Market Access for Smaller Size Intelligent Electricity Generation (MASSIG)

Position paper about improving the organization of the German Minuten reserve market

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Abstract:
In the EU-project MASSIG, http://www.iee-massig.eu/, the goal is to promote and increase the participation of small scale power producers in the Electricity Spot Market and the Electricity Balancing Markets.

During the work in this project it has become apparent that the German Balancing Markets are differently organized as the Danish Balancing Markets. The consequence is that the competition is low and it is not easy for small scale power producers to participate in the German Balancing Markets. The result is that in Germany too much money is needed for its balancing tasks.

In this paper three proposals are made, that will promote the participation of small scale power producers in the German Minuten Reserve market, thus increasing the competition in this market. In this paper is estimated, that the three proposals will save Germany an amount of at least 160 Mill. €/year for providing balancing tasks. The proposals will be used in a dialogue with the four German Transmission Systems Operators about improving the organization of the German Balancing Markets.

Contents

1 Introduction

In this paper we have limited ourselves to three proposals for improving the organization of the German Minuten reserve market which will increase the participation of small scale producers in this market.

Badenova WÄRMEPLUS´s 6 MW-Combined Heat and Power-plant in Freiburg-Weingarten is used to illustrate the importance of these proposals for improvements. We estimate that implementing our proposals will allow this CHP-plant to increase its participation in the German Minuten reserve market and increase its profit.

Figure 1: Badenova WÄRMEPLUS´s 6 MW-Combined Heat and Power-plant in Freiburg-Weingarten

The plant delivers around 68.000 MWh-heat per year to a district heating system with about 25.000 consumers. The thermal store is 360 m^3.

In Figure 2 is shown a simulated operation in one week in the Spot Market of this CHP-plant. The challenge is to produce electricity in hours with high spot prices and store the produced heat in the thermal store. In the hours in which the CHP-units are not in operation, they will be offered as Positive Minuten reserve. In the upper graph is shown the spot market prices for electricity, in the next graph is shown the produced heat and the heat demand. In the third graph is shown the produced electricity and in the lower graph is shown the content in the thermal store.

