

Prospects of Low Emission Development in Industrial Sector of Central Java

by Jawoto S. Setyono

Submission date: 14-Dec-2019 02:49PM (UTC+0700)

Submission ID: 1234426648

File name: ow_Emission_Development_in_Industrial_Sector_of_Central_Java.pdf (417.2K)

Word count: 2778

Character count: 15314

PAPER • OPEN ACCESS

Prospects of Low Emission Development in Industrial Sector of Central Java

To cite this article: Agung Sugiri *et al* 2019 *J. Phys.: Conf. Ser.* **1175** 012190

View the [article online](#) for updates and enhancements.



IOP | ebooks™

Bringing you innovative digital publishing with leading voices to create your essential collection of books in STEM research.

Start exploring the collection - download the first chapter of every title for free.

Prospects of Low Emission Development in Industrial Sector of Central Java

Agung Sugiri*, Nany Yuliasuti, Jawoto Sih Setyono and Rukuh Setiadi

1. Introduction

Industrial development in Central Java has constantly been growing over 6% annually since Indonesia figured out how to escape from the 1998-99 crisis. This rate surpasses those of Central Java and Indonesia. In the meantime, all the secondary activities share around 40% to the economy of Central Java, which is well over the contribution of the primary sector, implying that the economy has been founded on manufacturing industries. This sector is consequently expected to take a critical part in the application of Low Emission Development Strategy (LEDS), which looks for the way to keep a high economic growth but with reduced GHG emissions.

However, recent studies have concluded that industrial sector is the least prepared to implement the Action Plan in Reducing GHG Emissions of Central Java 2010-20 [1]. Preparedness of this sector is 1.75 (on the scale of 5) while that of Central Java is 3.47, which means a little more than half prepared. On the other hand, the Program for Pollution Control, Evaluation, and Rating (PROPER) is considered potential [2].

Meanwhile, a research [3] investigating the possibility to apply Market Based Instruments (MBIs) has confirmed that the original forms of MBIs, such as tradable pollution permits, cannot be applied; however, the principles of polluters pay and internalizing the externality, which are in accordance with equity-based development concept [4], could be incorporated into PROPER, a national program based on command and control (CAC).

So, amid the difficulties of applying such a theoretically better approach, this research highlights the governance aspect of LED in the industrial sector and looks for the best model of equitable management. The question is: "How should low emission development in the industrial sector of Central Java be managed equitably?" This article presents the first year progress of the two-year research.

2. Ensuring Sustainability Through Equity-Based Development

Following WCED's definition [5], sustainable regional development is development able to ensure equity within and between generations without reducing the ability of other related regions to do the same thing [6]. The concept of Equity-Based (Regional) Development (EBRD) [4] can address the challenges. There have been pieces of research using the model on various topics, from spatial inequality [6], the main conclusion of which is that inequity should be addressed first to resolve the inequality problems, to investigating the sustainability of the Semarang metropolitan development [7], to bettering the oil (and gas) governance for local benefits [8].

This model (see Fig. 1) confirms the four functions where equity is to be applied, i.e., the distribution of benefits (I), the production function (II), non-production function (III) such as ecological, conservation and buffer aspects, and sustainability reinvestment (IV). The concept corresponds to the relevant current literature [9,10]. McDermott et al. [10], for example, classify justice into distributive justice, procedural justice, and contextual fairness, all of those are included in the EBRD.

