AGGM Austrian Gas Grid Management AG

Report on the quality of SLP forecasts for the 2015/16 gas year

Pursuant to Commission Regulation (EU) No. 312/2014 Art. 42 (3) on establishing a Network Code on Gas Balancing of Transmission Networks

Table of contents

1 Introduction

Pursuant to Article 42 (3) of the Balancing NC Regulation, a report on the accuracy of the forecast of a network user's non-daily metered withdrawals shall be published at least every two years.

In accordance with the Gasmarktmodell-Verordnung (Gas Market Model Ordinance) 2012, AGGM draws up SLP forecasts for each supplier on a daily basis. The figures are calculated according to the balance group coordinator's requirements and are based on the data supplied by the distribution system operators.

In this report, the consumption forecasts submitted to the balance group representatives are compared with the daily consumption data from the second clearing. Since the meters of consumers are read only once per year, the daily consumption data is calculated ex post based on the actual temperatures and the SLP profile of the respective metering point. In addition, a synthesis factor is determined which is used to balance the consumption calculated based on the profile and the actual annual consumption. As a result of this method for calculating daily data, deviations of the forecast may be due to the following:

- error in temperature forecasts;
- inappropriate SLP parameter;
- the fact that all forecasting models can only provide an estimation.

1.1 Forecasts using standard load profiles

The importance of the standard load profiles' parameters is best illustrated using the sigmoid function's formula and its graphical representation.

1.1.1 Sigmoid function of standard load profiles

$$h(\vartheta_a) = \frac{A}{1+\left(\frac{B}{\vartheta_a - \vartheta_{a0}}\right)^C} + D$$

Figure 1: Source: www.agcs.at/agcs/clearing/lastprofile/lp_studie2008.pdf

1.1.2 Graphical representation of the sigmoid function

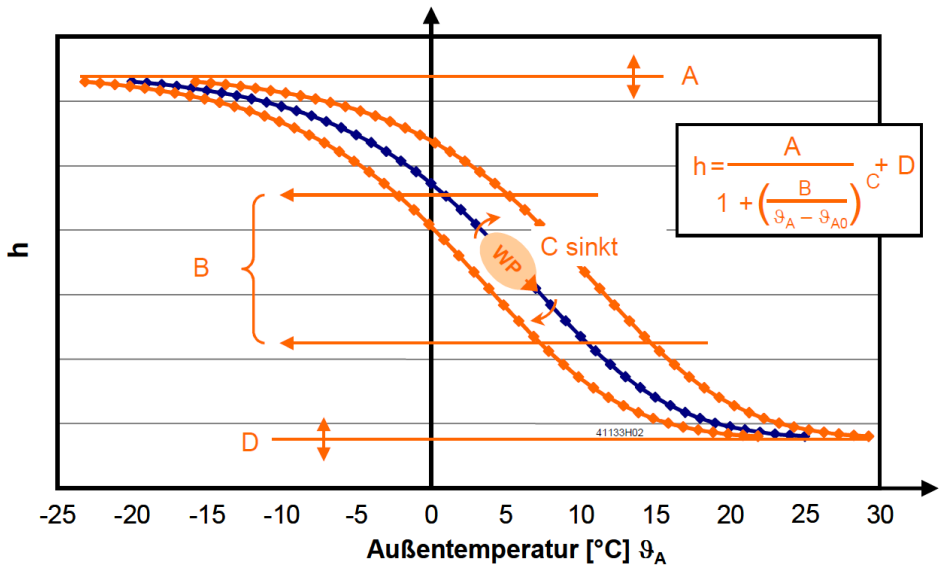

Figure 2: Source: www.agcs.at/agcs/clearing/lastprofile/lp_studie2008.pdf

Parameter D causes a vertical shift of the sigmoid function and thus can be used to define the base load in the summer (in case of high outside temperature).

1.2 Formulas and abbreviations used

Actual SLP consumption: *VBIst(i),i = 1,365(366)*

SLP forecast: *VBProg(i),i = 1,365(366)*

Annual consumption: *VBJahr* = $\sum_{i=1}^{365(366)} VBIst(i)$

Deviation: *Abw(i) = VBist(i) – VBProg(i)*

Relative deviation: *AbwRel(i) = Abw(i) / VBIst(i)*

Accumulated negative deviations:

AkkMinAbw(j) = $\sum_{i=1}^{j} Min(Abw(i).0)/VBJahr$, *j = 1,365(366)*

Accumulated positive deviations:

AkkMaxAbw(j) = $\sum_{i=1}^{j} Max(Abw(i).0)/VBJahr$, *j = 1, 365(366)*

1.3 Basis for comparison

The charts below are based on the following data:

- the last SLP forecasts for a particular day;
- and the SLP consumption from the second clearing.

