



Improving energy efficiency in Nigeria, one **smart meter at a time.**

By Switch Electric

Introduction.



SWITCH ELECTRIC

Switch Electric was founded amidst the 2020 pandemic, which dramatically increased energy demand and put a strain on power grids around the world. The company's founders were passionate about renewable energies and determined to make a difference in Nigeria's electricity situation.



VISION

To have fully-electrified Africa, with interconnected and sustainable smart grids that ensures access to clean, reliable and affordable energy for all.



MISSION

Switch is on a mission to resolve energy poverty in Africa by fostering decentralised sources of modern energy.

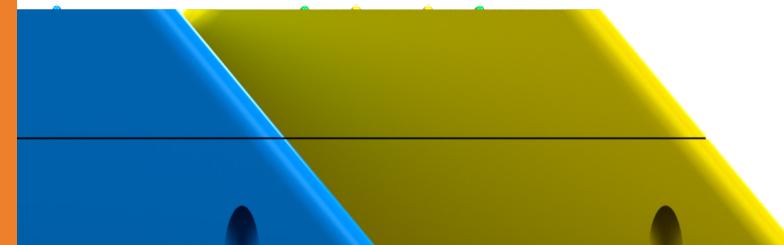


Smart Metering .

Smart meters were initially created to solve problems related to manual meter reading, inaccurate billing and lack of real-time energy consumption data in the energy industry. However, the services of smart meters have advanced to include two-way communication capabilities, providing real-time energy consumption data, peak-load pricing, advanced analytics and forecasting, integration with renewable energy sources, blockchain integration, enhanced cybersecurity measures and many more.

According to an International Energy Agency research, energy theft costs Distribution Companies throughout the world an estimated 6% of their earnings. Poor data quality and management may potentially cost businesses up to 20% of their income, according to Gartner, a major research and consultancy firm. It is important to note that the renewable energy industry does not elude these damages.

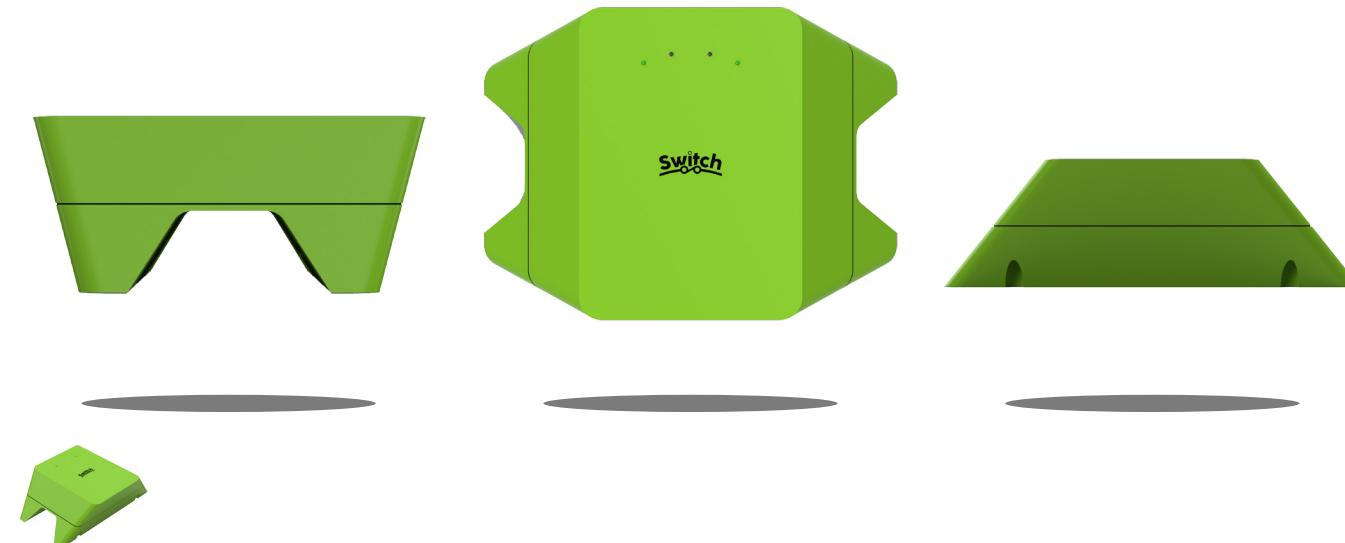
All noted features of a smart meter were developed to solve unique problems encountered in energy distribution and yet, only about 10% of the global population have access to advanced smart metering services — this ultimately leads to missing out on the security, cost and accuracy benefits that come with utilising smart meters for both utilities and energy consumers. Hence, the obvious roadblock in scaling the energy industry to serve its user needs.