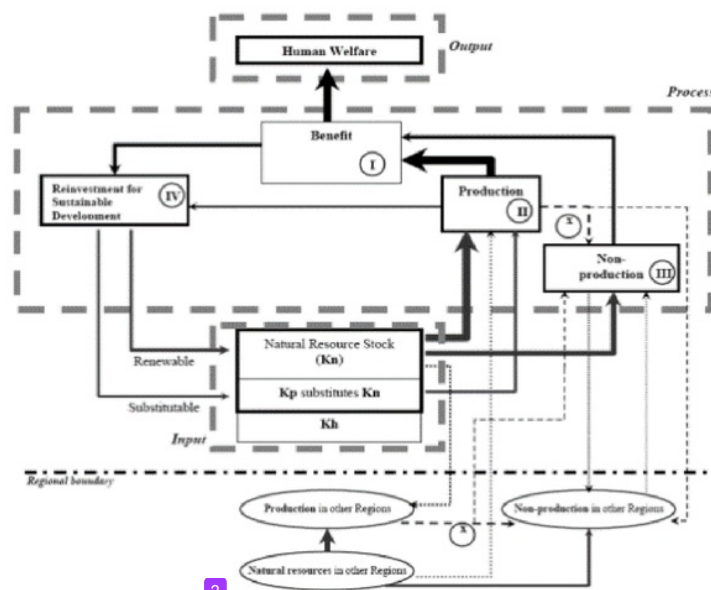


Figure 1. Equity-Based Regional Development [4]

Notes: I: Equity I; II: Equity II; III: Equity III; IV: Equity IV; All arrows represent positive flows, except the 'x' arrow which is negative externality, i.e., the negative impact of the production function to the non-production function; however, it is hardly captured by the market mechanism (the market failure)

The development process would result in the people's welfare using the inputs of natural capital (Kn), physical or human-made (Kp) capital, and human capital (Kh). The role of natural resources is critical, especially given the need to ensure the environmental sustainability. Some aspects of the role can be replaced by that of physical capital, but it is limited to the production function only.

Natural resources are also utilized as an input of matter and energy. The results are benefits recorded as, for example, the Gross Domestic Product (GDP). Moreover, natural resources are essential for the non-production function, which benefits such as maintaining the assimilative capacity, biodiversity, comfortable microclimate, and preventing global warming are vital though hardly recorded in the economic data.

However, the non-production function must be supported by the fourth function, namely reinvestment for sustainability. If it goes well, the authority of a city, region or country will have enough funds to finance sustainability efforts like restoring the carrying capacity. The idea of the carbon market, for example, is consistent and can be done in the framework of this fourth function.

That most of the GHG emissions come from the production function makes it essential in climate change mitigation. However, this aspect is often under-valued due to the market failure. Many of the cost items are not included in the existing market mechanism. The industry may produce pollutants harming the environment and the surrounding community. It would need money to reverse the environmental damage and compensate the community; however, in many cases, the production cost structure of the industry does not accommodate the issue.

3. Addressing High Level of GHG Emissions As An Equity Failure

Equity in the production function in the classification of McDermott et al. [10] includes the types of procedural and distributive justice. The function involves natural resource extraction, manufacturing, and the related services. Public policy should be able to ensure fairness in managing this function because if not, there will be equity failures concerning deep economic inequality and the threat of unsustainability [4].

The indications of unsustainability include the impacts of climate change. The exploitation of natural resources is usually at a very high level ending up to equity failure IIc. Achieving high economic growth without appropriate sustainability reinvestment (function IV) is an equity failure that may also result in unsustainability. Unfortunately, the severe negative externalities are evident in the form of air, water, and soil pollutions, worsened by high GHG emissions (equity failure II d).

The equity failure can be explained through a graphical analysis in Figure. 2 [3]. The degrading environment is represented by the level of pollution, waste, or GHG emissions if it relates to climate change. As recognized, the more intense the economic activity, the worse the pollution. There are two sides in the picture, i.e., pollution, and externalities. The polluter's side is shown by the MNPB (Marginal Net Private Benefit) curve, i.e., the revenue minus the cost of an additional unit of output. On the other hand, the externalities borne by the public is indicated by the MEC curve (Marginal Externality Cost).