2 Eastern market area

The graph shows the sum of consumption and forecast values of all suppliers of the Eastern market area's distribution systems.

2.1 Consumption vs. forecast

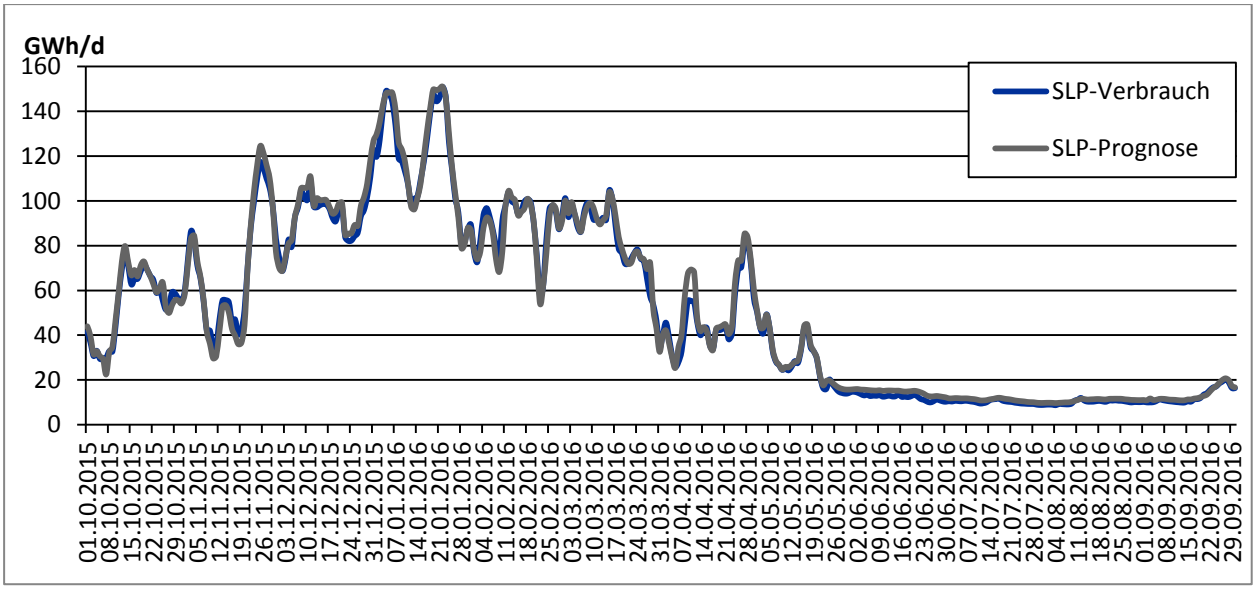

Figure 3 - Consumption and forecast in the Eastern market area

In this figure, the sum of consumption values is compared with the sum of SLP forecasts. The accuracy of the forecast is almost as good as in the gas year of 2014/2015.

2.2 Forecast deviations

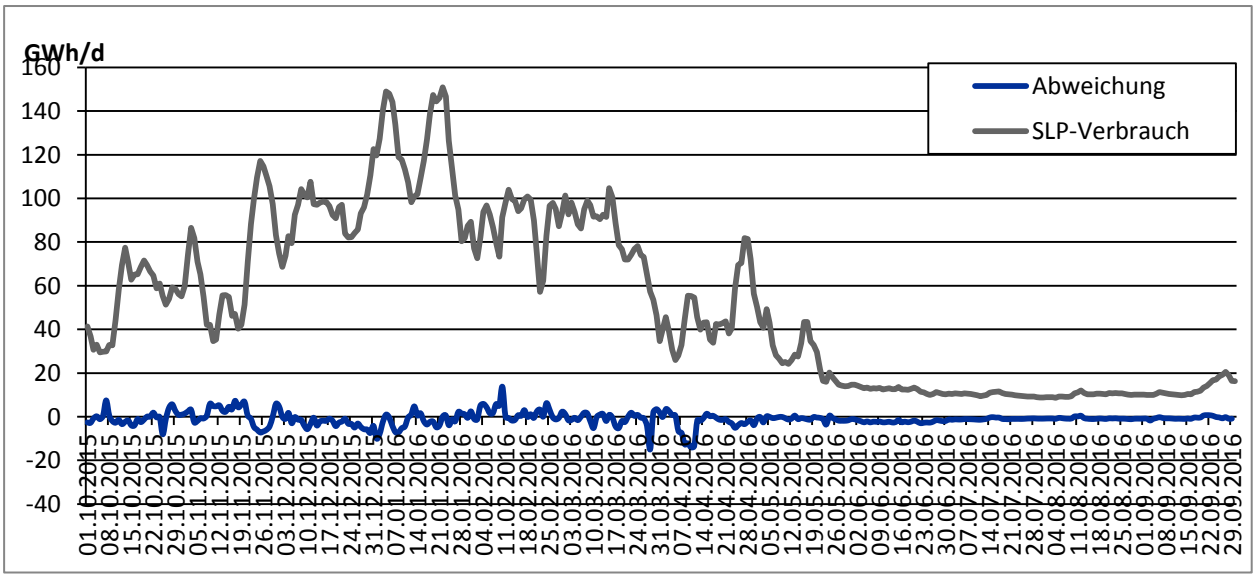

Figure 2 - Consumption and deviations in the Eastern market area

This figure shows SLP consumption and deviations of the forecasts.

