

Fusion Grid project: A stacked energy+connectivity concept for remote communities in emerging economy countries

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Background

- By 2017, 3.5 billion people lack internet access
- 1.06 billion people do not have electricity access
- The annual energy spending of off-grid house holds in Sub-Saharan Africa is of \$160 per year

Aim

- Fusion Grid project intends to develop and roll out a comprehensive approach that provides connectivity, electricity, and digital services to regions without or with limited access employing innovative business models for high value proposition for rural communities

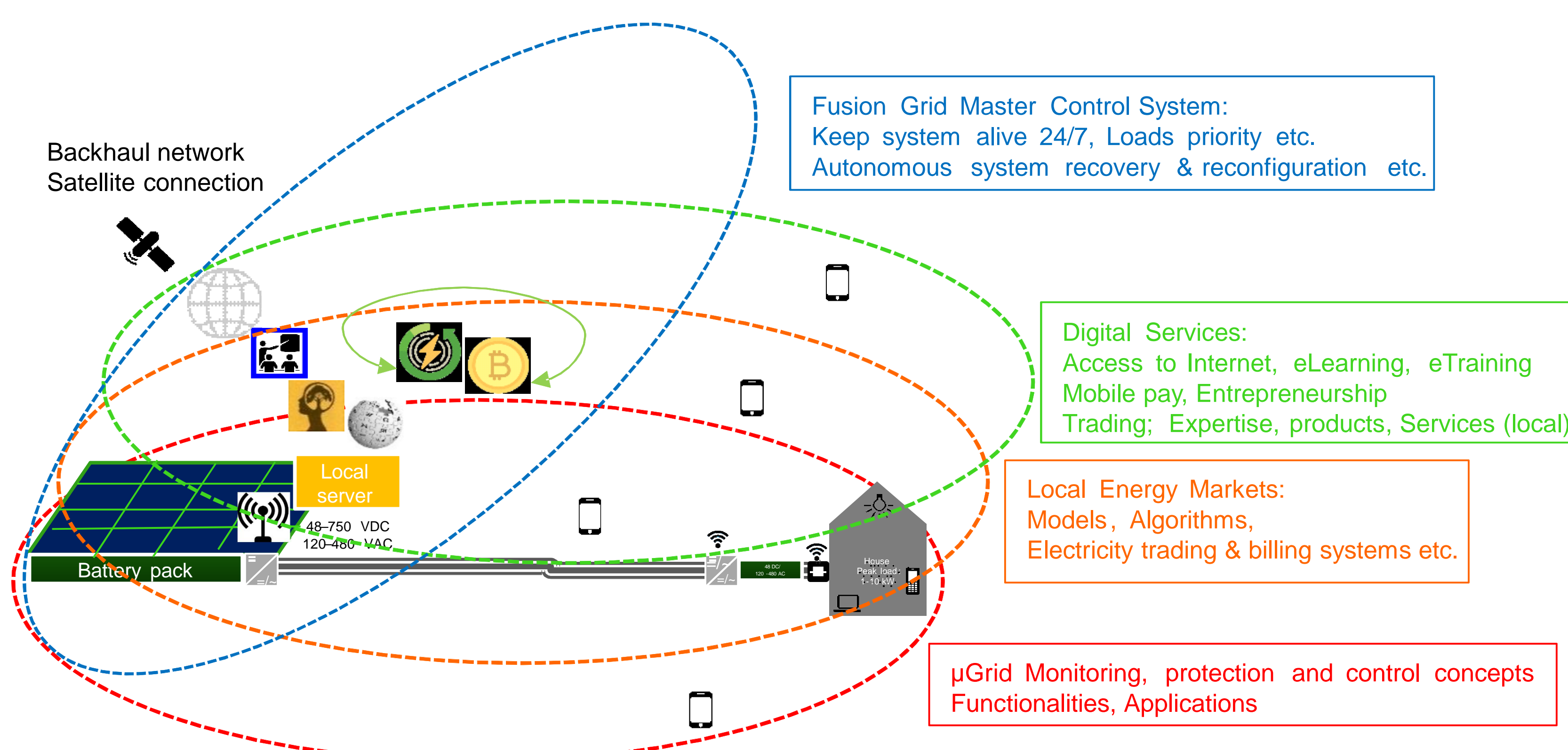


Figure 1. Fusion Grid concept platform.

Concept infrastructure:

KUHA Mobile 4G LTE Base station – Easy-to-setup mobile base station for rural communities -- Nokia

Renewable Energy Base – PV solar and battery energy storage with control system for micro grid -- Green Energy Finland (GEF) Off-Grid System – Delivers power to basic loads; lighting, refrigerators, mobile phones -- LUT

Local Energy Market – Ensures flexibility and affordability of the electricity & connectivity for local consumers -- LUT

Mobile Digital Services – Information services, eLearning, eGovernment, payments, ID services -- Aalto and SYK

Digital Marketplace – Announce and broadcast information about products and services -- Nokia, Aalto and LUT

Research Approach

- Fusion Grid project integrates state-of-the art technologies, namely Nokia Kuha BTS, GEF PV+ES and a digital market place into a scalable off-grid power system with novel services
- This approach should allow rural community's customers to (1) increase their income by participating in local job and service markets, and through that (2) increase their digital presence and provide an access to global markets
- Design of wider µGrids from Fusion Grid cells will be formed in order to built power+mobile network infrastructures to areas having none, where:
 - **Affordability and Sustainability** are key
 - Selection & dimensioning of grid components and voltage levels for different cases is made
 - Autonomous grid reconfiguration and recovery concept is proposed
- Novel innovative business models will be proposed for Fusion Grid implementation in order to address lack of financial capabilities in target markets
- The concept will be tested and evaluated with two pilot systems that will be set up during the project:
 - LUT laboratory, Finland
 - Rural community in Namibia (target pilot site)