Maxwell Smart Meter is a game-changing new technology developed by Switch Electric, built on the power of real-time sensors and web3 technologies to enable complex metering services in decentralized energy systems such as microgrids. In the span of just one minute, a smart meter can collect and analyze over 3,600 data points from several different sensors, including voltage, current, frequency and power factor. Using this data, the meter is able to calculate a very accurate reading of the energy being produced or consumed by any resource connected to it.

Maxwell 1.0 basically addresses these energy concerns:

- Energy Security
- Energy Distribution
- Consumer Micro Services
- Data Collation and Analysis



Switch Smart Meter: Maxwell Gen-2.

Features of Maxwell Gen-2.

DATA AND COMMUNICATION

Maxwell is designed to communicate wirelessly via LoRaWAN, a type of long-range, low-power wireless communication protocol that is designed to be used in the internet of things. Cellular connection is free and accessible, hence, enables consumers and utilities to access meter data remotely. Consumers also benefit via automatic payment confirmations and low balance notifications.



Reporting Smart Alerts Performance Benchmark Diagnostics

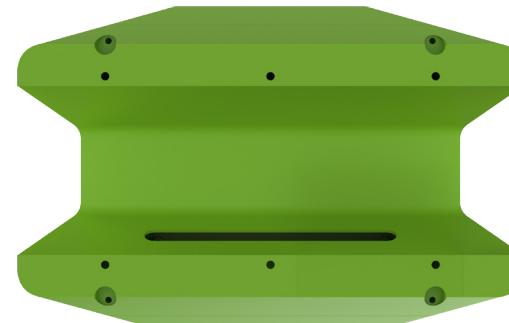
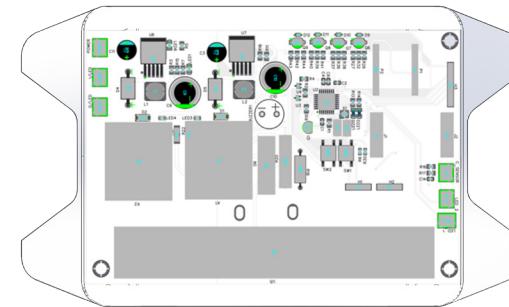
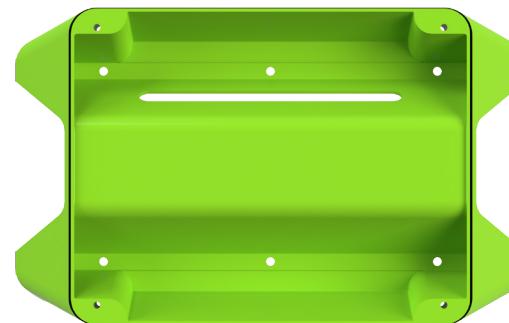


Voltage Measurement Current Measurement Secure Communication Clock Synchronisation



HARDWARE FUNCTIONALITY

- True RMS Voltage Measurement
- Instantaneous Current Measurement
- Active Energy Calculation
- Remote-Controllable Relay
- Programmable Sampling Rate
- Authentic & Secure Communication
- Real-Time Clock Synchronisation
- -10°C to +55°C Operating Temperature



Benefits

- Measuring parameters enable efficiency in calculating precise energy usage.
- Energy data transmission periods can be customised.
- Energy data is secured and cannot be intercepted by 3rd party.