2.3 Relative deviations of forecasts

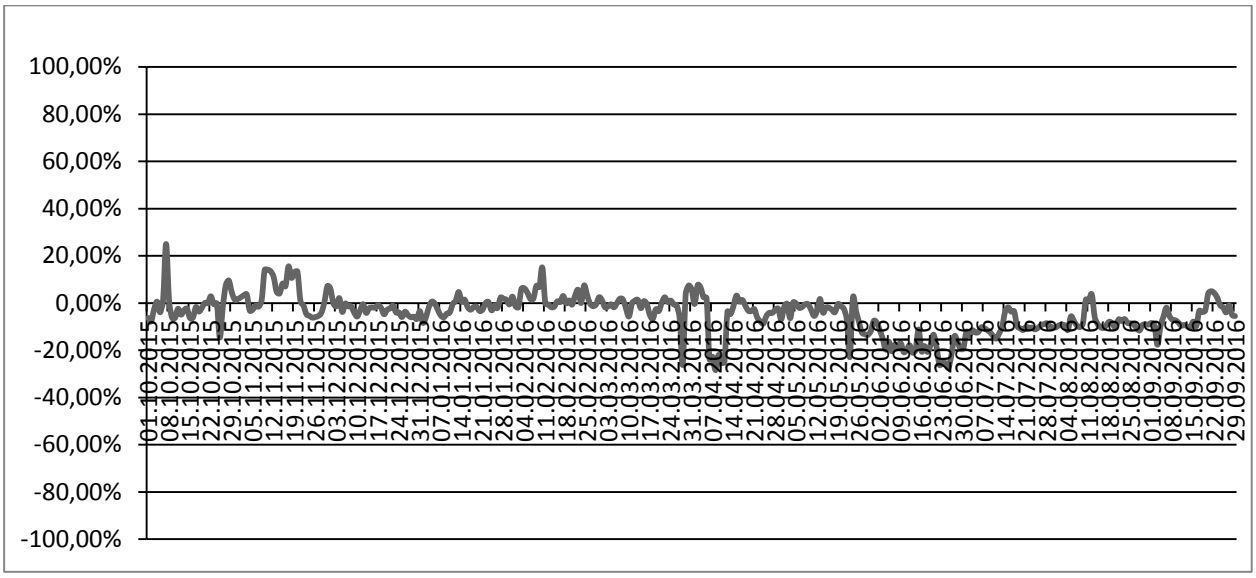

Figure 3 - Relative deviations of forecasts in the Eastern market area

Similar to the 2014/2015 gas year, the relative deviation tends to be greater during the warm seasons of the year.

