

AN INTRODUCTION TO REGIONAL GOVERNMENT IN INDONESIA TO SUCCESS RAD-GRK PROGRAM: LITERATURE REVIEW OF GHG EMISSION TRENDS IN INDONESIA

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Abstract

This paper tried to figure out the extent to which trends of GHG emissions were accurately introduced in some province in Indonesia and a possibility elaborate the GHG emission trends each provinces comprehensively through their economic activities. So far based on Presidential Decrees of the RI No.61 Year 2011 regarding National/Regional Action Plan for Reducing Greenhouse Gas Emissions (RAN/RAD-GRK), No.71 Year 2011 regarding national GHG inventory system and No.62 year 2013 regarding Managing Agency for the Reduction of Emission from Deforestation and Degradation of Forest and Peatlands shown only 6 provinces from 34 provinces have counted their GHG emission according to the Decrees. We argue the regulation as foundation must be also covered activities economic in respective provinces which the activity given large GHG emission contribution. By literatures reviewed, this paper aims as proposal to regional government counts their emissions based on activities economic to success RAN/RAD-GRK and integrated with improve regional competitiveness prior engaged on ASEAN Economic Community and preparation to enter SDG's post MDG's of Indonesian government by 2015. As further work suggested to extend the study more broad related to renewable energy technology and possibility to count carbon tax, Feed-in tariff of electricity in regional areas Indonesia.

Keywords: Indonesia's RAN-GRK program, Regional GHG emission trends

JEL classification:

1. Introduction

Indonesia is the world's largest archipelagic country comprising around 18,306 islands. Of these, 8,844 islands have been named according to government estimates, with 922 of those permanently inhabited and the rest, being small islands along the coastline that have not yet been recorded formally. Indonesian livelihoods mostly depend on natural resources as well as related economic sectors. Indonesia is prone to natural disasters due to its geographical position and geological condition and a lack in public commitment in maintaining a sustainable environment. This in turn increases the level of risk for climate change impact threats. As this country is a victim of climate change impacts mentioned above, it is reasonable that Indonesia should take the front line in global efforts to address climate change impacts. Moreover, there is huge potential for conducting climate change mitigation actions for Indonesia to optimize its strategic position in various international forums and foster bilateral or multilateral cooperation (BAPPENAS, 2011).

Efforts to deal with climate change impacts constitute an integral part of the national development, so that all planning must be in line with national economic development planning. Thus, climate change adaptation and mitigation action planning are integrated into the national and local development planning including provincial, district or city. Indonesia also has huge potential for reducing GHG emission significantly and cumulatively by 2020. Therefore, it is necessary to take prioritize sectors and programs, their various aspects such as abatement cost and, investment and taxes for each sector's actions, and also have the tools to

evaluate economic impacts against GHG emission reduction achievements. It is necessary to take into consideration that target for GHG emission reduction may increase if the scenario used is different. Therefore, there is a need to develop a GHG emission inventory and monitoring systems to incorporate measuring, reporting and verification from all sectors. Economic activities as key indicators of a region need to be carried out as part of the business as usual (BAU) scenario and obtain maximum results in pursuit of significant GHG emission reduction. In addition, institutional capacity in every regional level and their related sectors become instrumental. Kupang City, plays an important role as the capital city of NTT province and the main gateway between Australia and Timor Leste as well as being the centre of economic activities in NTT province which contributes to GHG emissions in Indonesia.

In order to pursue national government target to reduce GHG emission 26% from BAU and 41% if assist from abroad, a number of efforts has been set by local government and fully support by Regional Planning Agency called BAPPEDA as the institution responsible for the work and National Planning Agency or called BAPPENAS as institutional in charge for the program at national level. Therefore, it is necessary to detect challenges in the policy and/or mechanism implementation to reduce GHG emission in economic activities in order to prepare appropriate policy of GHG emission in regional level under the short-term and long-term strategy and how achieve the target. Moreover, to establish the program in regional level required comprehensive assessment considers on-going dynamic developments of the provinces/cities. In addition, scientific and technological developments such as introduce new renewable energy sectors to enable various new breakthroughs that can provide an alternative approach and solutions for GHG emission reduction in regional side indispensable. To ensure the GHG emissions at national and regional levels are accurate and accepted by international committees, a comprehensive evaluation of related sectors is necessary in conjunction with negotiation with the United Nation Convention on Climate Change (UNFCCC).

