



# FENIX – Regulatory issues and recommendations

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A presentation to EC Review

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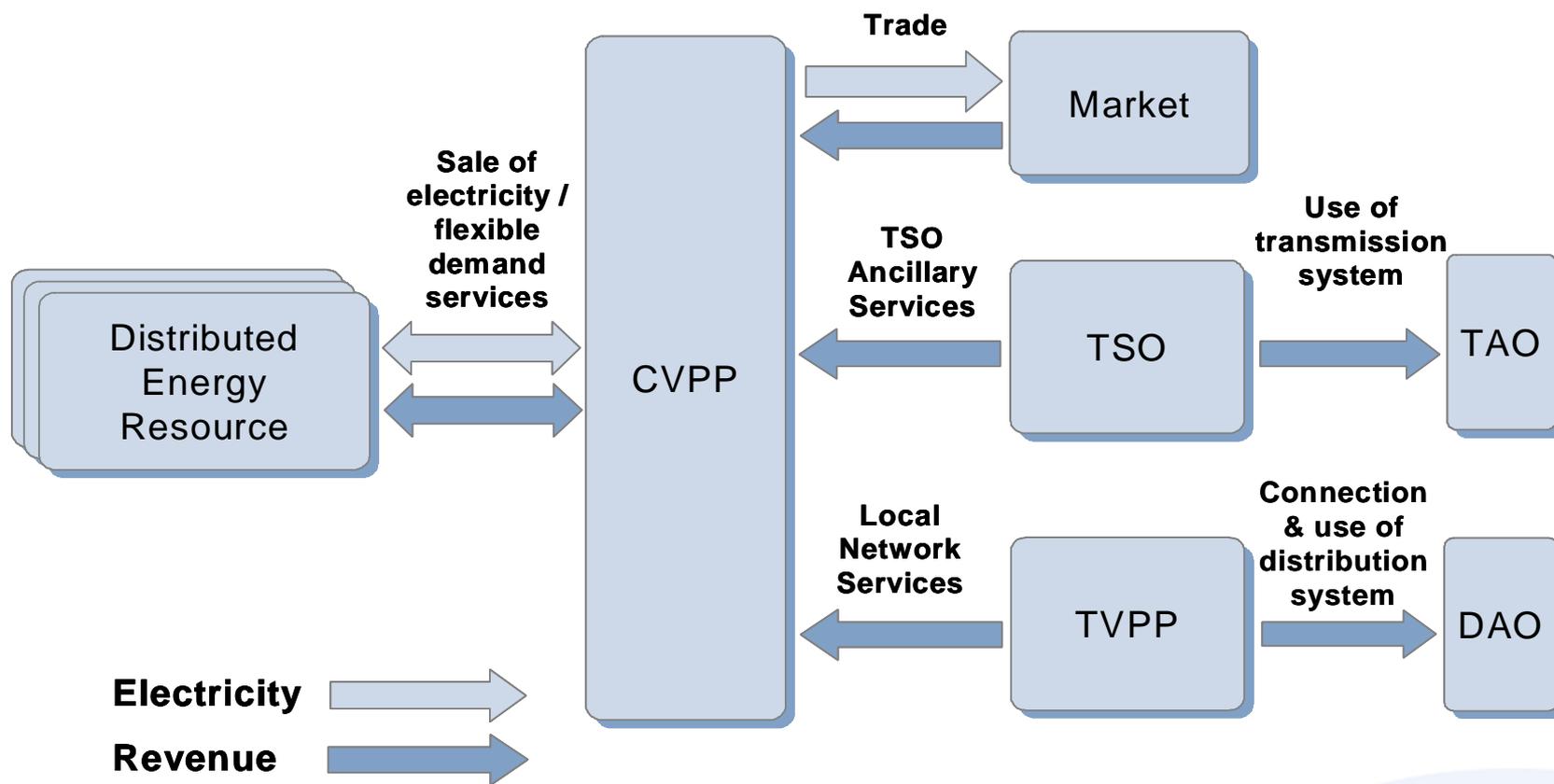
24 September 2009

