Challenges in Increasing Sustainability of Implemented Renewable Energy Technologies in receiving communities

N. Sintawardani[a], W. J. Ng[b], Mamat[a], J. Tri. Astuti[a], D. Nilawati[a], V.Evelyn[b] and A. M. H. Putri[a]

[a]Research Center for Chemistry, Indonesian Institute of Sciences. Kawasan PUSPIPTEK, Serpong 15310, Tangerang Selatan, Indonesia; neni.sintawardani@lipi.go.id; [b]Nanyang Environment and Water Research Institute, Nanyang Technological University, Singapore

Technologies are created to address problems perceived by the inventor as adversely affecting certain processes with the purpose to improve the efficacy of such processes. Technologies do not, however, operate in isolation of human operators and other stakeholders. A technology should therefore be sensitive to the cultural context and behavior of the operators and where changes in behavior are necessary, then such changes should not be such major impositions as to make behavioral changes overly difficult. This is necessary to ensure acceptance of the technology and its sustainable use over the service life of the equipment embodying the technology. Notwithstanding the need for the technology's creator to be sensitive to the characteristics and needs of the receiving community, there also is the need for the receiving community to adapt to the technologies. Clothes, food and shelter are basic human needs, but to sustain and improve quality of life there is need for energy to support community activities, according to the UNHCR. To achieve social and economic development while caring for the environment and contributing towards sustainable development in Indonesia, the role of energy cannot be overstated. The consumption of energy in Indonesia is growing rapidly in line with economic and population growth, but distribution and availability of energy in hinterland or rural areas is limited due to transportation and infrastructure constraints. Bearing in mind the issue has to do with rural areas with infrastructure constraints (such as transmission systems), the challenge then is to identify and apply an appropriate technology such that the recipients of such technology, i.e. about 50% of total population in Indonesia, would have the opportunity to generate energy *on-site* for in-situ use. Creators of technologies have a tendency to focus on technological and engineering aspects, and are also likely to perform conventional cost-benefits analysis. Such an approach has been found inadequate and especially so when the creator and recipient do not come from similar economic and cultural backgrounds.

A study was made on a village which was preparing to apply anaerobic wastewater treatment using wastewater from tofu factories. The main purpose of the treatment is to reduce the organic pollutant in the wastewater, so it could be safely discharged into a nearby river without polluting it. The anaerobic process was selected as it could produce biogas. The latter could then be distributed to the community as a renewable energy source. This is an economic benefit to a community which needed energy to manufacture a product for sale to the larger society. The economic benefit so conferred had helped to engender acceptance of the technology within the community. Consequently a sense of ownership of the technology and system was progressively constructed. This paper describes the steps utilized to ensure acceptance, proper usage, and ownership of the technology by the community in the village.

Financial support from the Lien Environmental Fellowship Program is gratefully acknowledged