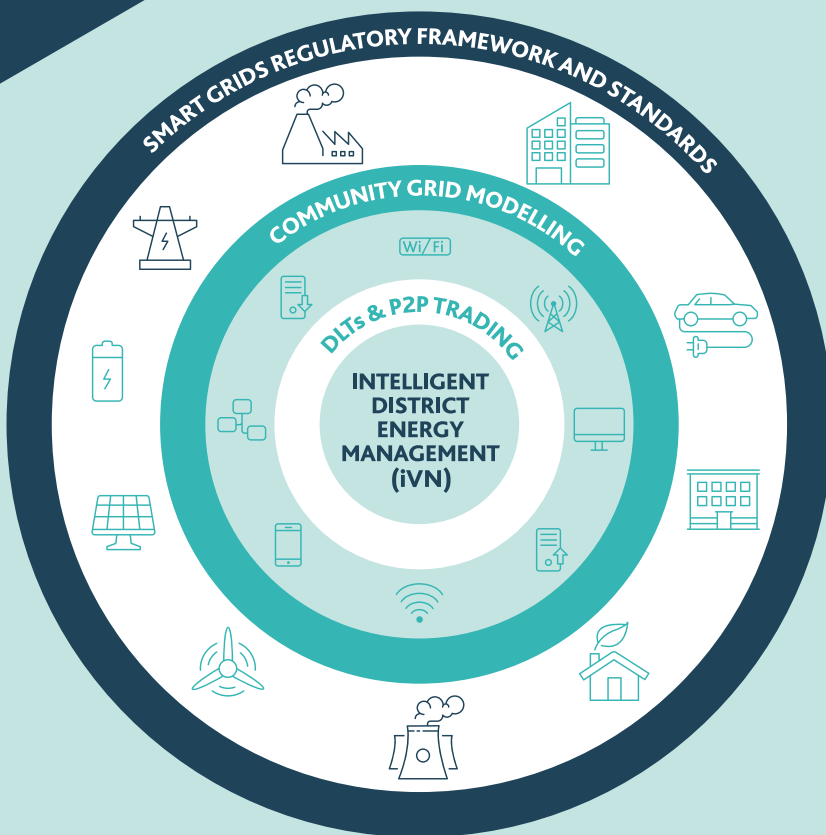




CEDISON

Community Energy Dynamic Solution



The CEDISON project has developed an iVN (Intelligent Virtual Network) mapping and analysis tool, incorporating Blockchain as an energy trading platform. CEDISON focuses on local balancing, demand side response, energy trading, and aims to resolve any other issues outlined by the local community. CEDISON can identify trading opportunities between buildings or communities to reduce energy bills and improve the welfare of a community. CEDISON can result in benefits to both customers in terms of energy and cost savings, and the grid in terms of demand load balancing, increased operational efficiency and reduced infrastructural costs.

SMART CITIES

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Finish: October 2018

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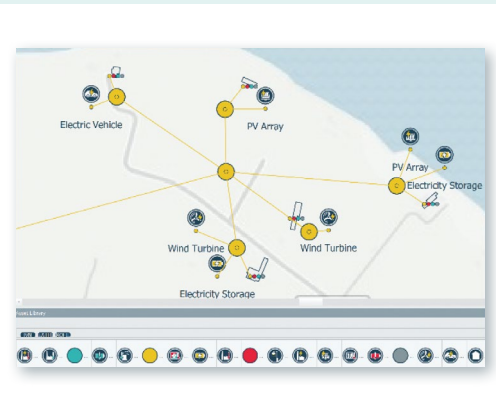
EUROPE | NORTH AMERICA
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CEDISON