# Outline of presentation

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- ➔ 1. Introduction
- 2. Desirable features of regulatory framework
- 3. Examples of country-specific barriers and recommendations
- 4. General regulatory recommendations to overcome barriers

# FENIX concept seeks to improve participation of Distributed Energy Resources in the electricity sector



CVPP and TVPP aggregate DER and provide route to market

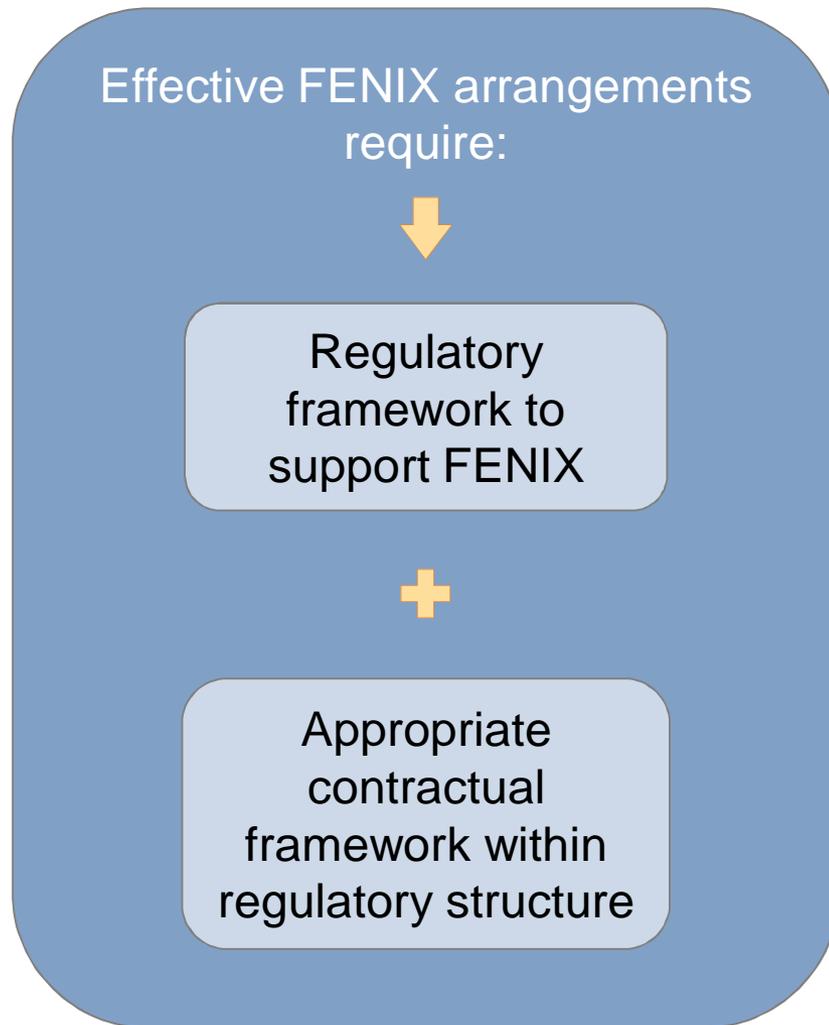
**Key:**

DER: Distributed Energy Resource  
CVPP: Commercial Virtual Power Plant  
TVPP: Technical Virtual Power Plant

TSO: Transmission System Operator  
TAO: Transmission Asset Owner  
DAO: Distribution Asset Owner

# Regulatory and contractual frameworks need to support FENIX concept

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- FENIX creates **economic value** by allowing DER to:
  - participate in wholesale electricity markets
  - provide services to TSO and DSO
- **Regulatory framework** needs to enable DER participation
- **Contractual framework** needs to:
  - enable **DER value to be realised**
  - provide a **route to market** for DER services
  - clarify the **commercial obligations / entitlements** of the parties involved

# Review seeks to identify regulatory barriers to the FENIX concept and make recommendations for regulatory change

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## What kind of regulatory framework is needed for FENIX to be viable?

