

## Communicate Easily on the Smart Grid – via VHPready

The open industrial standard makes it easier to connect power generators and consumers in virtual power plants. WAGO controllers already meet the requirements of the new specification.

Virtual power plants are one solution to manage fluctuating electricity generation from solar plants and wind turbines: decentralized generators such as combined heat and power plants and controllable power consumers such as heat pumps are combined in a flexible, controllable network. Its intelligent interaction then ensures that the load on the electrical network is lightened.

But it is difficult to merge different systems, as all participants speak different languages and are not able to easily communicate with each other. WAGO telecontrollers are the answer: They meet the requirements of the VHPready (Virtual Heat and Power) industrial standard and thus ensure trouble-free connection of systems in the virtual power plant. The current version of the specification is VHPready 4.0. It combines control and communication within the virtual power plant and as a virtual interpreter, ensures that control centers and systems understand each other.

VHPready standardizes the objects and variables of different communication protocols and explicitly declares them. Instead of a system-specific set of variables, which was previously the case, VHPready communicates via predefined profiles using explicitly defined data point lists. In addition to communication, domain-specific definitions, like the specifications of operating behavior and reaction times, are also defined. This enables the possibility of controlling systems with schedules and timetables. Thus, the control center can transmit control parameters to a system for a time period of 24 hours as a command/set/message/file/.

### Versatile System Managers

Power suppliers such as Vattenfall and the Trianel public utility are already using WAGO telecontrollers based on VHPready in their virtual power plants because it is crucial for companies that



Many systems, one language: With VHPready, electrical generators, storage devices and consumers can easily communicate with each other.

controllers are programmable and flexible and that communication is achieved based on IEC 60870-5-104 or IEC 61850. The compact and modular telecontrollers from WAGO also offer an enormous variety of protocols, such as PROFIBUS, CAN, BACnet or MODBUS. Thus, they can be used in the virtual power plant as gateways for most of the technical units used in the field. By using digital and analog input and output modules, as well as more than 500 additional function modules, WAGO can guarantee the complete management of the system controls of a virtual power plant.

Data security plays a central role. With VHPready version 4.0 or higher, the IEC 60870-5-104 telecontrol protocol or another TCP/IP based, object oriented approach per IEC 61850-7-420 is the communication basis for WAGO telecontrollers. To ensure the security of data transmission, the controllers establish a virtual private network (VPN) based on OpenVPN with SSL/TLS connections (Secure Sockets Layer, Transport Layer Security). SNTP/NTP (Simple Time Protocol/Network Time Protocol)

are used for time synchronization. The WAGO controller can establish a VPN tunnel via OpenVPN or IPsec directly in order to transmit encrypted data to the control center and receive the same from there as well. Thus, WAGO not only meets IT security requirements for network operators, but also enables strengthening of the system according to the requirements of the BDEW white paper.