DEVELOPMENT DIRECTION FOR SUGAR INDUSTRY AREA OF TOELANGAN THROUGH INDUSTRIAL SYMBIOSIS APPROACH

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Abstract

Common phenomenon which occurs in the relationship between industry and nature is caused by a conflict of importance that nature is a cycle and industry system is linear. The impact of linear system in the industry may lead to a decrease in the production activity and makes the industry becomes unsustainable. Pabrik Gula Toelangan (Toelangan Sugar Factory) which is located in Toelangan district Sidoarjo, has experienced the negative impact of industry linear system, that is suffer losses large number of materials. These losses greatly affect the decline of sugar production. On the other hand, Toelangan Sugar Factory proved to have the potential for developing industrial symbiosis concept by the availability of waste/by-product of sugar production which has not been used optimally.

This study aims to arrange development direction for sugar industry area of Toelangan through the concept of industrial symbiosis approach. The concept of industrial symbiosis, which is derived from the concept of Sustainable Development, is a form of cooperation among different industries in creating added value on waste or unused residue of production which later have a positive impact on the environment and the welfare of community around the industry area.
Industry type derivatives from the sugar industry which is obtained through the concept of industrial symbiosis approach have unique characteristics. Based on the industry tree, it is identified that the flow of raw materials from the derivatives industry can be developed into some industries. Paper industry and bio-ethanol are in the first layer, bio gas industry is in the second layer, and fertilizer industry is in the third layer. Development factors of industry symbiosis area are obtained from the literature review qualified by AHP which later obtained high priority factors such as pure materials, human resources, and land requirements; average factor priority such as stakeholder cooperation, organization of industry area management, disaster mitigation, environment design, facilities and utilities; and also low priority factor such as accessibility, media and information systems. From both these goals, we will get development direction for sugar industry area which appropriate to concept of symbiosis.

**Keywords:** development direction, sugar industry area, industrial symbiosis, development factors, material flow