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- Summary of regulatory recommendations made by previous studies of DER
- Definition of services offered by FENIX, which a regulatory regime should allow and reward
- Outline of the business model of Technical and Commercial VPPs



## How do current regulatory regimes compare to this?

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- Overview of how regulation is done in Europe
- Description of regulatory frameworks in GB, Spain, Netherlands and Austria
- Examination of current businesses operating as CVPPs or TVPPs in GB
- Specific barriers to FENIX, particularly in Great Britain and Spain



## What changes need to be made to existing regulatory frameworks?

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- Specific recommendations for changes to regulatory structure in Spain and Great Britain
- European-wide recommendations based on the lessons learnt from Spain, Great Britain, the Netherlands and Austria

**Remainder of slides focus on desirable regulatory features as well as examples of GB and Spain specific findings**

# Outline of presentation

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1. Introduction
- ➔ 2. Desirable features of regulatory framework

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3. Examples of country-specific barriers and recommendations
4. General regulatory recommendations to overcome barriers

# Regulatory framework recommendations fall into several categories...

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Area	Focus
<b>DNO/DSO incentives and requirements</b>	<ul style="list-style-type: none"><li>• Changing the environment within which distribution businesses operate</li></ul>
<b>Metering and communications</b>	<ul style="list-style-type: none"><li>• Creating enabling infrastructure</li></ul>
<b>Network access</b>	<ul style="list-style-type: none"><li>• Allowing/encouraging DER participation</li><li>• Guaranteed connection but not firm access</li></ul>
<b>Market participation</b>	<ul style="list-style-type: none"><li>• Market access for DER</li></ul>
<b>Demand side measures</b>	<ul style="list-style-type: none"><li>• Time-dependent pricing</li></ul>
<b>Ancillary services</b>	<ul style="list-style-type: none"><li>• Access by DER</li></ul>
<b>Technology support</b>	<ul style="list-style-type: none"><li>• Appropriate forms of support to encourage flexibility</li></ul>

# Desirable regulatory framework features for DER...

Area	Requirements	Detail
<b>DNO/DSO incentives and requirements</b>	<ul style="list-style-type: none"> <li>• Allowance of full recovery of DG connection costs</li> </ul>	<ul style="list-style-type: none"> <li>• removes the temptation for connection to be delayed in order to defer the costs faced by a DNO/DSO, which can occur even with a statutory requirement to offer terms of connection</li> </ul>
	<ul style="list-style-type: none"> <li>• Incentives and allowances for innovation</li> </ul>	<ul style="list-style-type: none"> <li>• innovative solutions to network problems, such as the involvement of DER can only come about through investment in research and development</li> </ul>
	<ul style="list-style-type: none"> <li>• Consistent treatment of OPEX and CAPEX</li> </ul>	<ul style="list-style-type: none"> <li>• would allow more switching between the two, an important step for fully integrating DER within the network</li> </ul>
	<ul style="list-style-type: none"> <li>• Longer term planning framework</li> </ul>	<ul style="list-style-type: none"> <li>• important for operators to have a view of what the network 'should' look like from an economically-efficient point of view in order to make informed investment decisions</li> </ul>
	<ul style="list-style-type: none"> <li>• Islanding and statutory requirements</li> </ul>	<ul style="list-style-type: none"> <li>• statutory technical requirements such as voltage and frequency limits may need to be relaxed in some situations in order to increase the reliability of network when using DER</li> </ul>

# Desirable regulatory framework features for DER...

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Area	Requirements	Detail
Network access	<ul style="list-style-type: none"><li>Guaranteed Rights to Connect</li></ul>	<ul style="list-style-type: none"><li>essential if there is to be an increase in penetration of DER</li></ul>
	<ul style="list-style-type: none"><li>Non-firm capacity connections</li></ul>	<ul style="list-style-type: none"><li>encourages the use of actively managed networks</li></ul>
	<ul style="list-style-type: none"><li>Assess DER's contribution to SoS</li></ul>	<ul style="list-style-type: none"><li>essential step in moving from a passively built distribution network to a more actively managed one</li></ul>
	<ul style="list-style-type: none"><li>True reflection of costs and benefits of DER</li></ul>	<ul style="list-style-type: none"><li>necessary for DER to have appropriate incentives to connect and operate in a manner that benefits the economy as a whole</li></ul>