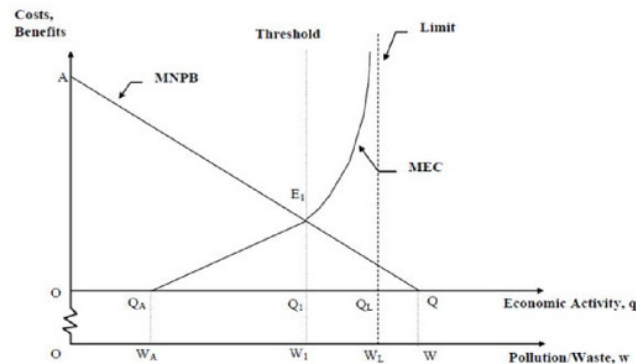


Figure 2. High Level of GHG Emissions is an Equity Failure [3]

Meanwhile, the assimilative capacity of the environment can absorb the maximum amount of OW_A units of pollution without incurring any cost. Therefore, the MEC curve starts after the economic activity exceeds OQ_A units. Without considering the externality, the economy will grow to OQ level to obtain the maximum benefits, i.e., the area of OAQ . This situation may not be sustainable because economic activities may exceed the environmental limit indicated by the OQ_L level of economic activity. The

environment could not embody more than OW_1 units of pollution because the damage would be irreversible.

It is also realized that economic activities cannot exceed the environmental carrying capacity [11]. On another thought, the "threshold to further development is encountered if cannot extend to a new area, produce additional output, achieve higher quality, or accelerate production, without involving an increase of investment, social or ecological cost" (Kozłowski [12] : 19). Consequently, passing over the threshold will make the MEC much more expensive as shown by its steeper curve. Thus, sustainable economic activities will achieve the maximum benefits at OQ_1 level with a pollution level of OW_1 .

Economic activities that are at the levels between the threshold and the limit can be an equity failure due to their much higher external cost. This way, the environmental degradation will be difficult to reverse. If the polluters pay principle applies, the E_1 balance can be achieved, and the level of economic activity will be at a sustainable level, OQ_1 .

It is apparent that LEDS, or first known as the Clean Development Mechanism (CDM) [13,14] is appropriate.

4. Experimental Result

The findings of previous studies [1,3] have confirmed that to facilitate better LED in the industrial sector of Central Java, market-based principles that conform to the EBRD model should be integrated with CAC applications, i.e., those of internalizing the externality and polluters pay. The existing PROPER must be conceptually refined and enforced more broadly to better accommodate these principles.

One way is to link the achievement of PROPER with the development mechanisms. It has been attempted in the lending or credit system in certain banks. Industrial companies with Green or Gold rank, for example, will be facilitated by obtaining a loan from the banks easier than those ranked Blue or below. It is a good thing to be expanded, for example with PROPER mechanism linking to the procurement of goods and services. For the first phase could be that in the government agencies, for example by requiring bidders to be rated a minimum of Blue, or the better PROPER rank will get higher grades.

Refinement can be done by developing the concept of PROPER. One of them, for example, is by requiring a company wanting to improve the ranking from Black or Red to Blue or better to conduct a study estimating the environmental costs of the externalities of the company, including those of the GHGs, when it was still rated Black or Red and in its current situation. The study should involve adequate expertise, so it should collaborate with research institutions or universities credible in environmental sciences and sustainable development.

Studies of the environmental costs of the negative externalities can be considered very significant for such integration for mid-term and long-term future. It is possible that this integration would be a unique model of Indonesia's equitable governance that would be appreciated and emulated by the international community later, and this is the expected result of this research by focusing on Central Java.

So far in this on-going research, in-depth interviews have been done with three key persons, i.e., the representatives from the Environmental Agency, Phapros pharmaceutical industry in Semarang, and So Good food industry in Boyolali, a sub-center of Surakarta metropolitan region. The interim findings are discussed within the framework of the proposition, that is, the equitable governance of LED should be done based on the followings:

(1) The principles of internalizing the externality and polluters pay should be integrated into the existing CAC system. As a consequence, it will incur changes in the constellation toward more equitable governance.

(2) It is in this context of integration that all stakeholders must understand their respective role in the new constellation and can run it well.

The three key persons are equally of the opinion that PROPER is the most appropriate way to support LED of the industrial sector. Industries in Central Java, both large-scale such as Phapros and So Good as well as medium and pollutive ones have participated in this program. However, to succeed RAD-GRK with reduced GHG emissions is still a voluntary action from the industry. Phapros and So Good are those committed and have implemented this aspect through the replacement of industrial and office

supplies with lower emission ones such as heating and cooling systems, air conditioning, and more energy-efficient lighting.

