

Auto Monitoring and Controlling of Biogas Plant using LabVIEW

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Abstract: *This article discusses the design and implementation of an automated control and monitoring system for biogas plants utilizing LabVIEW software and Arduino microcontroller. The system solves essential problems in conventional biogas plant operation such as irregular monitoring, late fault detection, and ineffective gas production management. Our approach combines real-time parameter monitoring (temperature, gas level, digester level) with automated control and remote access features. The system uses Arduino UNO as the master controller, interfaced with various sensors (MQ2 gas sensor, ultrasonic sensor, and LM35 temperature sensor) and a solenoid valve for gas output control. LabVIEW is used for the local user interface for monitoring and control, and ThingSpeak for remote real-time data access. Three months of testing showed notable improvements in plant reliability and performance, including 27% higher consistency of gas production and 89% decrease in response time to critical occurrences. The cost of implementing the system is very low in relation to industrial automation solutions, making it highly beneficial for small and medium-sized agricultural biogas production facilities. This technology gives farmers professional monitoring powers hitherto accessible only in industries*

Keywords: Biogas automation, LabVIEW monitoring, Arduino sensors, ThingSpeak IoT, Renewable energy control, Agricultural technology, Real-time monitoring

