Study on Gas Balancing
Project commissioned by E-Control

Presentation of Final Results

Christian Hewicker, Benedikt Schuler, Bert Kiewiet

Vienna, February 2, 2012

Experience you can trust.

Agenda

- Background
- Hourly vs. daily balancing: the suppliers' point of view
- Technical feasibility of daily balancing
- Cost of daily balancing
- Potential competition effects
- Conclusions

Background

Current changes in the European and Austrian legal framework require further development of the balancing system

- Framework guidelines require a transition to daily balancing at transmission level, subject to within-day restrictions where necessary
- Revised Austrian Natural Gas Act (GWG) from December 2011 demands:
  - Primary procurement of balancing gas at the VP, (partially) replacing the current use of a separate balancing mechanism at the distribution level
  - Harmonization of balancing arrangements at transmission and distribution level
- KEMA has been commissioned by E-Control to study the technical and economic feasibility of daily balancing
- Results are based on simulations of the Austrian gas network plus analysis of the economic impact on BRP and system operators (MGM / VGM)

Agenda

- Background
- Hourly vs. daily balancing: suppliers' point of view
- Technical feasibility of daily balancing
- Costs of daily balancing
- Potential competition effects
- Conclusions

Daily Balancing: Suppliers' Point of View

Costs of different approaches for imbalance settlement vs. costs of daily structuring

- In balancing systems with hourly and/or cumulative restrictions, shippers have two possibilities for structuring their diurnal profile:
  - Creation of diurnal profile by their own means;
  - Partial or full structuring by means of balancing gas
- To illustrate the effects of different approaches for imbalance settlement , we compare the potential costs of both alternatives below
- In parallel, we consider the effects of different models on the costs of individual customers and supply portfolios (including the costs for imbalances and/or diurnal structure)