2.4 Accumulated relative deviations of forecasts

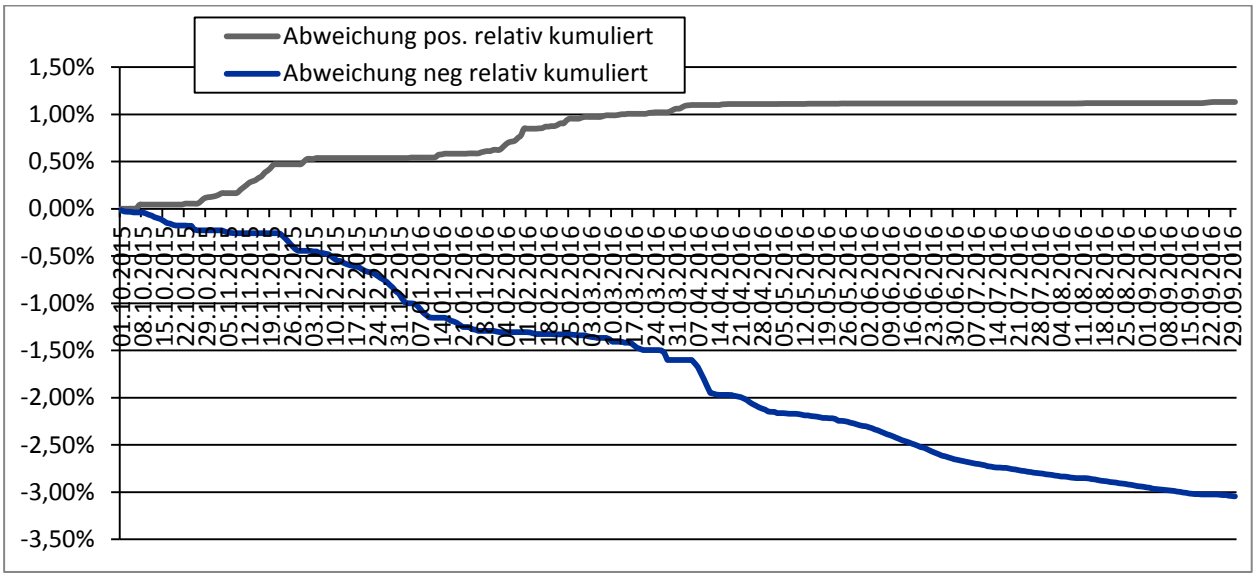

Figure 4 - Accumulated relative deviations in the Eastern market area

The figure shows the positive as well as the negative relative deviation between consumption and forecasts, accumulated over the entire gas year. The percentages indicate positive and negative balancing energy costs for SLP customers' supply. However, when looking at a period of several days, positive and negative deviations tend to offset each other during the winter; while the deviations in the summer are almost always negative. The difference between the positive end value of 1.1 per cent and the negative end value of -3 per cent, though, is almost as low as in the 2014/15 gas year.

2.5 Conclusion

As in the 2014/15 gas year, the SLP forecasts compared to actual SLP consumption were very accurate over the aggregate consumption volumes of all suppliers in the Eastern market area's distribution systems.

3 Tyrol market area

The graph shows the sum of consumption and forecast values of all suppliers in the Tyrol market area. The forecasts are drawn up by TIGAS-Erdgas Tirol GmbH and made available to the balance group representatives by AGGM.

3.1 Consumption vs. forecast

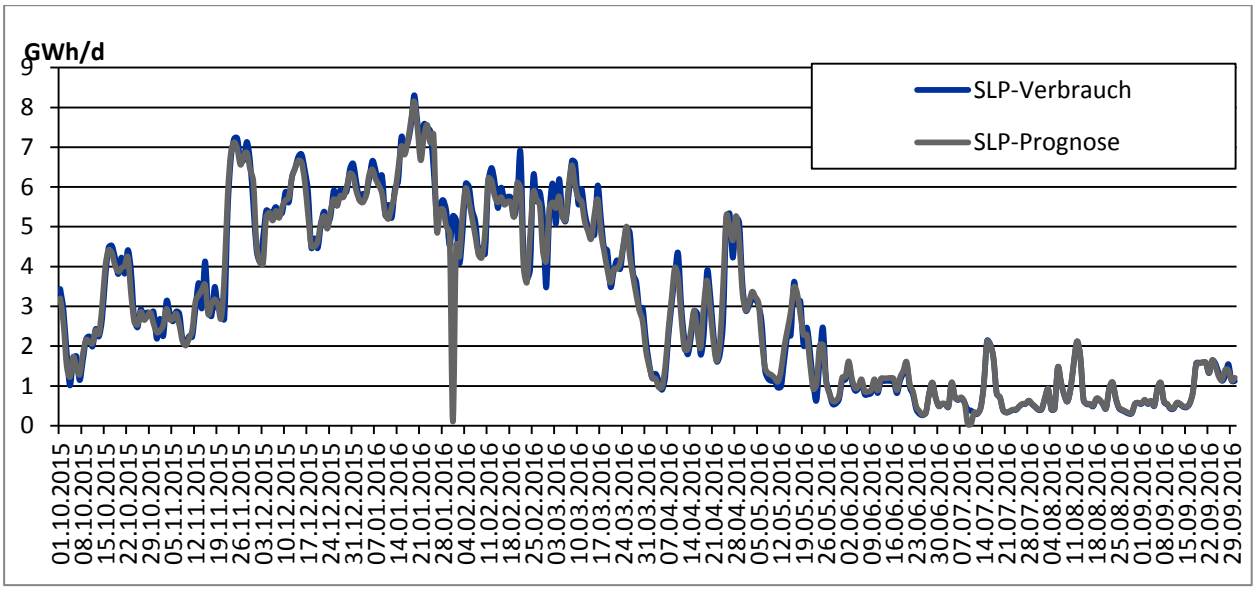

Figure 5 - Consumption and forecast in the Tyrol area

This year's results are similar to those of the previous year. However, the daily peak load of this gas year amounted to 8.3 GWh while last year's daily peak load was at 7.9 GWh. Due to lacking data on one day in February and July, respectively, the forecast was defective, which explains the two peaks in the relative deviations (see Fig. 7).