Unfortunately, other industries may not necessarily be committed to this GHG reduction. Therefore, if this aspect is also an obligation and included in the rating assessment of PROPER, the situation will certainly be better. However, requiring additional aspects of GHG emission reductions for all industries will face considerable obstacles, ranging from the legal aspects to the difficulties of monitoring and evaluation due to limitations of the equipment and the human resources of the corresponding agencies, to the compliance of the industry itself.

As for the two principles of equitable LED above, the key persons have not found a formula to be used as a reference as to how an industry contributes to not only reducing GHG emissions but also financing for environmental improvements due to its pollution and emissions. They question whether a related central institution, such as the Ministry of the Environment, has conducted a study on this matter.

So far the two principles have, to some extent, been accommodated in PROPER. Principle of internalizing the externality is through, inter alia, the construction of the Waste Water Treatment Plant (WWTP), which is the responsibility of the concerned industry; also through Corporate Social Responsibility (CSR) for various types of needs in the society, including environmental improvements through reforestation, seed plant assistance, and so on, which is somewhat an application of the polluters pay principle as well. However, it is all done by using the calculations not following the principles such as the methods of environmental economics and equity-based development, but rather on the basis of technical needs (for WWTP and the like) and social awareness (for CSR).

PROPER funding to date uses both national (APBN) and provincial (APBD) budgets. The APBN is used for PROPER on large scale industries, while APBD is for medium scale industries at the regional level. Recently, there is a cost-cutting for funding the field observation. This cost cutting is done as a form of increasing financial efficiency as stated by the national government.

Thus, for the proposition (1), it could be confirmed so far that it is quite prospective, but the consequences for the proposition (2) would become a major constraint. This limitation is exacerbated by the budget for PROPER which has been greatly reduced since 2016 as discussed above. Despite the government's argument of efficiency, it clearly shows a decrease in prioritizing the environmental sustainability and climate change mitigation due to the industrial impacts.

As a consequence, the self-assessment method applies. This method is certainly without doing field observation by the authorized agency. The industry is required to report online by sending data to the authorized agencies, both in the form of photographs and certified documents from accredited laboratories. This method is thus quite efficient. However, the shortcomings are due to the validity of the data that is in question. So the role of field observation is still important. The key person from the Environmental Agency emphasizes that direct review is needed to understand the real situations in the field to avoid fraud and data ambiguity.

Sanctions for the industry considered non-compliance are also applied in the implementation of PROPER. Such industries will receive warnings to improve their environmental management system. However, if the case still happens frequently, the corresponding industry will be submitted to law enforcement. Unfortunately, by relying on self-assessment, how could an industry judge itself badly?

5. Conclusion

Up to this point, i.e., about a halfway to the research completion, it can be concluded that efforts to support low emission development in the industrial sector of Central Java face more obstacles than the prospects.

Acknowledgments

This research has still been on-going, supported by *Penelitian Terapan Unggulan Perguruan Tinggi*/PTUPT (University Leading Applied Research) Grant of 2017 from DP2M, the Indonesian Ministry of Research, Technology, and Higher Education.

Prospects of Low Emission Development in Industrial Sector of Central Java

ORIGINALITY REPORT

11%

SIMILARITY INDEX

6%

INTERNET SOURCES

11%

PUBLICATIONS

0%

STUDENT PAPERS

PRIMARY SOURCES

- 1** Sugiri, Agung, and Ananda Kustanti Putri. "Equity Issues in Benefits Distribution: The Case of Kreo Cave Tourism in Semarang, Indonesia", *Journal of Sustainable Development*, 2015. **6%**
Publication
- 2** www.tandfonline.com **3%**
Internet Source
- 3** www.inter-disciplinary.net **2%**
Internet Source

Exclude quotes Off

Exclude matches < 1%

Exclude bibliography Off