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(57) Abstract :
The invention discloses an IoT-enabled framework for smart grid energy optimization, comprising IoT sensors (101), smart meters (102), renewable sources (103), edge controllers (104), cloud analytics platform (105), and consumer interfaces (106). The framework enables real-time monitoring, predictive maintenance, renewable integration, and consumer participation through secure communication and advanced analytics. By leveraging IoT technologies, the invention improves energy efficiency, reliability, and grid security while ensuring scalable and interoperable operations across diverse devices and protocols. This invention contributes to sustainable, efficient, and resilient smart grid management.

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