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

Bulletin 2
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The Virtual Power Plant: *Enabling integration of distributed generation and demand*

Editorial

by C. Ramsay,

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FENIX Workpackage 1

Welcome to the second edition of the FENIX project bulletin. In this issue we present the Virtual Power Plant (VPP), a core FENIX concept which enables the integration of Distributed Energy Resources - DER (both generation and demand) into power system operation.

To meet the challenge of DER integration, the aim of FENIX is to conceptualise, design and demonstrate a technical architecture and commercial and regulatory framework for VPP based integration of these resources. A framework that enables power systems based on DER (via VPPs) to become the solution for the future cost efficient, secure and sustainable EU electricity supply system.

Through the VPP concept individual DER can gain access and visibility across all energy markets, and benefit from VPP market intelligence to optimise their position and maximise revenue opportunities. Furthermore, system operation can benefit from optimal use of all available capacity and increased efficiency of operation. The VPP makes DER visible to the system operator and presents a resource that can be used for active control of electricity networks.

This bulletin explores the VPP concept and outlines the technical and commercial functionality that it can enable for a range of distributed energy resources.

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The Virtual Power Plant

The FENIX Virtual Power Plant (VPP) is comparable to transmission connected generating plant. Transmission connected plant has a profile of characteristics such as, schedule of generation, generation limits, operating cost characteristics. Using this profile individual plant can interact directly with other market participants and the system operator to offer services and make contracts.

Currently, DER are not integrated into system operation and market participation. They are too small and too numerous to be visible or manageable on an individual basis. The VPP counteracts this problem by aggregating these individual characteristics from a portfolio of DER , so that it can now be used in a manner similar to transmission connected generation.

The VPP can then be used to provide technical and commercial services to the system operator and in the energy marketplace

What is a VPP?

A Virtual Power Plant (VPP) aggregates the capacity of many diverse DER, it creates a single operating profile from a composite of the parameters characterizing each DER and can incorporate the impact of the network on aggregate DER output (see Fig. 1).

A VPP is a flexible representation of a portfolio of DER that can be used to make contracts in the wholesale market and to offer services to the system operator. There are two types of VPP, the Commercial VPP (CVPP) and the Technical VPP (TVPP).

DER can simultaneously be part of both a CVPP and a TVPP.

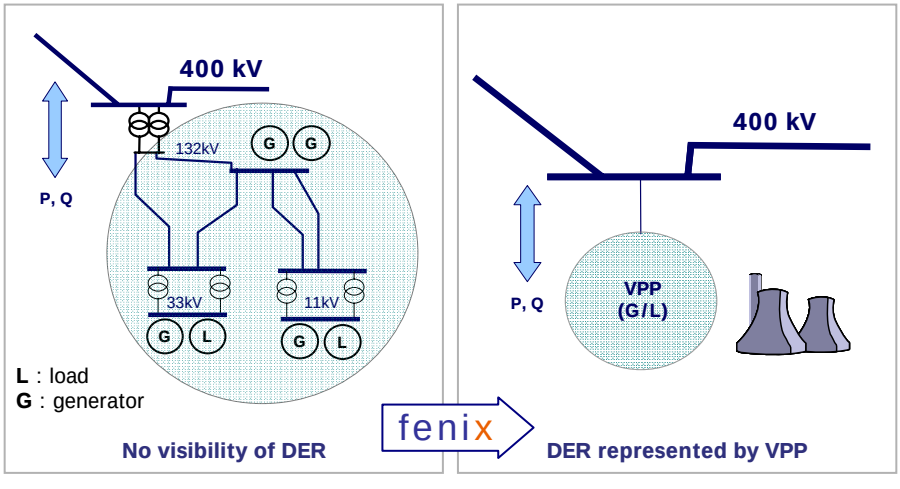

Figure 1. Characterising distributed generation and loads as a single Virtual Power Plant

CIRED Seminar 2008: SmartGrids for Distribution
23 - 24 June 2008, Frankfurt, Germany

Stop-press: FENIX will be present at CIRED Seminar 2008 „Smartgrids for distribution"

Where: Frankfurt / DE
When: June 23-24, 2008
Info: www.ciredsmartgrids.org

Side event: 1st meeting of FENIX Stakeholders Advisory Group June 24, 2008 afternoon

Mark your diary !!!