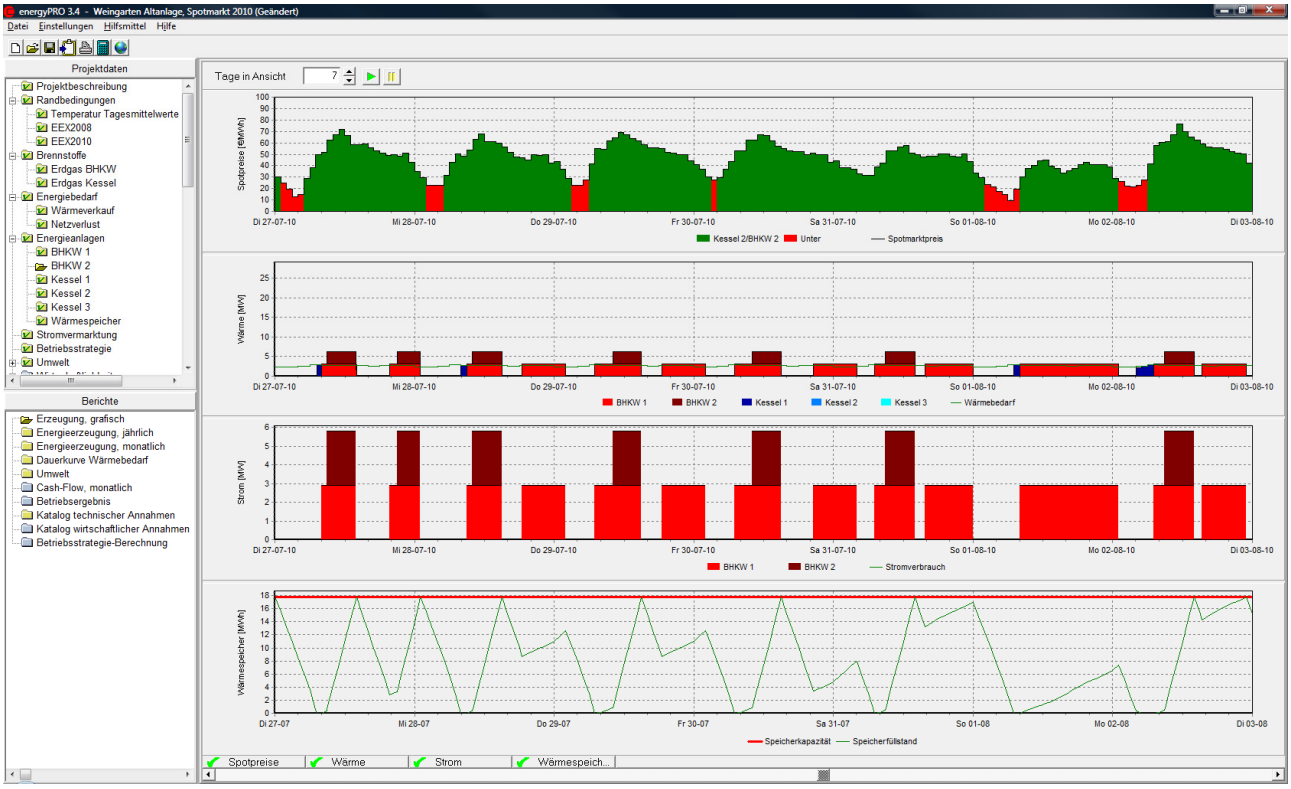

Figure 2: Simulated operation in the Spot Market of Badenova WÄRMEPLUS´s 6 MW-Combined Heat and Power-plant in Freiburg-Weingarten.

2 Proposals about improving the German Minuten reserve market

2.1 Changing "Arbeitspreis" closer to the operating hour

In Denmark it is allowed to change the activation price (Arbeitspreis), up to ¾ of an hour before the operating hour.

It is important to be allowed to do the same in Germany. Two examples why:

Example 1:
When planning the biddings for tomorrow for Weingarten (see Figure 2), we could decide to offer 12 hours of spot market operation and 12 hours of Minuten reserve, but leave no place in the thermal store for being activated in Minuten reserve (a high Arbeitspreis is offered). Tomorrow it becomes colder than expected and the heat demand goes up. The 12 hours of spot market operation is not enough to cover the heat demand. The thermal store will be emptied and it is necessary to start the gas boiler. In this situation it will be important to be able to lower "Arbeitspreis" to win activation in the Minuten reserve market, thus avoiding starting the gas boiler.

Example 2:
When planning the biddings for tomorrow for Weingarten (see Figure 2), we could decide to offer 12 hours of spot market operation and 12 hours of Minuten reserve, and leave some place in the thermal store for being activated in Minuten reserve. If the CHP-units tomorrow are activated more than expected, the thermal store will be filled and it will be necessary to cool away heat. It would be important to be able to rise "Arbeitspreis" in the hours, where we have to cool away the heat.

2.2 Offering activation even if having not won Minuten reserve

Even if not having won offered Minuten reserve, it is in Denmark allowed to make an "Arbeitspreis"-bid and to be activated.

It is important to be allowed to do the same in Germany. Two examples why:

Example 3:
For a plant participating in the Spot market and the Regulating power market, the Minuten reserve bid for tomorrow are made before the Spot market bid. That makes it complicated to offer Negative Minuten reserve, because offering Negative Minuten reserve requires that the generator is running, but at the time of the Minuten reserve bid it is not yet known, if the Spot market bid will be won. But if it is allowed as it is in Denmark to make an "Arbeitspreis"-bid closer to the operating hour and without having won Minuten reserve, it will be known if the generator is running, so that downward regulation can be offered. E.g. if we have won 12 hours of spot market operation and it becomes warmer tomorrow than expected, then the thermal store will

be filled and the CHP-units are not able to produce in all these 12 hours. In this case it is important to be allowed to offer downward regulation, so that the plant does not have to pay for imbalance.

Example 4:
Even if the plant has not won Minuten reserve, it would be important to be allowed to be activated in Minuten reserve of the same reasons mentioned in example 1.