3.2 Forecast deviations

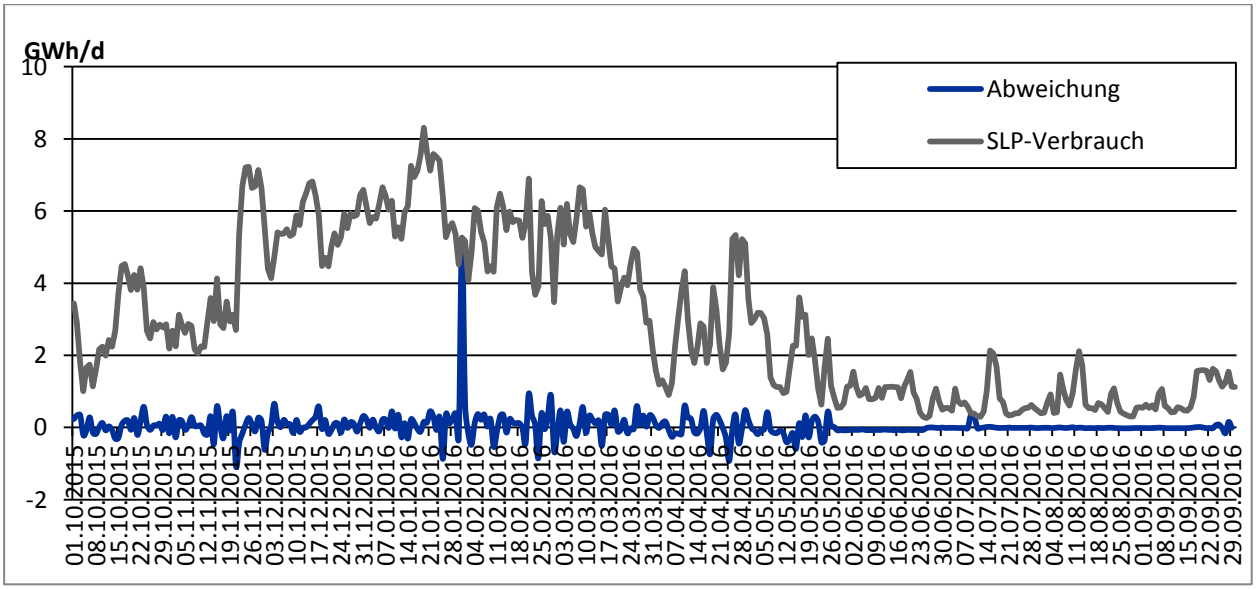

Figure 6 - Consumption and deviation in the Tyrol area

3.3 Relative deviations of forecasts

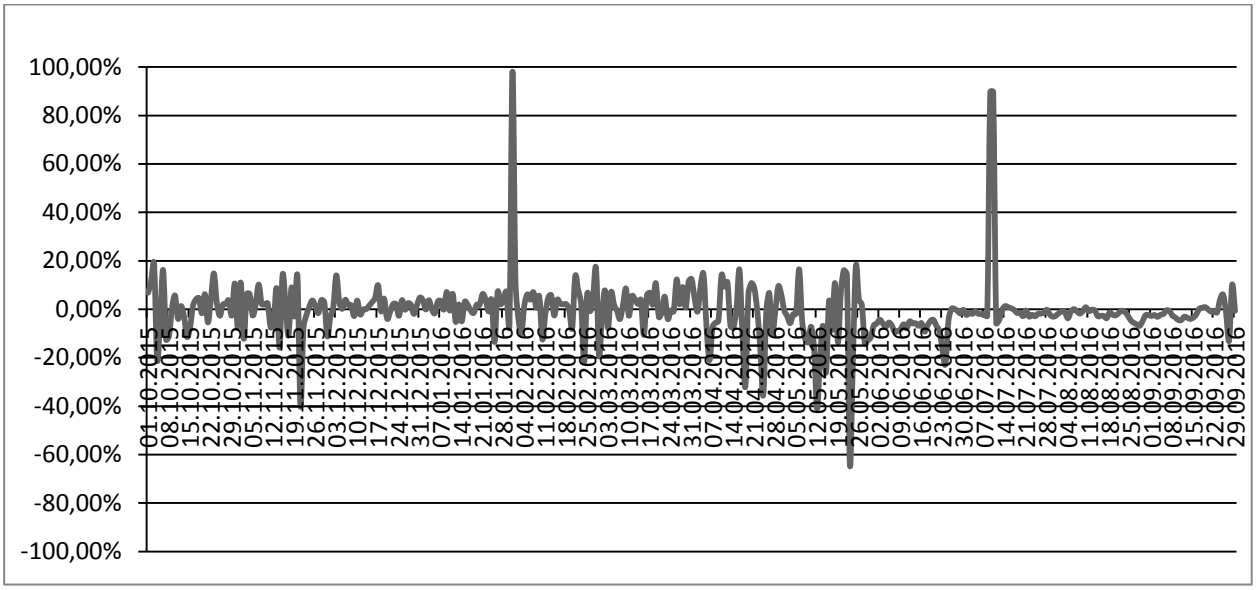

Figure 7 – Relative deviations in the Tyrol area

3.4 Accumulated relative deviations of forecasts

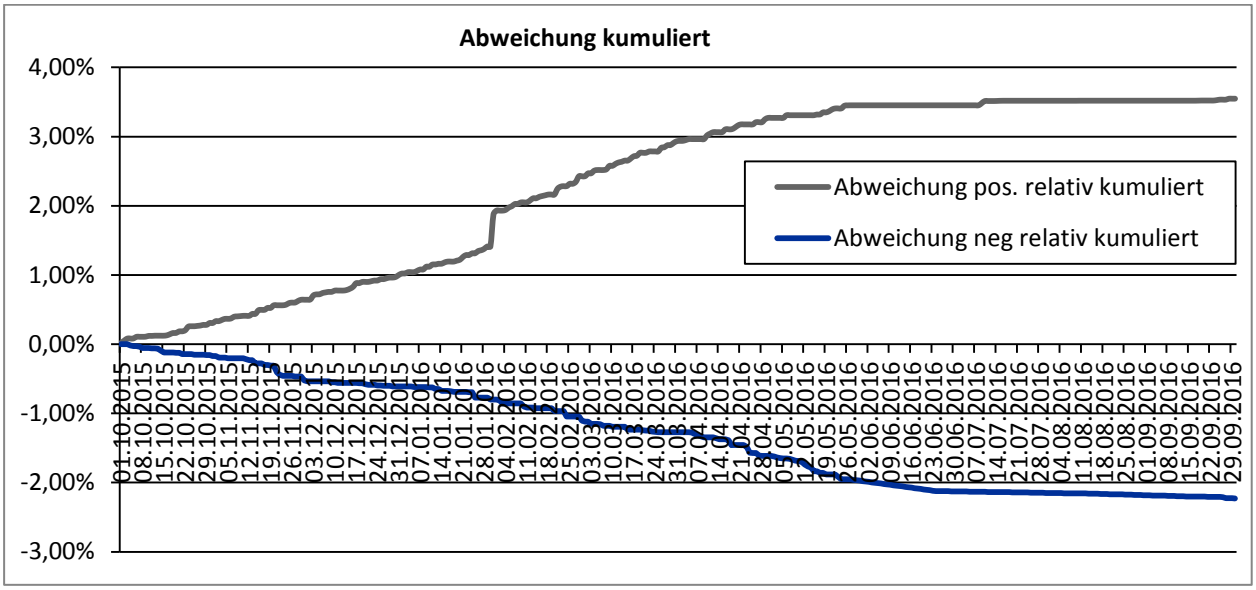

Figure 8 – Accumulated relative deviations in the Tyrol area

The relatively strong ascent of the curve of accumulated positive deviations on the left-hand side of the figure results from generally lower forecasts compared to actual consumption during the winter. As opposed to Fig. 4, which shows the relative deviations in the Eastern market area, the accumulated deviations illustrated in Fig. 8 increased only slightly in the summer.

3.5 Conclusion

Relative deviations appear to be balanced both in the winter and in the summer when looked at over a period of several days. However, the curve of relative deviations shows greater

fluctuations in the winter than in the summer. This is due to the fact that the forecasts strongly depend on outside temperatures and temperature forecasts may be imprecise.

4 Vorarlberg market area

The graph shows the sum of consumption and forecast values of all suppliers in the Vorarlberg market area.

