fenix
Flexible Electricity Networks to Integrate the eXpected 'energy evolution'
... a step towards the future of electricity network

Bulletin 9
6/2009

Regulatory and contractual framework for fenix

Introduction

By Stephen Woodhouse
(Pöyry Energy Consulting)

The FENIX concept seeks to improve the participation of Distributed Energy Resources (DER) in the electricity sector. This is achieved by aggregating the output of a large number of DER (distributed generation and controllable demand) using a Virtual Power Plant (VPP). The VPP can control the DER within its portfolio, trading the energy generated and offering ancillary services to the Transmission System Operator (TSO) and the Distribution System Operator (DSO).

For the FENIX concept to work, regulatory and contractual frameworks need to support it. As part of the FENIX project, Pöyry Energy Consulting has undertaken work to consider the regulatory and contractual frameworks required to enable the FENIX concept to be realised.

Regulatory framework

By Stephen Woodhouse and Simon Bradbury
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Issue

Technological barriers to the realisation of FENIX have been or are being overcome and economic gains are expected to be realised by its implementation. However, the regulatory regimes can present real obstacles to implementation of the FENIX concept. The regulatory framework needs to enable DER participation.

Approach

The first step involved the identification of the desirable features of a regulatory framework in which FENIX is viable. Then, for specific case study countries (GB and Spain principally and also the Netherlands and Austria), barriers to the achievement of the desirable framework were identified. Finally, recommendations for changes to regulatory regimes to facilitate FENIX were developed at generic European level and, for GB and Spain, at a country specific level.

Desirable features

At a high-level, a snapshot of some of the identified desirable regulatory features for FENIX is as follows:

- distribution network revenue regulation

Regulators must allow the distribution networks to benefit when they efficiently use active network management to defer or avoid capital expenditure

Consistent treatment of OPEX and CAPEX would allow more switching between the two, an important step for fully integrating DER within the network

- metering and communication

Wider use of real-time metering would add value for DER by encouraging suppliers/CVPP to make full use of the DER flexibility by participating in the market and by providing services to the TSO and DSO

Full information flows for new and existing DER means that schemes would no longer be invisible to network planners and operators

	Key current features	Barriers to FENIX	Recommendation/solution	
Regulated revenues	DSO revenues are fixed, with year-on-year increases based on demand growth and RPI. Connection costs are paid by generators	Costs of new assets borne by generators, but increases in opex reduce the DSO's profit: an implicit disincentive for lean, active networks	Regulators must allow DSOs to benefit when they use active network management to defer or avoid capital expenditure	
Invisibility of DG to the DSO	Small generators are not required to send production data to DSO and can assume physically firm access	DER is essentially invisible to DSOs, making it impossible to control DER to manage the network. Visibility first step towards controllability	Real-time metering of distributed generation should be mandated for DG above a certain size (delegated dispatch is step towards this)	
Network design / **DER control**	DG seen as a distorting element that complicates the operation and planning of the networks. Planning methodology is conservative	Network design methodology focused on connecting, not integrating, DG. Option for DER control by DSO under commercial contracts needed	Requirement for guaranteed physically firm access not needed. DSOs must be allowed to use lean network design with controllable DER	

Fig.1 - Example Country specific recommendations for Spain (The recommendations are colour-coded. A red traffic light signifies an essential change for FENIX while an amber traffic light signifies a change required to better enable FENIX)

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• ancillary services

Regulators must remove unjustified barriers to DER participation in ancillary service provision to enable DER flexibility to be utilise

• subsidies for distributed generation and CHP

Support mechanisms for distributed generation and CHP should encourage/enable flexibility so that DER has a route to market through a VPP

Further detail is provided in the report for work package 3.2.5.

Country specific recommendations

In addition to generic recommendations, country specific recommendations were identified for GB and Spain. As an example, several recommendations were made in relation to distribution network design, operation and regulation in Spain, as outlined in the picture on the page before (Fig.1). Again, further detail is provided in the report for work package 3.2.5.

Dissemination

Work is now underway to disseminate the regulatory recommendations to key stakeholders in the EU, in order to promote change that will facilitate FENIX implementation.

Contractual framework

By Simon Bradbury (Pöyry Energy Consulting)

Issue

In addition to developing a regulatory framework which supports FENIX, it is important that the contractual arrangements enable DER value to be realised by providing a route to market for DER services and provide clarity in respect of the commercial obligations/entitlements of the parties involved.

Approach

Focusing on a GB case study, Pöyry outlined the FENIX contractual relationships and developed 'heads of terms' which set out the types of provisions that need to be included within each contract.

Contractual relationships

The contractual structure required for FENIX is represented in the diagram below (Fig.2). For FENIX to be implemented, contractual arrangements need to be defined between the parties.

