

# **Passt Corporation GmbH**

## **Professional Services**

**Addressee:**                    *Stakeholders –*  
*<UNDISCLOSED COUNTRY'S> ELECTRICITY*  
*MARKET*

**Consultancy Topic:** *Provision of Ancillary Services in a liberalized Energy*  
*Market Environment*

**Our Reference:**            *REP-xxx\_1\_0/xx*

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## Proprietary Note

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## Revision History

Version	Date	Remarks
V 1.0	19/03/14	Initial, submitted and approved Version

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## 1. Introduction

In accordance with the Treaty Establishing the Energy Community signed in October 2005 and under consideration of the respective national energy law, <UNDISCLOSED COUNTRY> is obliged to open its electricity market to all actual and potential consumers by <MONTH> <YEAR>.

One of the various crucial pre-requisites to be taken care of while establishing a liberalized energy market environment is the timely introduction of a legal framework as well as the implementation of respective operational facilities, which do secure a regulated and efficient provision of ancillary services. Those services are supposed to be provided by the generation companies (→ here <UNDISCLOSED UTILITY> and other Independent Power Producers), which are connected to the electric power system and eligible (in terms of generation capacities, power ramping capabilities, process control facilities, IT subsystems & features, etc.) to actively participate in the ancillary service markets.<sup>1</sup>

Independent of the applicable national grid code, ancillary services can be generally defined as ...:

- Frequency Control (Primary Control)
- (Remote) Automatic Generation Control (→ Secondary Control) & potentially also Tertiary Power Control
- Spinning Reserves
- Standing Reserves
- Black Start Capacity
- Secondary Voltage and Reactive Power Control

The availability and provision of ancillary services are necessary in order to compensate the discrepancies between

- ... the forecasted power balances and the respective generation schedules determined / committed during the planning stage, (i.e. before closure of day-ahead and/or spot market, respectively), and
- ... the real time power balance.

Well known reasons for these potential discrepancies are ...:

- Uncertainties on the consumption side potentially leading to the non-applicability of the load forecast values, which have been used e.g. in the frame of day-ahead planning.
- Contingencies in the form of the unplanned non-availability of a major generation unit.
- Highly volatile power generation by renewable energy assets (→ e.g. wind parks).

In order to ensure a reliable operation of the <UNDISCLOSED COUNTRY'S> electric power system (despite those inadvertent effects) also in the future in a liberalized energy market environment, the TSO (→ <UNDISCLOSED UTILITY> in its role as Transmission System Operator) will have to optimally use the then available ancillary services. The respective activities to be performed by the dispatchers and the back-office of <UNDISCLOSED UTILITY'S> will be facilitated by the functions and features of the installed SCADA/EMS system.

In the following chapters it will be comprehensively summarized on a high-level, which general activities are to be initiated as early as possible in order to get timely prepared for a well-defined and efficient introduction of ancillary service in electricity markets. Based on that high-level description, detailed documents (in form of business plans, work flows, technical descriptions, checklists, forms, etc.) are to be prepared in order to exhaustively specify all related matters.

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<sup>1</sup> It is well understood that there won't be highly mature ancillary service markets at the initial phase; however, even in an early phase after the establishment of a liberalized electricity market environment, these services need to be provided by registered companies, which are to be paid based on provided physical amounts and defined price schemes.

## **2. Certified Provider of Ancillary Services**

The partners of contractual agreements concerning the provision of ancillary services are the generation companies on one side and the TSO on the other side. In order to secure that only qualified generation companies (→ GenCo's) are participating in ancillary service markets, the interested GenCo's have to apply for becoming certified as official provider of ancillary services. Therefore, it ought to be available (e.g. within the Grid Code or as part of the market Rules) an official specification of related organizational and technical pre-requisites, so that any applicant will be able to verify in advance whether or not it can comply with the stipulated requirements.

### **2.1 Application**

Once a GenCo has internally verified that it could qualify for becoming a certificated provider of one or more ancillary services, the TSO needs to be involved accordingly. This is regularly done by filling in and submitting a publicly available application form, which will provide the TSO with basic data related to the applicant and its preferences in terms of types and proposed sources of ancillary services to be potentially offered.

Based on a preliminary evaluation of the legal, organizational and operational abilities of the applicant, TSO either initiates the next step or declines the application.

### **2.2 Certification**

Once TSO has formally accepted the applicant as potential future participant of one or more ancillary service market(s), the certification process is to start. The certification is either done by an institution (authorized by Energy Act) or by a Class IEC 17020 certified & accredited testing company.

In any case, the goal of this step is to check the ability of the proposed power plant(s)/unit(s) to provide the selected ancillary services. The tests are made as per the methodology and acceptance criteria that are specified in the Grid Code and/or other relevant and/or in form of testing procedures established by the TSO.

The certification should also comprise the verification that the tested generation plant(s)/unit(s) are equipped with the facilities to properly process and exchange data (→ statuses, alarms, set-points, measurements, counter values, reports, files, etc.) with the SCADA/EMS system of the TSO.

If all tests performed by the testing company are successfully passed, each and every unit tested gets certified for the specific ancillary services to be provided.

### **2.3 Contractual Agreement**

Following the technical certification, the GenCo and the TSO sign the agreement(s) for the corresponding ancillary service. It is obvious that the respective agreements should be also based on well elaborated and generally accepted templates.

### **3. Provision of Ancillary Services**

#### **3.1 Operational Reporting**

In order to report the amounts and delivery times of the committed and actually provided ancillary services, a report is to be sent periodically by every generation plant/unit for each ancillary service. These reports might be sent as files, whose type, structures and contents have to comply with the format that can be read, interpreted and further processed by the TSO. These reports are sent to the TSO each day by e-mail.

In the best case, these files can be automatically generated and periodically sent to TSO by the Distributed Control Center (→ DCS) software deployed in the generation plant(s)/unit(s). However, it could happen that a plant/unit specific DCS software is not able to produce such reports or send automatically respective e-mails, e.g. because they are not open to web for safety reasons or for other reasons, respectively. As it is absolutely crucial that the formats and point in time for sending these text files are 100% compatible with the respective TSO software, it can be recommended to the respective GenCo's to look for readily developed products, which communicate with the deployed DCS to acquire the data, prepare the reports and send the e-mail to TSO (without jeopardizing the security of the DCS).

#### **3.2 TSO Software**

The reports sent by the GenCo's (per generation plant/unit and per ancillary service) are to be received, interpreted and processed by TSO. The TSO's SCADA/EMS software is supposed to check the quality of the corresponding ancillary service(s). It shall be able to perform a comparison of the realized plant/unit response with regard to generation set-point changes and grid frequency/voltage changes.

#### **3.3 Operational Controlling and potential Ramification**

The aforementioned TSO specific SCADA/EMS software module is to be used by the responsible engineers in order to systematically compare committed versus provided ancillary services. Afterwards, the quality and accuracy of the provided services are to be analyzed in terms of volumes, response times and sustainability. In case of any serious discrepancies found for the corresponding ancillary service, the respective GenCo may be not paid and/or subject to penalties as defined in the official ancillary service agreement signed by the parties.

#### **3.4 Performance Assessments**

In addition, it is recommended that TSO is performing periodically assessments to proactively ensure the sustainability of a high quality delivery of ancillary services. These assessments can be done in form of

- Performance Audits (→ auditing resource performance after contingency runs) and/or
- Compliance Tests (→ unannounced tests after performance audit or independently conducted),

which do generally consist of respective mechanics/procedures (→ frame work defining test environment, testing criteria, means to ensure accuracy of test results, etc.) and defined ramifications / rescissions of committed payments/benefits.