4.1 Consumption vs. forecasts

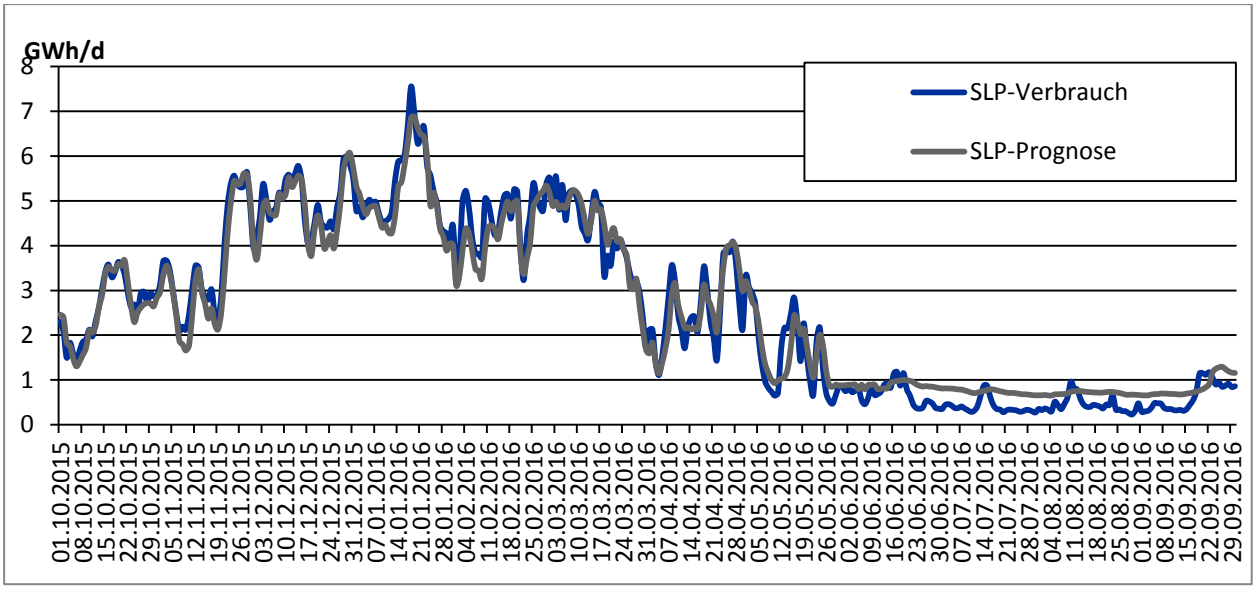

Figure 9 – consumption and forecasts in the Vorarlberg area

As in the 2014/15 gas year, the SLP forecasts are almost always higher than SLP consumption during the summer. This deviation could be reduced by adjusting parameter D of the sigmoid function.

