



Energy Cellular Grids



Enabling local & connected energy markets



The ongoing energy revolution is supported by the diffusion of information technologies (IT) in the energy sector. This trend has led to the emergence of the “Enernet”, Smart-Grid concepts and the gradual disappearance of a very static and vertical approach of the power grids. In this former vision, a limited number of localized production sources distribute energy in a largely unidirectional way to a multitude of consumption centers. The topology of the existing grid follows this very pyramidal vision of the energy flows.

In addition, the continuous balancing between electricity production and consumption, was until recently mainly ensured by adjusting the production according to the fluctuations of the consumption. The massive development of renewable intermittent energies, which are reaching their break-even point, is leading to a paradigm shift with the proliferation of distributed generation sources, supported recently by the skyrocketing evolution of storage solutions such as Lithium-Ion batteries, also on their way to financial viability.

These distributed production and storage assets disrupt the topological approach of electrical networks with the appearance and multiplication of transversal flows. The grid then has to cope with multiple, often bidirectional, exchanges at different scales. The parallel development of other technologies such as IoT or blockchain allows consumers to become more involved in their energy footprint. The advent of intelligent energy

management systems like the one developed and commercialized by [BeeBryte](#) in the form of a SaaS coupled to an easy-to-install box, allows these “prosumers” to optimize the use of their flexibility (variable load, production and/or storage) according to various economic inputs like : energy & subscription prices, grid services, opportunity costs, tear & wear costs, social or environmental stakes (CO2 for example).

The products and services offered by BeeBryte are inspired by the following beliefs:

- grid connection is desirable, both for global security, efficiency and resilience issues,
- price signals, if properly developed and shared without bias between participants, constitute effective vectors of regulation and optimization to guarantee the adequacy between supply and demand,
- optimized management of flexibilities to minimize the electricity bill of a consumer, helps to de-stress the grid and promotes the integration of intermittent renewable energy sources.

Until now, BeeBryte solutions have focused on the optimization of “behind-the-meter” systems, connected to an upstream network, of supposed infinite capacity, that is, whose state is not influenced by the behaviour of the controlled system. They are thus adapted either to individual applications (e.g. large commercial & industrial buildings), or to aggregated applications where we optimize in parallel the behaviour of several prosumers according to common price signals, so as to benefit from 'a mass effect'. This second type of application is typically the basis of the concept of "Virtual Power Plant" (or VPP), but remains part of a vertical vision of the relationship between prosumers and the grid.

LET'S THINK “CELLULAR”

In order to further improve the integration of renewable energies and the efficiency of energy exchanges (that is, to reduce losses), it is necessary to bring together prosumers who actually want to

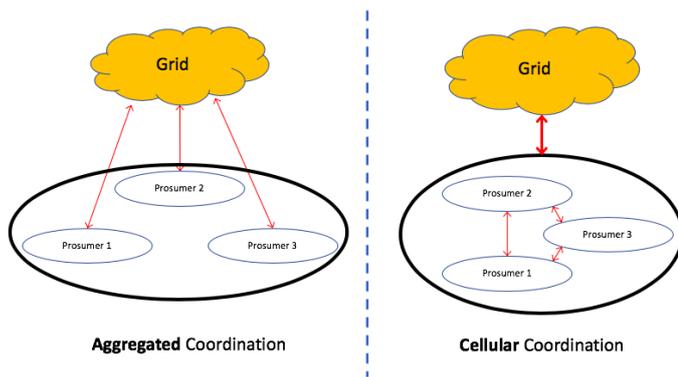


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participate in a connected energy community (including eco-suburbs).

Beyond the economic optimization of the resultant flows of such a community with the grid (always considered as infinite), a "local" criterion is also sought, namely: to favour the transversal flows of energy along short electrical paths, promoting local exchanges.

This requires a permanent search for the best possible match between production forecasts and local consumption profiles, maximizing exchanges between peers and effectively limiting electricity exchanges with the rest of the Grid. This Cellular approach (illustration hereunder) is part of a radically transverse vision of the relationship between the consumer and the grid.



The Cellular approach can be seen as a step towards peer-to-peer trading, which also supposes the implementation of a transactional ledger tracking the different energy flows between prosumers. Technological solutions already exist and are currently developed by BeeBryte, mainly based on blockchain technology, to solve the problem of metering, tracking and accurately registering the energy flows in a transparent, secure and trustable way. This technological brick is crucial to further proceed with a fair redistribution of the value within the community, with a pricing that ensures the fair remuneration of the DSO, operating and maintaining the distribution network.

The Cellular approach allows BeeBryte to already implement local markets and integrate over time the potentials of the multi-faceted sources of flexibility

existing within a community, while promoting local and shared economic models.

STOP THINKING, ACT!

We are on our way to drastically facilitate the empowerment of connected energy communities (Cells) by enabling their members to optimize their energy behaviours and benefit from the various synergies existing between them. In the age of the Enernet, synergistic groupings of consumers are becoming a reality, from a technological standpoint, and will significantly contribute to meet the challenges of the energy transition. Regulatory framework, financing and business models are also evolving towards more agility and initiatives are sprouting up like mushrooms around the world.

This is a promising avenue intending to increase the resilience of networks, optimize their architecture, and streamline the energy flows. But beyond the challenges and technical excitement, the grouping of prosumers also promotes a streamlined use of resources and the development of the sharing economy.

BeeBryte is committed to becoming one of its global enablers.

BeeBryte is using Artificial Intelligence, IoT & Blockchain to get commercial buildings, factories, EV charging stations or entire eco-suburbs to consume electricity in a smarter, more efficient and cheaper way while reducing carbon footprint! BeeBryte is based in France & Singapore, and is accelerated by Intel & TechFounders. One of its shareholders is Compagnie Nationale du Rhone (CNR), the largest French Renewable Energy producer. Since its creation in 2015, BeeBryte's solutions have received many awards including EDF Pulse, DENA Start-up Energy Transition award & Hello Tomorrow Challenge.

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