

Integrated Project FENIX – what is it all about?

Editorial

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In late 2005 a consortium of 20 different partners from research and industry launched on behalf of the European Commission, an integrated research project code-named **FENIX**. This acronym stands for "Flexible Electricity Networks to Integrate the eXpected energy evolution". The main mission of this 4-year project is to analyse and develop technological and commercial tools and methods in order to enable a cost efficient, secure and sustainable electricity supply system in the European Union.

Issues like climate change, diminishing reserves of fossil fuels, energy diversity, etc. are driving a significant change in generation portfolios, with a sharp growth in wind, solar, biogas and cogeneration plants, among others.

However, the increasing penetration of Distributed Energy Resources (DER) is causing operational problems within the traditional, centralized grid structure. The former philosophy of *connecting* rather than *integrating* DER in to power systems can no be longer accepted. New elaborate solutions are required to help these new energy sources *support* the electrical system by providing the well-established *ancillary services*, in a similar way to that of conventional generation. And, to cope with the indeterministic and/or intermittent behaviour inherent with DER, aggregation in Virtual Power Plants is required and becomes a key concept of the project.

This important change will require the engagement of the whole electrical energy supply chain in the dissemination process as the project's advances will be fundamental. This bulletin is the first of a series that will communicate our main findings.

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Why FENIX?

Figure 1 shows a schematic representation of the capacities of DER, distribution and transmission networks, as well as the role of central generation of today's system and its future development under two alternative scenarios, both with increased penetrations of DER.

The centre column "Status quo Future" represents a system developed under a continuation of the traditional system operations paradigm characterized by the present centralised control and passive distribution networks.

The alternative, FENIX Future, represents the system capacities of DER and demand side fully integrated into system operations under a decentralized operating paradigm with the concept of virtual power plants as proposed by this project.

Status quo Future

Large penetrations of DER will displace, to a significant extent, the energy produced by large conventional power plants. However, if DERs and the demand side are not integrated properly into system operations, conventional generation will continue to be necessary for provision of the system support services required to maintain security and system integrity e.g. load following, frequency and voltage regulation, reserves, etc.

This implies that large penetrations of DER will not be able to displace the capacity of conventional plants as indicated in Figure 1. Given that a significant proportion of DER is likely to be connected to distribution networks, maintaining the traditional passive operation of these networks and centralized control will necessitate an increase in capacities of both transmission and distribution networks. →

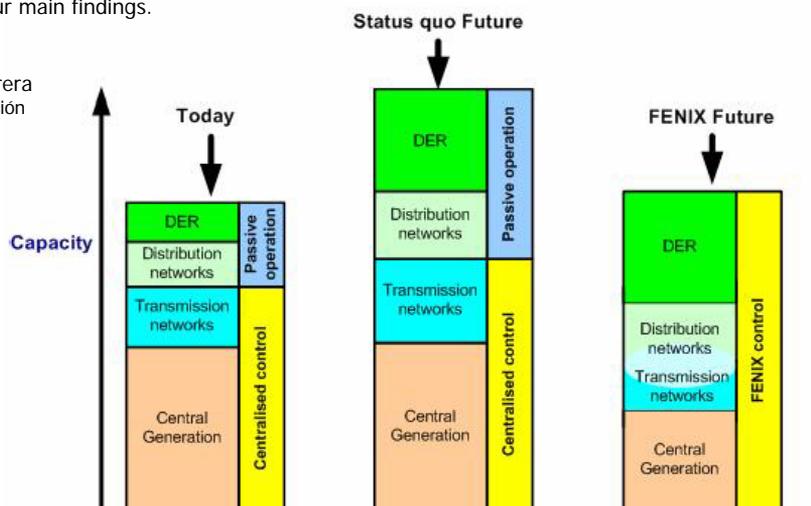


Figure 1 Relative levels of system capacity



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FENIX future

On the other hand, by fully integrating DER and demand side into network operations as proposed by FENIX, DER and demand side will take the responsibility for the delivery of some system support services sharing the role of central generation.

In this case DER will be able to displace significant amounts of energy produced by central generation. Furthermore its control functions, and will assist in reducing the capacity of central generation as shown in the figure.

In order to achieve these targets the operating practices of traditional distribution networks will need to change from passive to active. This will require a shift from the conventional central control philosophy to a new distributed control paradigm, including significant contribution from the demand side to enhance the control capability of the system.

The FENIX consortium

The FENIX consortium comprises 20 Trans-European industrial partners, universities and independent research institutes from Austria, France, Germany, the Netherlands, Romania, Slovenia, Spain, and the United Kingdom.

All partners have a strong background and expertise in energy generation, transmission and distribution, as well as in research and development. This ensures that all scientific tasks of FENIX, whether they are on an experimental, practical or theoretical level will be processed with high professional competence.

More information about the FENIX project can be retrieved from the FENIX homepage:

www.fenix-project.org



Figure 2: Overview of the consortium

Next FENIX bulletin

The next FENIX bulletin will be published in January 2008.

Subjects:

Introduction to Virtual Power Plants (VPP), Commercial Virtual Power Plants (CVPP) and Technical Virtual Power Plants (TVPP).

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