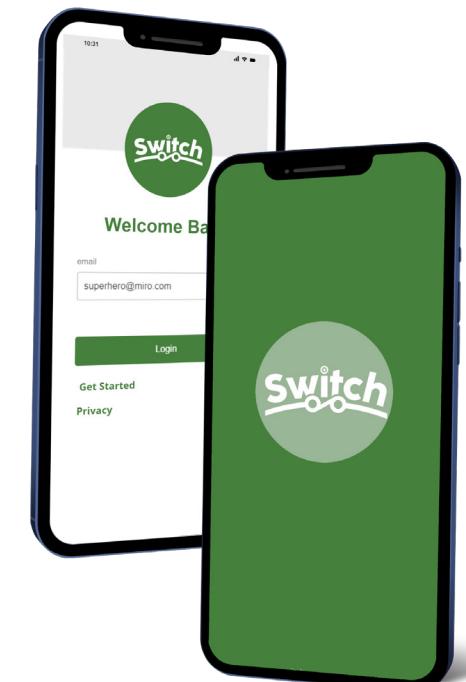


CUSTOMER RESOURCES

- Customisable payment options for utilities (such as FIAT or crypto currency).
- Mobile application for customers with key benefits:
 - Remote Meter Controller
 - Energy Usage Monitor
 - Payment Services
 - Online Customer Support

Benefits

- Create functional user experience for energy users to manage their electricity needs remotely.
- Offer online assistance and benefits to customers.



DATA ANALYTICS

- Reporting Systems
- Diagnostic Systems
- Smart Alerts
- Meter Bypass Detection
- Predictive Maintenance
- Energy Theft Detection
- Performance Benchmark
- Remote Asset Administration

Benefits

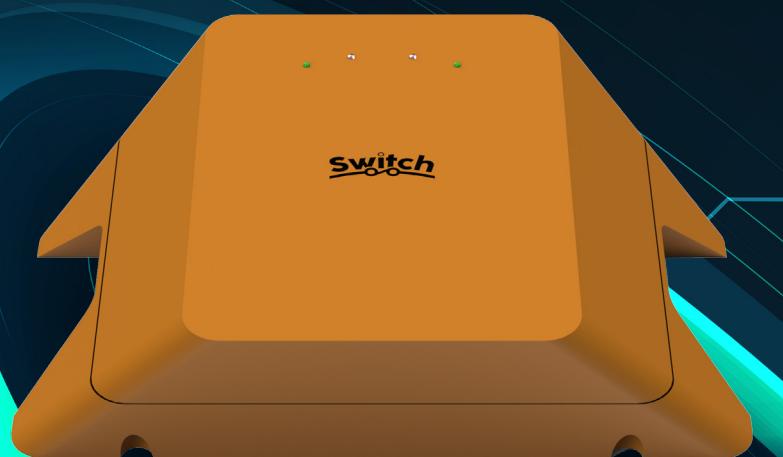
- Monitor usage patterns and track issues remotely.
- Conduct software maintenance via OTA updates.
- Retrieve and analyse data to develop distribution variants.
- Monitor and analyse project performance.



W3BSTREAM INTEGRATION

Maxwell is built on a special infrastructure; W3bstream, that is developed by the oTeX network. W3bstream provides an open, decentralized protocol that sits between blockchain and smart devices. It offloads computation so data remains secure.