2. Review of previous study

Indonesian government continues to make efforts to reduce GHG emission up to 26% by self-effort or about 0.767giga tons (Gt) carbon dioxide equivalent (CO₂e) by 2020 as well as involve stakeholders from regional, national and international levels to carry out studies in order to give recommendation for policy-makers. In this review we focused on studies were done using macro-economic indicator in counts GHG emission, in this sense using input output analysis as principle reference and previous studies in terms of GHG emission in some regional area in Indonesia.

2.1. Research of Input-Output Model

Input output (IO) model according to Miller and Blair (2009) is generally constructed by observed real data from any economic aspect of a region with respect to specific geographic of that region, concerned with the activity of a group of industries that both produce goods (outputs) and consume goods from other industries (inputs) in a process production of every industry's own output. In fact, the number of industries considered may vary from only a few to hundreds or even thousands. In order to grasp the economic impact caused by increase GHG emission, we need to examine historically the impact of industry infrastructure development periodically with respects to economic growth by use an IO model (Faizah, 2008). Duchin and Lange (1992) their assumption in a formal working group regarding IO analysis in the future for Indonesia stated that technically, most likely future changes of Indonesia in household consumption, especially energy use, construction, transportation, and key manufacturing sectors. Hulu and Hewings (1993) under conditions of limited information has constructed an interregional IO table for Indonesia to develop relationship between social-economic and future change of economic in Indonesia through computable general equilibrium model which will be useful as reference in calculating whole of GHG emission in Indonesia based on economic activity as indicated in IO table which allow compared to regional GHG emission.

We found very little study studying IO model analysis in Indonesia especially focused on social-economic, environment and energy to produce comprehensive evaluation of GHG emission for both regional and national level. So far study about Indonesian and surrounding

using IO model as reference is not comprehensive because not touching aspects thoroughly and do not integrate to all sectors.

Sasai, Hasegawa, Imagawa, and Ono (2012) clarified the prediction of GHG emission in Japan emitted by industrial and household activities and how nuclear generation as replacement for thermal power generation will contribute to cut-off amount of the GHG emission by 2020. The complexity and comprehensively done in this study shows one step ahead clarified estimated amount of GHG emission emitted by Japan's economic activities by 2020, however, they do not clarify GHG emission contributed from economic activities in regional area Japan. Mizunoya and Higano (1999) formulated a model of total environmental economic system based on Japan IO model to control air pollutants emitted by industries including households, then recommend an optimal level of economic activities and air pollutants emission with respect to emission taxes. Moreover, Uchida, Mizunoya, and Higano (2008) evaluated effect of economic policies in use potential energy of wastes. They study shown new energy industries were achieved the production and able to replace fossil fuels or in the other word, to change industrial structure in reducing fossil fuels consumption would be achieved through introduction new energy industry that impact gross domestic product (GDP) increased under GHG emission constraints by respect to emission tax and subsidy. Both Uchida and Mizunoya use and present an IO model for a national level in case of Japan by endogenously determined. Thus, the IO model is a good reference to calculate and/or formulate estimated amount of GHG emission in a region. In this sense, there is no study counts GHG emission in regional and national level in Indonesia refers to economic activities especially using IO model as reference.

3. GHG Emission Trends in Indonesian

After the United States 5.95 Gt and China 5.06Gt (MoE, 2010), Indonesia is the world's third largest emitter of CO₂e, with estimated GHG emissions of 2.183Gt as of 2005 accounting for 4.5% of global emissions. Indonesia's emissions are projected to rise to almost 2.95Gt CO₂e by 2020 under a BAU scenario (MoE, 2010; Tedjakusuma, 2013; Thamrin, 2011). Almost of Indonesia's current GHG emissions estimates are based on reduce emission from deforestation and degradation (REDD) and land use aspects, in addition to the drying, decomposing and burning of peat land (ADB Climate Change team, 2008). In response challenges to reduce the emissions, Indonesia is in process of establish a national policy framework to address climate change issues where consider socio-economic attributes including population density, income levels and other related sectors in provide livelihoods to communities (ADB Climate Change team, 2008; MoE, 2010; Thamrin, 2011).