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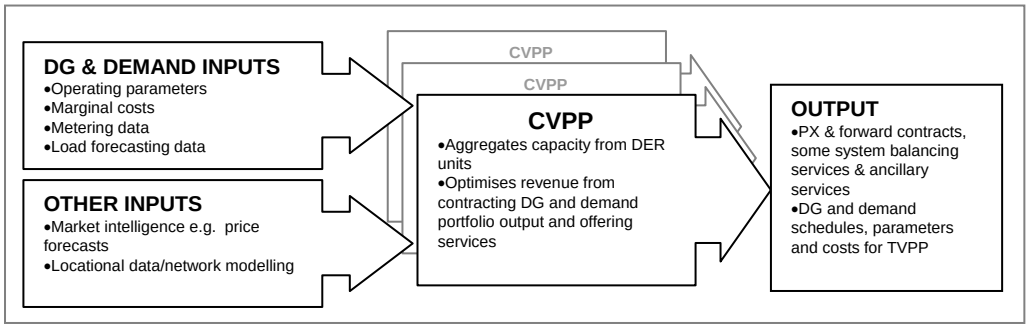
VPP functionality

The VPP can be used by system participants to facilitate access for DER to a wide range of markets and to provide services to support system management (for example, various types of reserve, frequency and voltage regulation). In the development of the VPP concept, these activities of market participation and system management and support give rise to two different types of VPP : the Commercial VPP (CVPP) and Technical VPP(TVPP). Both are defined in more detail below:

Commercial VPP

A Commercial VPP is a type of VPP. A CVPP has an aggregated profile and output which represents the cost and operating characteristics for the DER portfolio. The impact of the distribution network is not considered in the aggregated CVPP profile.

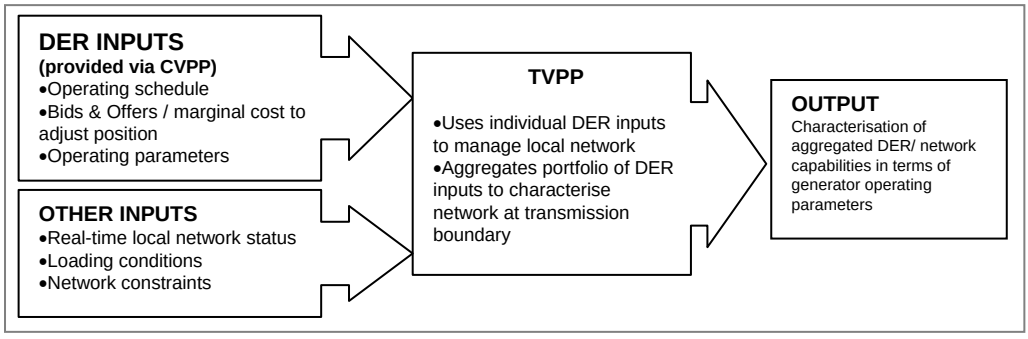
Services/functions from a CVPP include trading in the wholesale energy market, balancing of trading portfolios and provision of services (through submission of bids and offers) to the system operator. The operator of a CVPP can be any third party aggregator or a Balancing Responsible Party (BRP) with market access; e.g. an energy supplier.



Technical VPP

A Technical VPP is a type of VPP. The TVPP consists of DER from the same geographic location. The TVPP includes the real-time influence of the local network on DER aggregated profile as well as representing the cost and operating characteristics of the portfolio.

Services and functions from a TVPP include local system management for DSO, as well as providing TSO system balancing and ancillary services. The operator of a TVPP requires detailed information on the local network; typically this will be the DSO.



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Second period completed – next steps

The FENIX project has successfully completed its second year having completed all major targets and project objectives. As we move into 2008 and our third year of work, the project team is concentrating on the physical implementation and demonstration of VPPs in existing networks. Hard- and software developed in previous project phases will be integrated into real facilities and networks in order to test its behaviour in the electricity markets in Spain and the UK. The portfolio of the UK market is characterised by a broad integration of CHP units from the kW-range (µ-CHP, domestic use) up to large units in the MW range (industry, district heating). The Spanish market is dominated by a combination of medium-size industrial CHP units and large wind farms.

Next FENIX bulletin

The specific features of both of these technology and market conditions and the according Northern and Southern scenarios developed by FENIX will be presented in more detail in the upcoming issues of the FENIX bulletin. The main subject of the next bulletin will be **The FENIX Scenarios – Part 1, The Northern Scenario** to be published in April 2008.

Register to FENIX: If you are interested in receiving regular information on actual results and news of the FENIX project we offer a free subscription to our newsletter. Just register to FENIX on our homepage or sent an email with **SUBSCRIBE** as a subject to **bulletin@fenix-project.org.** If you don't want to receive the FENIX-bulletin any longer sent an email with **UNSUBSCRIBE** as a subject to **bulletin@fenix-project.org**

More information about the FENIX project is available on the FENIX homepage: **www.fenix-project.org**