VHPready and OpenADR Coexisting in the Smart Grid – Position Statement

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During the last decade two mayor initiatives with significant impact on traditional energy systems and networks have started: back in 2010, after several years of research the **OpenADR alliance** has been created in the U.S. as a reaction to the California electricity crisis. Just about 2 years ago, back in 2014 the **industry alliance VHPready** has been founded in Germany in order to ease the integration of renewables into the energy supply system. Both initiatives experienced great market acceptance indicated by a rapid growth with respect to member companies (member count 02/2016: OpenADR: 140, VHPready 44).

Due to the fact that OpenADR and VHPready have evolved from different starting points and with different main objectives, there is a huge potential for alignment and synergies in order to reach the common vision to facilitate the global deployment of market accepted standards in order to reduce the cost of providing and consuming energy, while improving energy reliability and reducing environmental impact.

Both developments cover the management of decentralized technical units comprising energy production systems, storage units / batteries and consumption units / loads. While OpenADR concentrates on price-signal driven demand-response programs, VHPready currently focusses on certified control mechanisms to provide balancing power ("control reserve") and to participate in electricity trading e.g. at the European Energy Exchange.

Open Automated Demand Response (**OpenADR**) provides a non-proprietary, open, standardized DR interface that allows electricity providers to communicate DR signals directly to existing customers using a common language and existing communications such as the Internet. OpenADR is a public domain standard to communicate price and reliability signals in order to adjust supply and demand of electricity.

While in the past the energy grid was basically a unidirectional distribution network, where most energy is generated in bulk and transported using large transmission lines and smaller distribution networks the future smart grid will face a completely different situation. More and more households have e.g. a solar panel, a wind turbine, an electric car or a micro CHP and turn into "prosumers", producing and consuming energy. This means clean energy and less addiction to fossil fuels but it also causes unpredictable supply and demand on the edges of the electricity grid with increasing potential for imbalances that can cause a blackout.

Of course you could increase the capacity of the power lines but a more effective way to solve the problem is by using Demand Response (DR) or by pooling energy assets into a Virtual Power Plant. Both methods make use of flexibilities that the consumer and/or the energy systems resp. have in order to minimize the mismatch between supply and demand.

While OpenADR relies on decentralized decisions being stimulated mainly by prize signals VHPready is based on a control room running the operator specific VPP control software (the “brain”) and interacting with the remote technical units being qualified to participate in the respective VPP.

VHPready (*Virtual Heat and Power ready*) has been started with the ultimate goal to substantially contribute to the Energiewende by simplifying the large scale integration of renewables into the energy system. VHPready specifies the integration of various types of energy systems like CHPs, batteries, solar panels, wind turbines and heat pumps to form an integrated network which can be remotely steered from a central control room resulting in a virtual power plant. Building those virtual power plants is one approach to integrate renewables into the energy system and harmonize the production and consumption of electrical and thermal energy, in particular helping out with balancing the fluctuations caused by solar and wind power to reduce the strain on the electricity transmission grid and contribute to system stability.

VHPready adopts the security requirements being stated by the German TSOs and therefore includes state of the art mechanisms for encryption, key management, authentication, integrity, availability, confidentiality, closed user groups and nonrepudiation. The basic transmission technology is based on TCP/IP secured by VPN and Transport Layer Security (TLS 1.2) and for message exchange VHPready uses IEC 60870-5-104 or IEC 61850-7-420 protocols. A comprehensive data point list defines parameters (names, types, values) for various types of energy systems and allows to implement VHPready compliant systems which have to pass a certification procedure currently being developed in order to be part of a virtual power plant based on VHPready.

Industry alliance VHPready and OpenADR alliance have started discussions about cooperation and mutual support in further developing open, industry-driven standards for the smart grid. A joint white paper explaining details is currently in preparation.

Industrieforum VHPready e.V.
EUREF-Campus 13
Torgauer Str. 12-15
10829 Berlin | Germany
phone: +49 30 3988 4445
www.vhpready.de

Contributors:
Rolf Bienert (OpenADR)
Thomas Luckenbach (VHPready)
Klaus-Dieter Walter (SSV)
Bartholomäus Wasowicz (E.ON)

OpenADR Alliance
275 Tennant Avenue, Suite 202
Morgan Hill, CA 95037 | USA
phone: +1 408 778 8370
www.openadr.org