that the opportunity cost of drastically reducing our emissions in the medium-term would be the potentially inclusive economic development

## Conclusion

This document provides a brief overview of the 2015 Paris Agreement, the Philippine INDC, and historical greenhouse gas emission trends. The preceding discussion highlights several of the salient implications of pursuing the 70% emissions reduction target. In particular, if the government commits to reduce its BAU emissions by 70% in 2030 and if it receives sufficient foreign aid, then it must be prepared to formulate an economic development strategy that could simultaneously promote inclusive growth and reduce greenhouse gas emissions. Given its (1) growing industrial base, (2) burgeoning demand for energy, (3) pivot towards coal-energy, and (4) the established relationship between industrialization-led economic growth and greenhouse gas emissions, simultaneously pursuing an extremely low carbon future and robust economic development could be a dubious proposition at best. There is thus an urgent need to promote nuanced discussions and debates on our willingness – and capacity to commit to an ambitious emissions reduction plan. If the Philippines ratifies its INDC then it must formulate and implement a cohesive set of strategies designed to maximize the emissions-reduction impact of the policy tools, indigenous resources, and foreign aid that could be at its disposal.

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