# Desirable regulatory framework features for DER...

Area	Requirements	Detail
<b>Market participation</b>	<ul style="list-style-type: none"> <li>• Full market access for DER</li> </ul>	<ul style="list-style-type: none"> <li>• DER should be able to compete on an equal standing with centralised generation, although aggregation may be needed to permit it to do so</li> </ul>
	<ul style="list-style-type: none"> <li>• More open, liquid and transparent markets</li> </ul>	<ul style="list-style-type: none"> <li>• necessary to enable independent agents to innovate in order to integrate distributed energy resources and allow participation on a more equal basis</li> </ul>
<b>Metering and communications</b>	<ul style="list-style-type: none"> <li>• Establish technical and communication standards</li> </ul>	<ul style="list-style-type: none"> <li>• lack of technical standards is a major barrier to the uptake of more innovative metering solutions.</li> </ul>
	<ul style="list-style-type: none"> <li>• Full information flows for new and existing DER</li> </ul>	<ul style="list-style-type: none"> <li>• means that schemes would no longer be invisible to network planners and operators</li> </ul>
	<ul style="list-style-type: none"> <li>• Wider use of real-time metering</li> </ul>	<ul style="list-style-type: none"> <li>• 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</li> </ul>

# Desirable regulatory framework features for DER...

Area	Requirements	Detail
<b>Demand side measures</b>	<ul style="list-style-type: none"> <li>Reduction in profiling</li> </ul>	<ul style="list-style-type: none"> <li>means that more demand and generation is more exposed to within-day price variation</li> </ul>
	<ul style="list-style-type: none"> <li>Time-differential pricing</li> </ul>	<ul style="list-style-type: none"> <li>providing a different cost for electricity consumed at different times would provide a currently unavailable incentive to shift demand from peak times</li> </ul>
<b>Ancillary services</b>	<ul style="list-style-type: none"> <li>Full participation from DER</li> </ul>	<ul style="list-style-type: none"> <li>increase the value of flexible load</li> </ul>
	<ul style="list-style-type: none"> <li>Localised as well as national ancillary services</li> </ul>	<ul style="list-style-type: none"> <li>allow DER to fully participate in the ongoing security and reliability of the grid at the distribution level</li> </ul>
<b>Technology support</b>	<ul style="list-style-type: none"> <li>Optimised support mechanisms</li> </ul>	<ul style="list-style-type: none"> <li>sufficient subsidy is available to ensure that distributed generation, both renewable and conventional, is economically and financially viable, but marginal enough (in line with the economics of the technology) to need to compete to provide the flexibility and other services necessary for active networks to become a reality</li> </ul>
	<ul style="list-style-type: none"> <li>Targeted support for DER</li> </ul>	<ul style="list-style-type: none"> <li>where new technologies require support in the early stages of development</li> </ul>

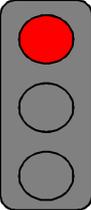
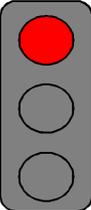
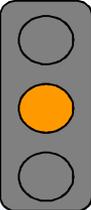
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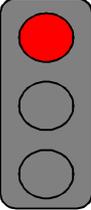
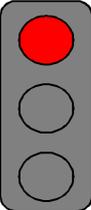
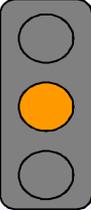
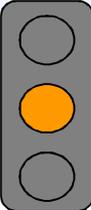
# Spain: Barriers and recommendations for distribution networks

We identified key features of distribution network design, operation and regulation in Spain, identified barriers to FENIX, and developed recommendations for change