Community Energy Dynamic Solution

IES

Forecasting



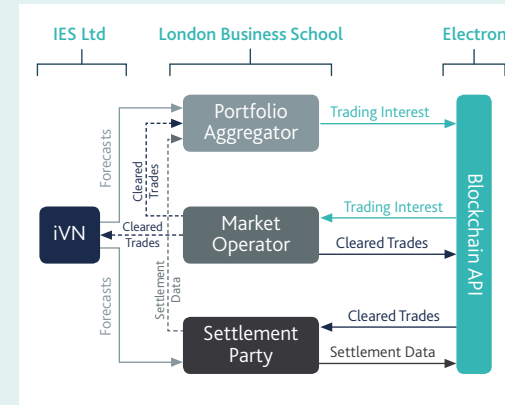
IES developed an Intelligent Virtual Network (iVN) mapping and analysis tool capable of modelling electrical distribution networks of a community, with the inclusion of all energy consumers and producers on that network. The iVN can create a model of a community in its existing state, and analyse the impact that various scenarios (addition of EV's, PV, wind etc) would have on the overall community in terms of impact to the grid, as well as the welfare of the individual members within the community. This enables the iVN to be used as a decision making tool, helping to determine optimum scenarios at both building level and community level. The iVN can also be used to forecast both demand and generation, enabling the prosumer or community to engage in energy trading.

KEY FINDINGS

- Community battery more financially viable than domestic storage
- EV's in place of traditional petrol/diesel vehicles can reduce transport running costs by up to 30%
- Shifting the demand of flexible appliances in the home (e.g. washing machines, dishwashers) can reduce peak building load demand by 10%.
- Addition of renewable assets and flexibility increases trading potential

London Business School

Trading Platform



London Business School applied its expertise in electricity markets to develop a trading platform which could simulate a Portfolio Aggregator operating within new local market arrangements. In functional terms, this module takes forecasts and information on the system states from the iVN to generate the bids and offers (trading interests) for the envisaged day-ahead, 4 hour-ahead and 30 minute-ahead local energy markets. Within this function, a network systems check revised the initial trading interests to resolve any physical power flow constraints. The feasible trades are then cleared by the Market Operator. The Settlement Party completes the transactions. Submitted trading interests, cleared trades and imbalance positions are stored using Distributed Ledger Technology (DLT's) on the blockchain platform.

In this way, LBS created innovative local trading features for the design, functionality and market modelling on the experimental CEDISON platform.

Electron

Blockchain Platform



The project utilises blockchain technology to provide a trading infrastructure ideally suited to the peer-to-peer interactions between participants.

The platform facilitates the exchange of data via decentralised technologies, creating transparency over the trades between participants. Any authorised party is able to audit the trades executed on the platform, providing assurance that all aggregators or market operators are acting in the best interests of the communities they represent.

The decentralised design also means that any authorised participant can help run the platform, resulting in a consortium trading platform controlled and operated by the communities using it. Deploying a traditional, centralised platform would mean a single intermediary retains control of future development and ownership of data generated. Using blockchain technology as the core infrastructure means there is competition amongst service providers to host and operate the community trading platform, keeping prices low for all participants.

Using blockchain to provide trading services to the communities allows participants to retain control of the data and platform operation, maximising value for all parties.

Our Power

Operation



CEDISON was designed to operate within pre-existing regulations. As a licenced energy supply company Our Power was able to help with the design of CEDISON to ensure that it was not only deliverable within this requirement but also that it would be operationally, practicably and commercially viable too. By working with our partners, we were able to develop potential new business models and design new commercial arrangements that might allow us to socialise the benefits and drive cost down for all residents of a CEDISON community.

CEDISON could lead to the deployment of an 'Energy as a Service' model where the kilowatt hours themselves are not charged for, but all of the cost of powering a home is met by a standard monthly subscription regardless of actual consumption. Such an approach would most likely involve tiered subscription levels (to take account of differences between properties – both size and energy efficiency), and employ a 'fair usage' cap. For the consumer, energy supply would start to feel much more like a TV or mobile phone subscription.

CEDISON not only delivers on the decarbonisation agenda, but fundamentally only allows us to explore these types of tariff BECAUSE it relies so heavily on renewables.



How to collaborate with us

If you wish to collaborate with us, please contact research@iesve.com or call **0141 945 8500** or visit our website to find out more at www.iesve.com/research

Project Partners

IES coordinated the CEDISON project; they are world leaders of building monitoring and simulation software.

London Business School are a research leader in modelling electricity markets.

Our Power is an energy supply company and social enterprise, working with housing associations to tackle the issue of fuel poverty.

Electron is bringing together blockchain and energy expertise to create efficient, resilient and flexible systems for the energy sector.

Community Energy Scotland and **Glasgow Housing Association** provided the two real-world test sites.



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