4.2 Forecast deviations

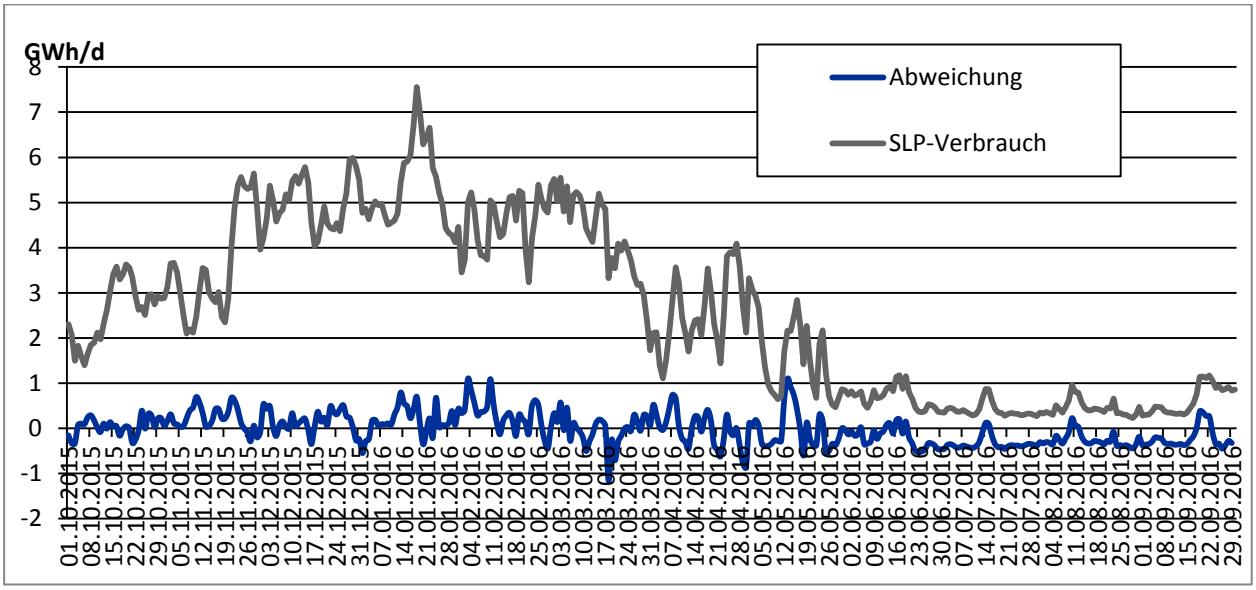

Figure 10 – Consumption and deviations in the Vorarlberg area

4.3 Relative deviations of forecasts

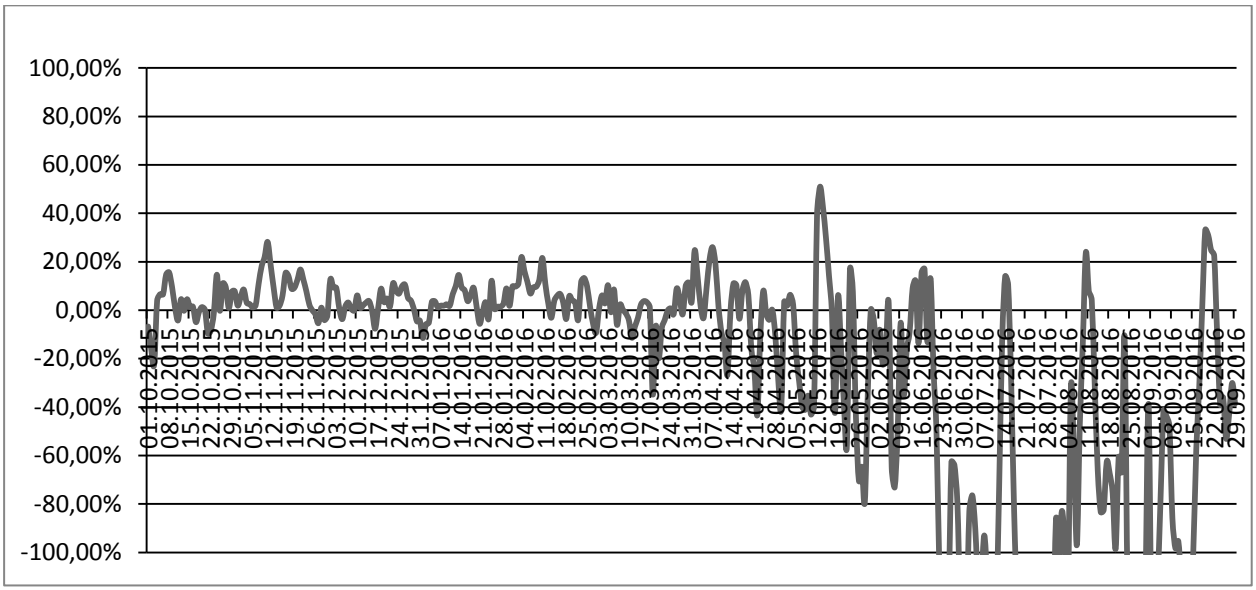

Figure 11 – Relative deviation in the Vorarlberg area

This figure clearly illustrates the fact that SLP forecast values are much too high during the summer months.

4.4 Accumulated relative deviations of forecasts

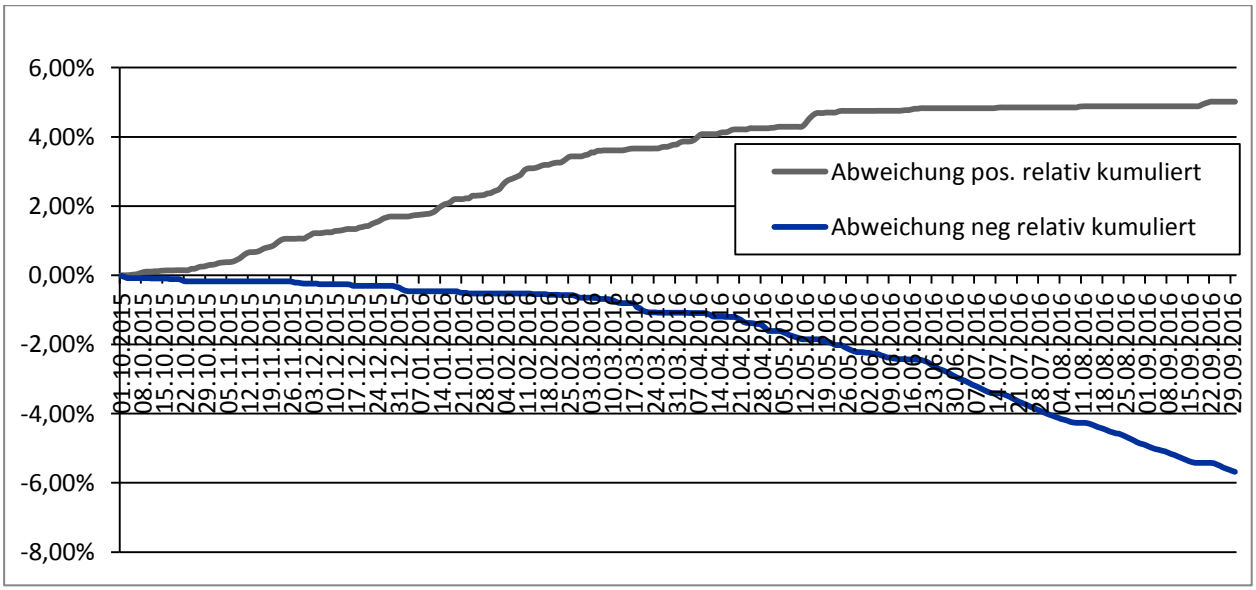

Figure 12 – Accumulated relative deviations in the Vorarlberg area

4.5 Conclusion

During the summer months, the SLP forecast values deviate considerably from actual SLP consumption, but the generally low consumption values in the summer months result in big relative deviation values. The deviation over the whole year remains within the range of +/-5 per cent. Nevertheless, an adjustment of the sigmoid function's parameters should be considered.