	Key current features	Barriers to FENIX	Recommendation/solution	
<b>Regulated revenues</b>	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	
<b>Invisibility of DG to the DSO</b>	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)	
<b>Network design</b>	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	
<b>DER control</b>				

# GB: Barriers and recommendations for distribution networks

The first area where we have identified barriers to the Fenix concept and made recommendations for change is in the framework used to regulate distribution networks

	Key current features	Barriers to Fenix	Recommendation/solution	
<b>Regulated Revenues</b>	Distribution network revenues are based on their regulated asset base	Implicit incentive to build more assets means that active network management is only used where there are administrative or cost barriers	Regulators must allow DSOs to benefit when they use active network management where this is appropriate rather than capital expenditure	
<b>Government Support</b>	Innovation Funding Initiative (IFI) has had success in promoting innovation and popular with DNOs	The focus is more on measures to connect DER to the network as opposed to integrating it into the network	Funding arrangements should focus more on promoting DER integration so that the benefits of DER can be fully exploited	
<b>Network Design</b>	Networks are often designed to maximize profit in the short term and do not take into consideration potential benefits from DG	The regulator or industry groups do not provide any longer term framework on network design	DSOs should not be required to guarantee physically firm access to all DG, and must be allowed to use lean network design methodologies	
<b>DNO Power Trading</b>	DNOs are not permitted to trade in or contract for electricity in order to support the network	DNOs must rely on constructing a network that can withstand any likely flows	Regulators must allow DNOs to reward generators for contributing to active network management	

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# General regulatory recommendations...

Area	Requirements	Detail
<b>Distribution network revenue regulation</b>	<ul style="list-style-type: none"> <li>Allow DNOs to benefit when they use active network management</li> </ul>	<ul style="list-style-type: none"> <li>Regulatory regimes must be devised that allow network owners to benefit when they increase the economic efficiency of their networks by substituting operational expenditure for capital expenditure</li> </ul>
	<ul style="list-style-type: none"> <li>Appropriate network unbundling</li> </ul>	<ul style="list-style-type: none"> <li>It is imperative that measures introduced to ensure a level playing field between users of distribution networks do not prevent DER from cooperating with network operators to the degree necessary for them to participate in active network management schemes</li> </ul>
<b>Metering and communications</b>	<ul style="list-style-type: none"> <li>Smart metering with real-time communication</li> </ul>	<ul style="list-style-type: none"> <li>Unless smart meters have the capacity for real-time communication with a third party agent and DER, using common protocols, then these meters will represent a barrier rather than an enabler to the implementation of VPPs</li> </ul>
	<ul style="list-style-type: none"> <li>Interoperable smart metering</li> </ul>	<ul style="list-style-type: none"> <li>In order to allow freedom for DER to choose between different VPPs, it will be necessary to ensure that common standards for interoperability exist in advanced communication and metering functions</li> </ul>
	<ul style="list-style-type: none"> <li>Reduce use of demand profiling</li> </ul>	<ul style="list-style-type: none"> <li>Infrequent meter reading and the profiling of demand prevents the majority of consumers from observing and responding to anything other than long-term changes in electricity prices</li> </ul>

# General regulatory recommendations...

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Area	Requirements	Detail
<b>Ancillary services</b>	<ul style="list-style-type: none"><li>No unjustified barriers to distributed generators' equal participation in ancillary services markets</li></ul>	<ul style="list-style-type: none"><li>Where not already in place, introduce market based mechanisms for procuring ancillary services</li><li>Remove arbitrary limits on service providers and ensure VPPs can participate</li></ul>
<b>Subsidies for renewable energy generation and CHP</b>	<ul style="list-style-type: none"><li>Support mechanisms must allow generators to benefit from ancillary service provision through VPPs</li></ul>	<ul style="list-style-type: none"><li>In designing support mechanisms, ensure that revenues available to renewable generators and CHP are not reduced when it is economically beneficial for them to contribute to the provision of system or ancillary services</li></ul>

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