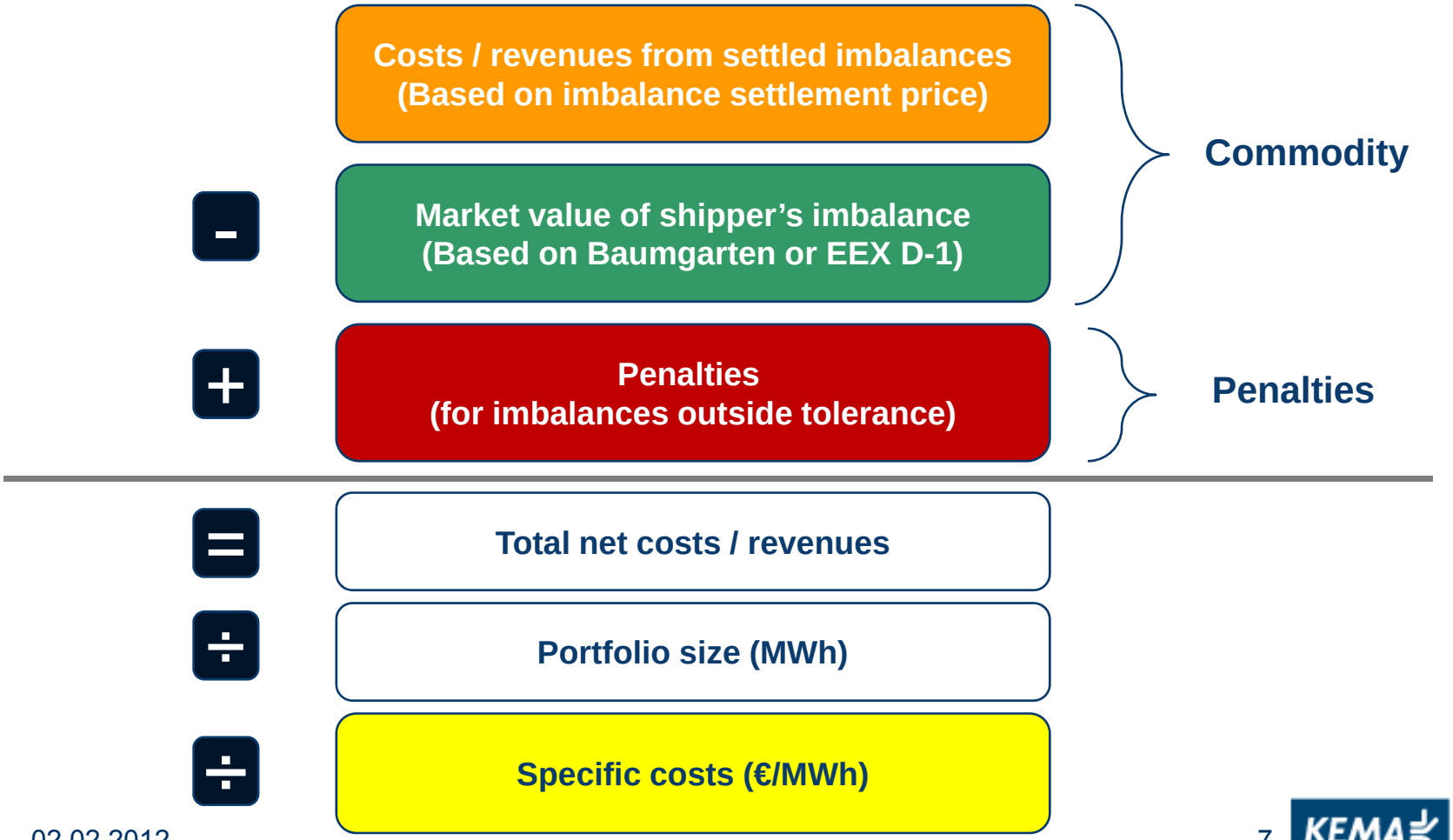
Analysis of Basic Balancing Models

In our comparison, we consider the two basic models (i.e. daily vs. hourly balancing) in three variations

Basic Balancing Model			
Basic model	**Tolerances**	**Penalty**	**Basic Imbalance Price**
Hourly balancing	-	-	1. Historic (AGCS) 2. Baumgarten D-1 ±3 €/MWh a) Based on system error b) 2 price system
Daily balancing	a) - b) Hourly (1%,3%,5%) c) Cumulated (0%,5%,10%)	- 10% of imbalance price 10% of imbalance price	2 price system: Highest or lowest price at EEX Within-day market

