Optimalisasi Pengelolaan Sampah Plastik di Kelurahan Mulyaharja melalui Penerapan PiRoTech Berbasis Internet of Things

(Optimizing Plastic Waste Management in Mulyaharja Subdistrict through the Application of Internet of Things (IoT)-Based PiRoTech)

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ABSTRAK

Permasalahan sampah plastik masih menjadi isu lingkungan yang serius akibat rendahnya kesadaran masyarakat dalam memilah dan mengelola sampah secara berkelanjutan. Penumpukan sampah plastik yang tidak terkelola dengan baik berpotensi mencemari lingkungan, sumber air, serta mengganggu kesehatan dan kesejahteraan masyarakat. Program pengabdian kepada masyarakat ini bertujuan untuk membangun kesadaran masyarakat akan pentingnya pemilahan sampah serta mendorong pemanfaatan teknologi PiRoTech (Plastic Pyrolysis Technology) sebagai solusi pengurangan limbah plastik. Kegiatan ini dilaksanakan di RW08 Kelurahan Mulyaharja, Kota Bogor, dengan pendekatan edukatif dan penerapan teknologi pirolisis berbasis Internet of Things (IoT) yang mampu mengonversi sampah plastik menjadi bahan bakar cair. Integrasi sistem IoT memungkinkan proses pirolisis dikendalikan dan dipantau secara real-time sehingga lebih aman, efisien, dan mudah digunakan oleh masyarakat. Metode pelaksanaan meliputi analisis dan identifikasi kebutuhan masyarakat RW08 Kelurahan Mulyaharja, perancangan dan pembuatan alat PiRoTech, pelatihan penggunaan alat, sosialisasi pemilahan sampah dan penerapan alat PiRoTech, serta pendampingan operasional dan evaluasi. Program ini diharapkan dapat meningkatkan kesadaran dan partisipasi masyarakat dalam pemilahan dan pengelolaan sampah, menurunkan volume sampah plastik di lingkungan, serta mendorong terbentuknya perilaku ramah lingkungan yang berkelanjutan.

Kata kunci: internet of things, kesadaran lingkungan, limbah plastik, pirolisis

ABSTRACT

Plastic waste remains a serious environmental issue due to the low level of public awareness in sorting and managing waste in a sustainable manner. The accumulation of improperly managed plastic waste has the potential to pollute the environment and water sources, as well as to disrupt public health and well-being. This community service program aims to build public awareness of the importance of waste sorting and to encourage the utilization of PiRoTech (Plastic Pyrolysis Technology) as a solution for reducing plastic waste. The program was implemented in RW08, Mulyaharja Sub-District, Bogor City, through an educational approach and the application of Internet of Things (IoT)-based pyrolysis technology capable of converting plastic waste into liquid fuel. The integration of the IoT system allows the pyrolysis process to be controlled and monitored in real time, making it safer, more efficient, and easier for the community to operate. The implementation methods include the analysis and identification of the needs of the RW08 Mulyaharja community, the design and fabrication of the PiRoTech device, training on device operation, socialization of waste sorting practices and the application of PiRoTech, as well as operational assistance and evaluation. This program is expected to increase public awareness and participation in waste sorting and management, reduce the volume of plastic waste in the environment, and encourage the development of sustainable, environmentally friendly behavior.

Keywords: environmental awareness, internet of things, plastic waste, pyrolysis