THE PHILIPPINES' KEY GROWTH SECTORS: CONSUMPTION TRENDS IN BAU AND BEYOND, A DECOMPOSITION ANALYSIS

Elvira Torres Gelindon, Research Fellow, Asia Pacific Energy Research Centre (APERC), (+81)3-5144 8543, gelindon@aperc.or.jp

Overview

The Philippines recognises the importance of energy efficiency and conservation. Learning from major drawbacks such as oil price hikes, supply shortage, power outages, etc. various programs and measures to conserve energy have been developed and closely implemented. In 2004, the Department of Energy (DOE) launched the National Energy Efficiency and Conservation Program (NEECP) aimed at strengthening the implementation of energy efficiency and conservation by promoting awareness on the efficient utilisation of energy in the economy (APERC, 2012). In 2017 the Energy Efficiency and Conservation (EE&C) Roadmap was developed that aims to achieve by 2040 measurable reduction in energy intensity and consumption per year compared with business as usual. In 2019, after more than three decades of waiting, the Energy Efficiency and Conservation Bill was finally enacted into law [EE&C Act of 2019 or Republic Act (RA) 11285], institutionalising all the energy efficiency and conservation plans and programs devised from NEECP and the roadmap.

The Philippines is one of the fast-growing economies in South-East Asia, the average growth rate of its GDP (PPP 2017 USD) increased to 6.3% between 2010-19 from an average of 4.5% between 2000-09 (World Bank, 2021). The industry, services and agriculture sectors are the economy's key growth sectors as these are the major drivers of economic growth and employment. (DOE, 2021). As such, these sectors continue to rely on large amount of energy to sustain their revenue-generating activities.

The energy consumption growths in the above-mentioned sectors can be alarming if we don't understand the true trends of consumption of these sectors. This paper analyses the energy consumption of the Philippines using decomposition. This method allows us to understand better, true trends in energy consumption as well as trends in economic activity that influence energy consumption. Finally, as indicated in the EE&C Roadmap, this paper can be used as a basis to measure energy intensity improvement in the economy. Note that energy intensity is not the same as energy efficiency. Energy intensity is often used as a proxy to analyse energy efficiency improvements in an economy.

Methods

- The final energy consumption (FEC) consists of the industry, services and agriculture sectors only, as these are the key growth sectors in the Philippines. Data used in the analysis were from the EGEDA (APEC) database expressed in petajoules (PJ). Definitions follow that of the International Recommendations for Energy Statistics (IRES) by United Nations (UN).

- To conduct energy decomposition the equivalent measure of the level of activity of energy consumption is needed, in this case the gross value added. (GVA). GVA in were taken from World Bank Indicators adjusted to PPP 2018 US dollar while GVAs disaggregated by economic activity were from the Philippine Statistics Authority (PSA). The base year used in the analysis was 2005.

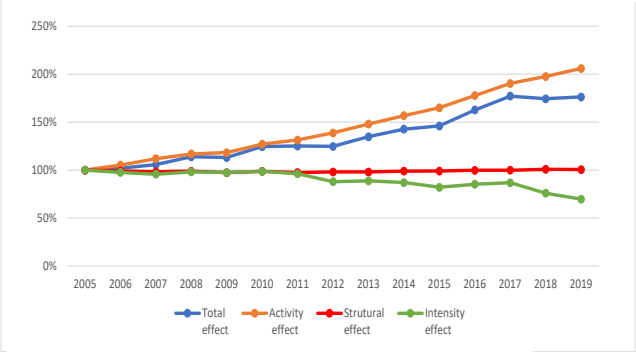
- Decomposition method represented by Logarithmic Mean Divisia Index (LMDI)-I Formula by B.W. Ang: $\boldsymbol{\Delta E_{tot} = E_T - E_0 = \Delta E_{act} + \Delta E_{str} + \Delta E_{int}}$ where ΔE_{tot} represents change in energy consumption, ΔE_{act} change in consumption due to activity, ΔE_{str} due to change in structure and ΔE_{int} due to intensity effect.

Results

Total final energy consumption (TFEC) grew 2.5% to 1 495 PJ in 2019 (EGEDA, 2021). The agriculture sector drove the increase in final consumption in 2019 with a robust 7.3% rise to 19.76 PJ. Energy consumption in the services sector was likewise significant (5.3% to 205.78 PJ) while the industry sector declined by 1.6% to 329.62 PJ in 2019. The three sectors made-up 37% of the economy's TFEC. Preliminary result of the APEC Energy Outlook 8th Ed likewise sees a string expansion on the three sectors between the outlook period 2018-2050. The services sector is poised to drive the TFEC with 4.5% growth in 2050. The industry follows with 2.9% while agriculture grows a modest 1.4% by 2050. Together, the three sectors will comprise 50% of TFEC by 2050, up by 13% from the 2019 level (APERC, for 2022 publication).