Many studies already suggest that if we continue current levels of industrialization and socio-economic activities coupled with high population growth the environmental consequences will be much harsher in the near future. The accumulation of industry and population in regional areas Indonesia will also trigger waste generation that will cause serious environmental and health impacts, and if industrialization and urbanization levels keep increasing this will have a significant impact on GHG emissions and hence the consequences of climate change will be harsher. In this regard necessary to estimate amount of GHG emissions based on integrated analysis of socio-economic and industrial activities. Due to political and economic conditions in Indonesia, the creation of such a program is necessarily an evolutionary process. Ideally, the Indonesian government should implement many steps of the process concurrently to deal with environmental matters (Damanhuri, 2010; Damanhuri and Padmi, 2008; Faizah, 2008; EPA US, 2013). Moreover, Boyle (1998) reported environmental impact assessment with respect to culture factor become important thing for Indonesia in conjunction with develops proper environmental policy. A life cycle assessment analysis of waste disposal of traditional markets in Indonesia has potentially to conduct a biogas system due to lowest environmental impacts such as GHG emission and it necessary established (Aye and Widjaya, 2006; Amheka, Higano, Mizunoya and Yabar, 2014). Some studies have measured GHG emissions where the land-use as a benchmark on regional level Indonesia without considers the economic development at designated areas (Hadi, Inubushi, Furukawa, Purnomo, Rasmadi and Tsuruta, 2005; Ishizuka, Iswandi, Nakajima, Yonemura, Sudo, Tsuruta and Murdiyarso, 2005; Murdiyarso, Hergoualc'h and

Verchot, 2010; Okimori, Ogawa and Takahashi, 2003). So far there is no specific studies investigate issues on GHG emission and its relation to economic development in Indonesia such as increase in GDP, GRP, etc. The only policy regarding GHG emissions reduction is designed by BAPPENAS office through National/Regional Action Plan for Reducing Greenhouse Gas Emissions (RAN/RAD-GRK) program. From 2011, the program was delegated to BAPPENAS office at national level and BAPPEDA office at local level. The action plan program provides directions for local and national governments to carry out multi-sector GHG emission reduction efforts directly and indirectly through specific efforts considering local characteristics, potential, and authority that must be integrated into a local development plan (ADB Climate Change team, 2008).

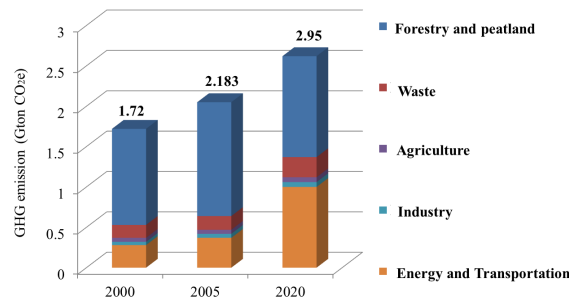


Figure 1-1 GHG emission trends in Indonesia (source, BAPPENAS, 2013)

Indonesia government regulation appears in the Presidential Decrees of Republic of Indonesia No.61 Year 2011 regarding RAN/RAD-GRK, No.71 Year 2011 regarding National GHG Inventory System and No.62 year 2013 regarding Managing Agency for the REDD of Forest and Peatlands were prepared following President Susilo Bambang Yudhoyono direction to various related Ministries/Institutions and regional government commitment to implement activities to reduce GHG emissions directly or indirectly. Yudhoyono in his speech at the G-20 summit in Pittsburgh, USA on September, 25th 2009 targeted a reduction of the emissions up to 26% (self-effort) from the BAU by 2020 as showed in Figure 1-1 (BAPPENAS, 2011; MoE, 2010; Thamrin, 2011; Tedjakusuma, 2013). The RAN/RAD-GRK program expected to become an integrated, concrete, measurable and practical action plan for the period between 2010 and 2020 and the activities shall be prepared by taking into account national and regional development principle where priority scale is given to mitigate GHG and other emissions reduction scenario from national and regional levels through comprehensive way (Thamrin, 2011). Therefore, the preparation of local government as part of regional focal point to reduce GHG emission while keeping economic growth must be a priority. In this sense we need comprehensive evaluate growth of the different industrial sectors coupled with final demand (public and private sectors including households) to provide a picture implication of GHG reduction target based on social-economic activity in related sectors. In addition, another objective of national government perspective is to serve investors who invest to reduce GHG emission at national and regional levels in Indonesia (Helmreich, Sterk, Wehnert and Arens, 2011; Situmeang and Lubis, 2011; Thamrin, 2011). Our paper focused on a literatures review of GHG emission trends in Indonesia as a first step in identifying the extent to which the trends already achieved, then recommend to government to success RAD-GRK program in regional areas Indonesia in conjunction with economic activities as the main cause. Furthermore, Amheka, Higano, Mizunoya and Yabar (2014) reported a study in calculating GHG emission caused by activity economy on regional level case study Kupang city along with a framework as optimal solution to integrate related sectors, natural resources, final demand and a possibility to introduce renewable energy technology including energy supply from waste treatment plant where the study became the first study focused on GHG emission in city level Indonesia.

