



## Improving the Efficiency of the Electricity System

The ENBALA Power Network allows large energy users to participate in the smart grid by taking advantage of the flexibility inherent in the way their equipment uses electricity. ENBALA's sophisticated platform aggregates the flexibility available in multiple disparate loads in the network to provide high quality, robust, reliable and resilient Regulation Service to Independent System Operators ("ISOs"). This provides electricity users with an opportunity to earn incremental revenue – all without impacting the operational effectiveness of their assets.

Regulation Service refers to the real-time adjustment of generation or load in the electricity system to ensure the second-by-second balance of supply and demand within the grid. This is a necessary service for the management of an electric system. All North American ISOs procure Regulation Service, virtually all of it from fast responding generators, such as combined cycle gas plants and hydro plants.

The requirement for Regulation Service is expected to increase significantly as the electricity system relies to a greater extent on renewable energy sources (wind, solar). Renewables are, by nature, intermittent (winds drop, clouds cover the sun), which increases the volatility of electricity supply in the grid. This leads to greater minute by minute imbalances, which may be managed through increased use of Regulation Service.

Delivering Regulation Service using the ENBALA Power Network instead of generators does not change the total amount of electricity used (or generated) in the system. Crucially, however, it allows the generating assets in the system to operate more efficiently – and this carries significant environmental benefits. When generators are used to provide Regulation Service, they must operate outside their optimal operating levels (so that they have the flexibility to increase or decrease their output as the moment by moment needs of the power system change):

- All generators have a maximum efficiency that can be achieved. This maximum efficiency generally occurs at near full capacity for the generator. If a generator is operated at a lower output level, in order to provide range for regulation, there is often a significant loss in efficiency. In the case of a fossil fuel powered facility, this results in higher emission levels per MWh. In the case of a hydroelectric generator, it means that more water is used per MWh.
- In addition, where run-of-river hydro-electric generation is used for Regulation Service, the dams are likely "spilling" water, rather than using it to produce electricity in order to provide the range needed. In this case, the use of the ENBALA Power Network provides 100 MW of Regulation Service and the electricity system may be rewarded with up to an additional 100 MW of clean, emission free power.

The ENBALA Power Network harnesses latent flexibility in demand side assets and uses it to provide Regulation Service. Currently this flexibility is unutilized and provides no benefit to anyone. The ENBALA Power Network increases the efficiency of the electricity system without any significant new capital investments and without service interruptions.

The ENBALA Power Network adjusts how demand side assets use electricity – allowing generating assets to operate at peak efficiency and allowing electricity to be generated in a cleaner, more fuel-efficient fashion. The increased availability of low-cost, energy-efficient and scalable Regulation Service facilitates the integration of desirable renewable energy sources into the electricity system.