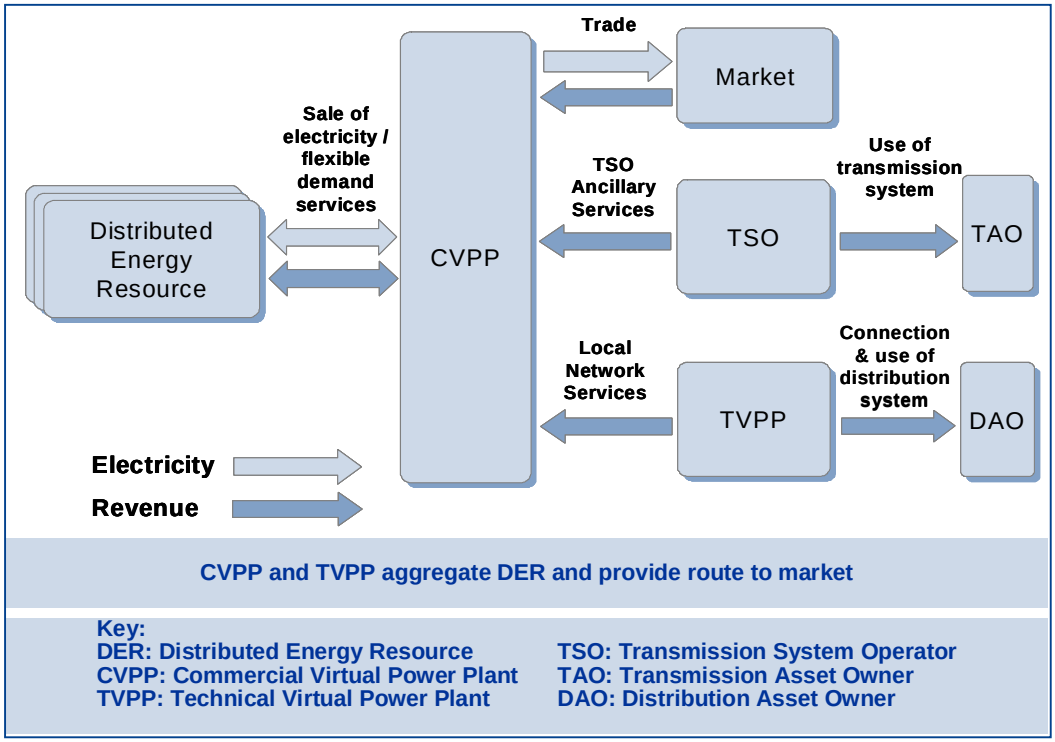


Fig.2 – Contractual structure required

DER-CVPP contractual relationship

By Simon Bradbury

From the perspective of DER, its contractual relationship with the CVPP is of great importance. The relationship between the CVPP and DER under FENIX will be more dynamic and interactive than the present relationship between suppliers and DER. Key requirements for this contractual relationship are described in the text box below. Further detail is provided in the report for work package 3.2.6.

Requirements for DER-CVPP contract

- metering arrangements
- calculation of Use of System and any other DER charges
- communications protocol
- submission of bids and offers to the CVPP by the DER (before real time)
- 'imbalance settlement' to account for differences between planned and realized volumes
- dispatch arrangements (of DER by CVPP) in real time
- billing and payment

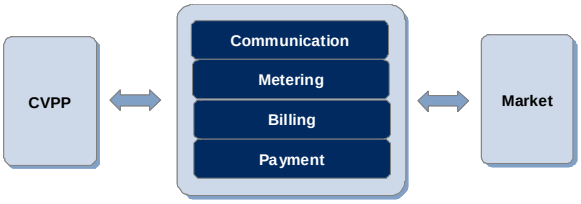
The exact contractual details will need to be tailored to the technology and the regulatory regime of the country in question, but the intent is that the identified common characteristics can be used as the foundation for the contractual structure for any DER technology.

CVPP (TVPP) contractual relationships

By Simon Bradbury

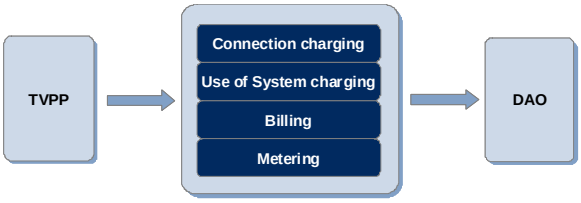
In order to realise value from its aggregated DER, the CVPP (TVPP) must trade energy and/or offer services to the network operators.

One option is for the CVPP to trade the DER via the wholesale power trading arrangements. Under this approach, the contractual relationship must cover the following areas:



Alternatively, the CVPP could offer ancillary services to the TSO e.g. voltage stability, balancing energy. In this case the contractual relationship between the TSO and the CVPP must cover the following areas:

The final option involves contracting with a DSO, thereby enabling more active management of the distribution network. The contractual relationship between the DSO and the TVPP must cover the following areas:



Conferences

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The FENIX bulletin No. 10

Subject

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