An investigation as indicated in Table 1, shown only 6 provinces in Indonesia has counted their GHG emission according to the Presidential Decrees and intensively involved in RAD-GRK program. However, most provinces around 34 provinces have never participated in the program. This is due to a shortage of human resources, lack of data availability and local government support such as technical, institutional and financial factors.

Table 1 Latest data trends of GHG emission every province in Indonesia (Unit: 1,000 tons)

Base year	Province	GHG emission sources							
		land used sector	percentage	energy, transportation, industry	percentage	waste sector	percentage	total GHG	percentage
2010	Sumatera Utara	168,080	88%	21,010	11%	1,910	1%	191,000	100%
2011	Sumatera Selatan	74,328	76%	22,494	23%	978	1%	97,800	100%
2006-2007	Jawa Barat	1,122.42	-	75,805.83	-	-	-	76,928.25	-
2010	Jawa Tengah	7,308	18%	28,420	70%	4,872	12%	40,600	100%
2010	D.I Jogjakarta	372.4	19%	1,509.2	77%	78.4	4%	1,960	100%
2007	Maluku Utara	-	-	819.51	-	-	-	819.51	-
2010	NTT (Kupang City)	-	-	-	-	-	-	-	-
-	Aceh	-	-	-	-	-	-	-	-
-	Sumatera Barat	-	-	-	-	-	-	-	-
-	Riau	-	-	-	-	-	-	-	-
-	Jambi	-	-	-	-	-	-	-	-
-	Bengkulu	-	-	-	-	-	-	-	-
-	Lampung	-	-	-	-	-	-	-	-
-	Kep. Babel	-	-	-	-	-	-	-	-
-	Kep. Riau	-	-	-	-	-	-	-	-
-	DKI Jakarta	-	-	-	-	-	-	-	-
-	Jawa Timur	-	-	-	-	-	-	-	-
-	Banten	-	-	-	-	-	-	-	-
-	Bali	-	-	-	-	-	-	-	-
-	NTB	-	-	-	-	-	-	-	-
-	Kalimatan Barat	-	-	-	-	-	-	-	-
-	Kalimatan Tengah	-	-	-	-	-	-	-	-
-	Kalimatan Selatan	-	-	-	-	-	-	-	-
-	Kalimatan Timur	-	-	-	-	-	-	-	-
-	Sulawesi Utara	-	-	-	-	-	-	-	-
-	Sulawesi Tengah	-	-	-	-	-	-	-	-
-	Sulawesi Selatan	-	-	-	-	-	-	-	-
-	Sulawesi Tenggara	-	-	-	-	-	-	-	-
-	Sulawesi Barat	-	-	-	-	-	-	-	-
-	Gorontalo	-	-	-	-	-	-	-	-
-	Maluku	-	-	-	-	-	-	-	-
-	Maluku Utara	-	-	-	-	-	-	-	-
-	Papua Barat	-	-	-	-	-	-	-	-
-	Papua	-	-	-	-	-	-	-	-

Note: Summarized by Amheka, 2014.

The Table shown progress and development in calculation estimated amount of GHG emissions by some provinces refers to Presidential Decrees (most refers to REDD). In this

sense, we argue that such calculations are not comprehensive because the calculations do not identify all the relevant sectors of economic activity that contribute most to GHG emissions.

