OptiSwitch™ System

Green Energy Network

"Smart Power, Always On."

Technology

This invention presents a plug-and-play energy management system designed for South African households, integrating Internet of Things (IoT) controls, opto-isolation, and delayed switching technology. It enables automated, safe, and intelligent switching between grid power and local renewable energy sources using optical coupling to prevent damage and power surges. It also allows for external control of load distribution to optimise household energy use and manage loads across municipal regions. The technology is also adaptable for water management networks and larger grid islanding applications.

Market need

South Africa faces prolonged scheduled electricity blackouts (load shedding), disrupting homes, businesses, and essential services. Most households cannot afford expensive imported solar or energy management systems that need specialised installation and maintenance. There is an urgent need for an affordable, easy-to-use, and locally producible solution that lowers reliance on the national grid, emphasises green energy use, prevents system damage from unsynchronised power sources, and helps municipalities manage distributed loads more effectively.

Features

- Smart Energy Switching: Automatically transitions between grid and renewable power sources without interruption.
- IoT-Enabled Controls: Real-time monitoring and remote management via connected devices for convenience and precision.
- Opto-Isolated Safety: Optical isolation ensures complete separation between power networks, preventing damage and electrical hazards.
- Renewable Integration: Seamlessly connects with solar panels, wind systems, or hybrid microgrids.
- Scalable Architecture: Suitable for single households, apartment complexes, and municipal applications.
- Can also be configured for water management systems and broader smart city infrastructure.

Benefits

- Reduces load on the national grid by prioritising the use of renewable energy over grid electricity.
- Useful from individual homes to large-scale utility grid management.
- Eliminates risks of power back-feeding and equipment damage.

Industry

Energy

Potential Applications

- Residential Energy Management: Optimises energy use for households adopting renewable technologies.
- Community and Rural Electrification: Provides off-grid communities with safe, reliable, and intelligent power switching.
- Municipal Load Management: Enables cities to balance distributed energy loads and prevent grid overload.
- Commercial and Industrial Use: Supports energy efficiency and redundancy for business operations.
- Water and Utility Networks: Adaptable for managing pumps, pressure systems, and distributed resource networks.

Creator

Prof Lukas Snyman

Stage of development

Lab-scale Prototype

Intellectual property

Patent Protection

Desired relationship

Co-development, Investors