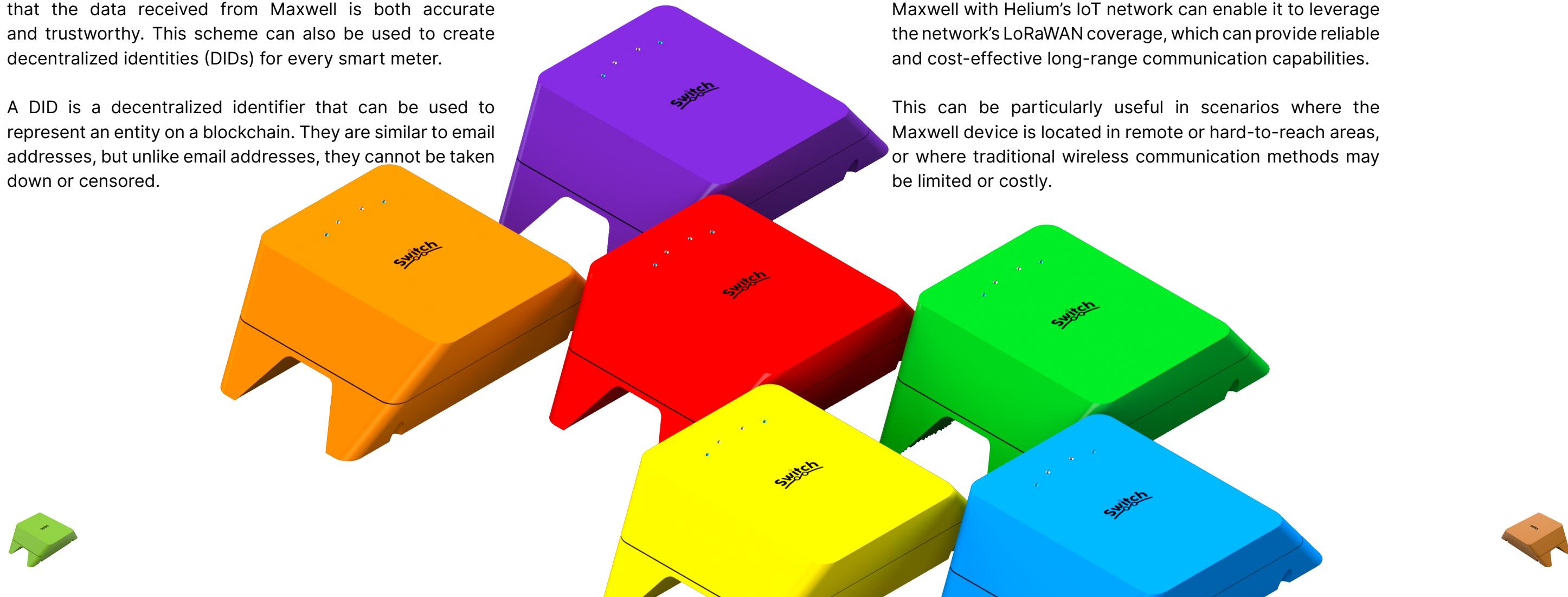
- No single point of data loss.
- Improved data generation.
- Access to financing for transparent projects.
- Improved energy distribution based on real data.



CRYPTOGRAPHIC SIGNATURES AND ZERO KNOWLEDGE PROOFS

To ensure data security, the device can secure its data by digitally signing them with the Secp256k1 elliptical curve algorithm and using SHA256 hash functions. This protects against unauthorized access, tampering, or forgery, ensuring that the data received from Maxwell is both accurate and trustworthy. This scheme can also be used to create decentralized identities (DIDs) for every smart meter.

A DID is a decentralized identifier that can be used to represent an entity on a blockchain. They are similar to email addresses, but unlike email addresses, they cannot be taken down or censored.



LoRaWAN AND HELIUM INTEGRATION

Switch Electric is in the process of bringing Maxwell to Helium's IoT network, which provides LoRaWAN coverage for many devices. Maxwell communicates via this technology and can send data across distances up to 3 km. Integrating Maxwell with Helium's IoT network can enable it to leverage the network's LoRaWAN coverage, which can provide reliable and cost-effective long-range communication capabilities.

This can be particularly useful in scenarios where the Maxwell device is located in remote or hard-to-reach areas, or where traditional wireless communication methods may be limited or costly.

Switch Support.

Switch Electric's smart meter was developed to be data-centric in order to solve the modern energy problems encountered in building off-grid energy projects. This is a new direction in building smart meters in Nigeria but it has proven to eliminate energy distribution problems in major leading countries and regions like the United States of America and the United Kingdom.

Switch Electric development team understands the issue of adaptation and promises a steep learning curve for utilities willing to take advantage of the smart meter and its resource by offering continuous support for both hardware and software services. For further discussions about Switch smart meters which may include pricing, product demo, partnerships or distribution; contact us via:

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**Meet
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