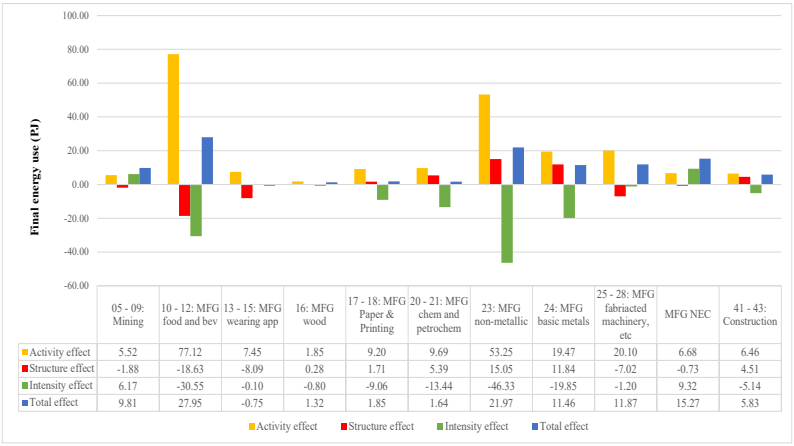
By decomposition, Figure 1 shows that the activity effect ramped up the FEC by 106% (333.74 PJ) to 555.15 PJ in 2019 compared with 2005 (314.90 PJ). The structural effect although insignificant, contributed 1% (1.72 PJ) increase in FEC while the intensity effect was the strongest factor, offsetting increases in FEC by 30% (-95.21 PJ). If energy intensity gains did not come into play, FEC would have increased by 335.46 PJ in 2019 from the 2005 level because of economic growth between these periods. It can be said that while energy consumption growths were robust brought about by activity and structural effects, the overall decline in the consumption was primarily due to energy intensity effect. Among the three sectors, industry and agriculture sectors posted significant energy intensity improvements from 2005 to 2019 with -103.64 PJ and -1.79 PJ, respectively.

Figure 1: Yearly additive decomposition results, 2005-19 (%)



Sources: EGEDA, WB, Author's analysis

Figure 2: Decomposition by industry sub-sector, 2019



	05 - 09: Mining	10 - 12: MFG food and bev	13 - 15: MFG wearing app	16: MFG wood	17 - 18: MFG Paper & Printing	20 - 21: MFG chem and petrochem	23: MFG non-metallic	24: MFG basic metals	25 - 28: MFG fabriacted machinery, etc	MFG NEC	41 - 43: Construction
Activity effect	5.52	77.12	7.45	1.85	9.20	9.69	53.25	19.47	20.10	6.68	6.46
Structure effect	-1.88	-18.63	-8.09	0.28	1.71	5.39	15.05	11.84	-7.02	-0.73	4.51
Intensity effect	6.17	-30.55	-0.10	-0.80	-9.06	-13.44	-46.33	-19.85	-1.20	9.32	-5.14
Total effect	9.81	27.95	-0.75	1.32	1.85	1.64	21.97	11.46	11.87	15.27	5.83

Sources: EGEDA, WB, PSA, Author's analysis

The paper also had a closer look on the sector with highest energy intensity gains (industry). Decomposition analysis by industry subsector indicated that overall industry consumption was due to the large extent energy intensity gains in most of the subsectors from 2005 to 2019 (Figure 2). The top three biggest energy intensity improvements were from non-metallic minerals products, food, beverages and tobacco and iron and steel industries. In 2019, energy intensity improved by 111 PJ. If energy intensity did not come into play, energy consumption in the industry sector would have increased by 218.23 PJ in 2019 due to activity and structural effects.

Beyond 2019, using the preliminary results of Outlook 8th Ed, decomposition shows that the overall decline in the economy's final energy consumption will primarily be due to intensity effect and lesser extent structural effect across the outlook period. Energy intensity gains ranging from -287.95 PJ in 2040 to -378.52 PJ in 2050 (APERC, 2022) are expected to offset the increase in energy consumption brought about by activity effect.

Conclusions

By decomposition, it can be said that intensity effect played a significant role in offsetting the increases in energy consumption brought about by the rapid growth (activity) in the Philippines. Industry sector was the biggest contributor in energy intensity improvement. A deeper analysis of a more detailed disaggregation of the services sector needs to be conducted to better understand the factors affecting the sector's energy consumption. Decomposition analysis can be a useful performance metrics of the industry, services and agriculture sectors.

References

Ang, B.W. *A Simple Guide to LMDI Decomposition Analysis*, 2016, retrieved August 2022.

APERC, (2012). Asia Pacific Energy Research Centre. *Peer Review on Energy Efficiency in the Philippines Report*. https://aperc.or.jp/file/2013/7/23/PREE_201211_Philippines.pdf.

— (2022 for publication). *APEC Energy Outlook 8th Edition*.

DOE. (2021). *Philippine Energy Plan 2020-2040*: https://www.doe.gov.ph/pep.

EGEDA. (2021). Experts Group on Energy Data and Analysis. Retrieved from APEC Energy Database: https://www.egeda.ewg.apec.org/egeda/database_info/index.html.

World Bank. (2021). World Bank. Retrieved from Databank: World Development Indicators: https://databank.worldbank.org/source/world-development-indicators.