Take example Kupang city and NTT Province has a goal to be referred as a Model Eco-friendly province/city in which nowadays many programs organized by the government deal with environmental sustainability such as “Kupang Green and Clean, District Race Clean” and competitions between government agencies and private sectors with regard to environmental sustainability (Amheka, Higano, Mizunoya and Yabar, 2014). This is proof the local government dedicate to promote programs in support GHG emission reduction while promoting prosperity. Further in terms of social activities, the government needs to improve introduction and promote eco-conscious urban development across community. As part of environmental promotion, we assume that the provinces/cities in Indonesia needs comprehensive analysis to ascertain detailed amount of GHG emission emitted by sectors activity (economic activity), and therefore, the information the extent to which the achievement has been achieved by local governments are provided in this paper is very important and useful for realize government goal in reducing GHG emissions and act as a core facility dedicated to revitalization of local economy through commitment to establish “Carbon projects” in Indonesia, then involved in RAD-GRK program.

4. Conclusion and suggestion for further work

An assumption of local government’s ambition in Indonesia for maintain a sustainable environment be one of a number reasons in conduct this review. On one occasion the Governor of NTT province together Mayor of Kupang city stated “we need to change our attitude and reconsider conventional ways of living as part of innovative environment solution”. This indicates an example the government effort to improve eco-conscious regional development.

Integration between local governments in Indonesia and globalization is necessary in which government has commitment to engage in the ASEAN Economic Community (AEC) by 2015 where correspondence with AEC goals to integrate regional economic among AEC members. AEC Blueprint (2008) envisages following key characteristics: First, a single market and production base; Second, a highly competitive economic region; Three, a region of equitable economic development; and four, a region fully integrated into the global economy. Moreover, develop a regional guideline on competition policy in environment sustainability is being developed by Indonesia government and it supposed to completed before enter AEC by 2015. In conjunction with this, the local government set integration with global economy with respect to uphold the green economy towards supporting sustainable global environment, for instance participate in RAD-GRK program. Perhaps, this option became value added of local government to be more confidential participate on several program set by AEC to compete internationally and make ASEAN more dynamic and stronger segment of the global supply chain and internal market remains attractive for foreign investment outside ASEAN countries, and in this sense we thinking GHG emission restriction must be set by provinces/cities in Indonesia in order to pursue as role model among provinces/cities in ASEAN countries to look beyond the borders of AEC participate globally such as establish initiative to create a carbon market not only among ASEAN countries but across the globe. To keep this on track the local government in Indonesia should consider when the mechanism and/or policies in terms of rules and regulations of AEC internally and externally will develop in relation with GHG emission.

Another important thing must be considered of local and central governments in Indonesia are in terms of energy cooperation, secure and reliable supply of energy including renewable energy (RE). It is crucial in support and sustain economic and industrial activities regionally especially for projects related to the ASEAN Power Grid (APG) where allows optimization of the regional’s energy resources for greater security as a wise thinking in terms of preventive measures in reducing amount of GHG emissions. Recognizing the limited global reserve of fossil energy and unstable world prices of fuel oil, thus it is essential for ASEAN to strengthen RE development through promotion free trade, facilitation and cooperation related to RE sectors such as new energy industries including investment to develop and strengthen RE infrastructure. Therefore, we pleased to other researchers conduct further research in

assessing, mapping and informing potential for RE in regional side Indonesia with considers geography, population and social-economic condition at designated areas. Capacity building for regional economic integration, energy and mitigate of GHG emission necessary as foundation to improve quality of life for regional Indonesia in participate to AEC. In relation to future perspective, recently elected President of Republic of Indonesia, Mr. Joko Widodo, said national security which includes security and environmental health endurance energy availability is indispensable in supporting the Indonesian economy. Thus, based on description above, literature review and several analyses, we decide the future objectives of Indonesian government to success RAD-GRK program divided into two integral part is that national and regional perspectives in order to produce comprehensive policy to reduce GHG emission in regional side Indonesia with respect to keep their improve of economic development. For National level is meet agreement COP-15 Copenhagen by Indonesian government to reduce GHG emissions between 26% and 41% with a range between 0.767 Gt CO₂e and 1.189 Gt CO₂e under BAU by 2020 from base year 2005 and prepare to enter Sustainable Development Goals as post Millennium Development Goals of Indonesian government by 2015. While for Regional level is expected to produce an evaluation framework to succeed RAD-GRK program and improve regional competitiveness prior involved on AEC 2015.

For suggestion work we highly recommend to other researcher conduct widely and deeply relationship between environmental policies and economic structural emphasis on control GHG emission reduction refers on economic activities instead REDD in regional level (provinces/cities) in Indonesia by introducing Carbon tax, RE technology sectors, Feed-in tariff of electricity sector supplied by RE technology to answer the future objectives which we had decided.

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