It is to be noticed, that in Denmark Negative Minuten Reserve Leistung is virtually not bought by the TSO, probably because it is in Denmark allowed to maintain the "Arbeitspreis"-bid and to be activated as downward regulation even if not having won Minuten reserve. It seems as if the Danish TSO are confident that enough will offer downward regulation, even if the TSO has not bought downward regulation capacity. If the same will be true in Germany, we estimate that it will save Germany an amount of 160 Mill. €/year.

Saved money for buying Negative minuten reserve		
Average bought Negative minuten reserve	1825	MW
Average Leistungsprice for Negative minuten reserve	10	€/MW/stunde
Estimated yearly payment for Negative minuten reserve	160	Mill. €/year

2.3 Increasing the Minutenreserve share of the balancing tasks

The balancing markets are divided into three markets, Primary reserves, Secondary reserves and Minuten reserve market.

The fast and automatic markets Primary reserves and Secondary reserves are very expensive for the TSO´s and due to technical reasons these markets are difficult for small scale power producer's to participate in. It is easier for small scale power producer's to participate in Minuten reserve.

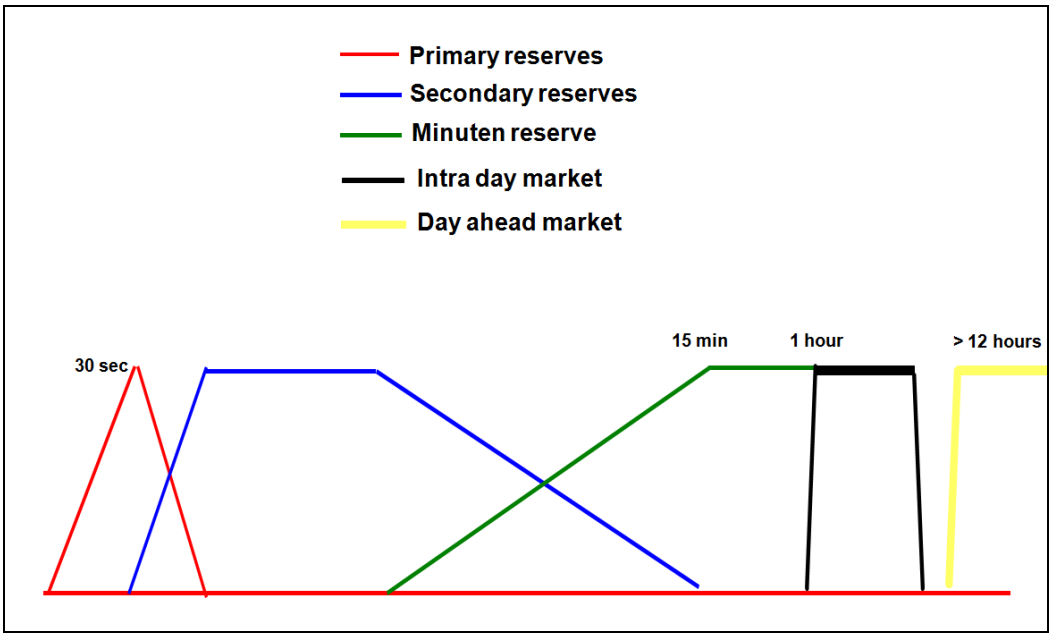

Figure 3: The balancing markets are divided into three markets, Primary reserves, Secondary reserves and Minuten reserve market.

UCTE determines how much Primary Reserves each TSO has to deliver.

But it is to be noticed that in Germany the TSO´s buys more than half of the remaining balancing capacity as expensive Secondary reserves. In Denmark less than a fifth of the remaining balancing capacity is bought as Secondary reserves. We estimate, that if increasing the Minutenreserve share of the balancing tasks in Germany, Badenova WÄRMEPLUS´s 6 MW-Combined Heat and Power-plant in Freiburg-Weingarten would increase its participation in the German Minuten reserve market and increase its profit.

	Positive Secondary Reserves (Sekundärreserve)	**Positive Tertiary Reserves (Minutenreserve)**
Germany	2955 MW	3054 MW
West Denmark	90 MW	513 MW

Sources:
http://www.bundesnetzagentur.de/media/archive/14513.pdf
http://www.energinet.dk/da/menu/Systemdrift/Systemydelser+for+el/Systemydelser+for+el.htm