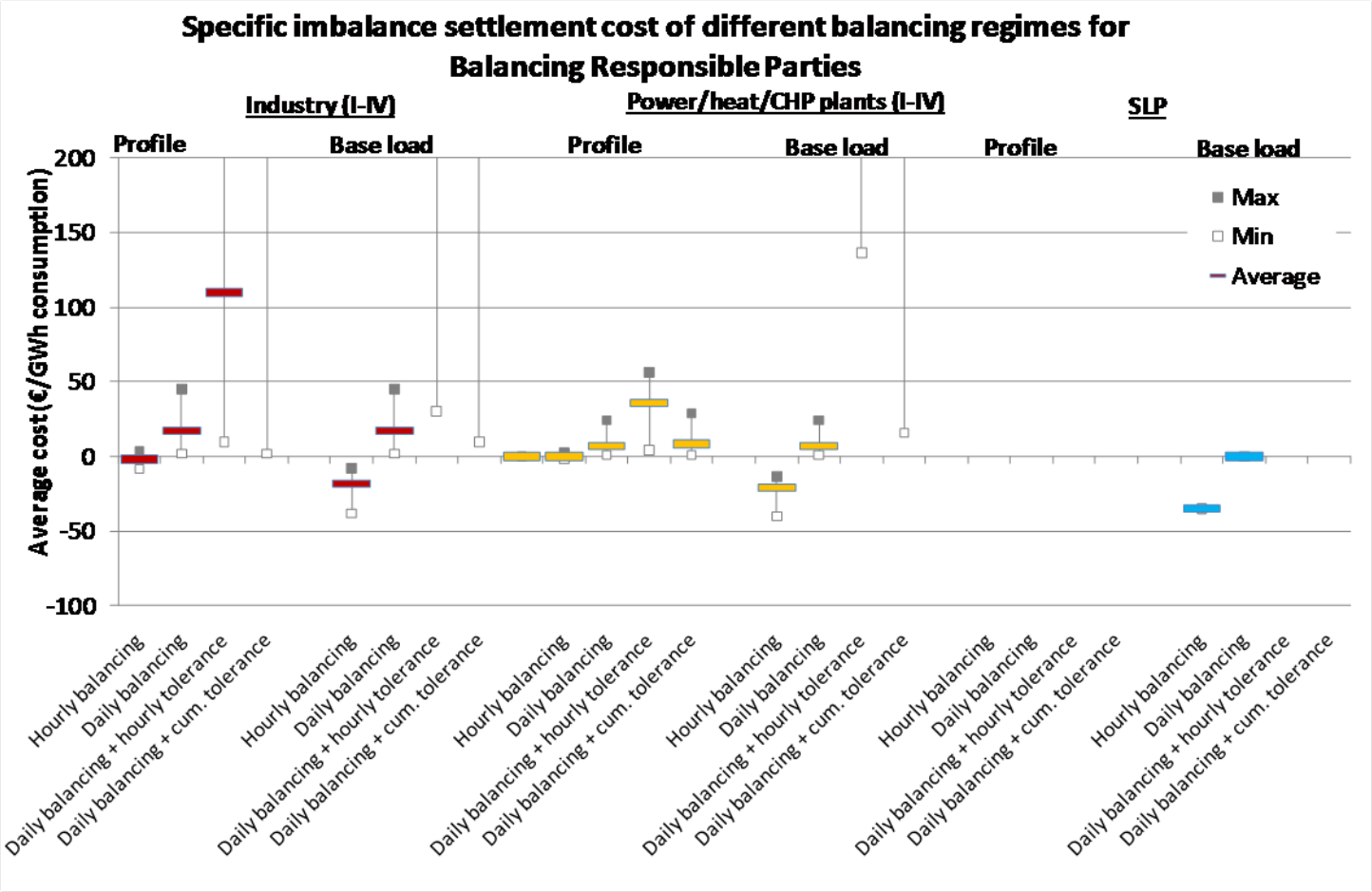
Analysis of Basic Balancing Models

Assessment of different models considers costs of imbalance settlement as well as market value of imbalances



Daily Balancing: Suppliers' Point of View

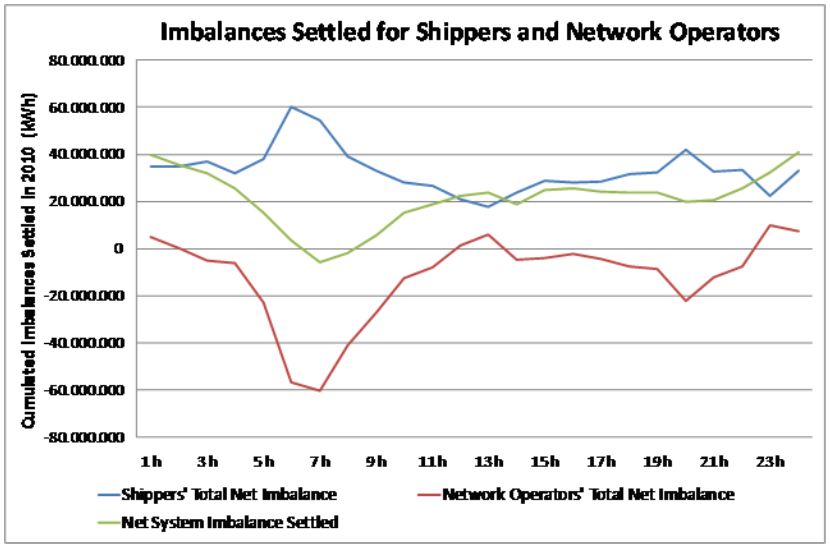
Current system of hourly balancing generally results in low costs and may even lead to net revenues for shippers

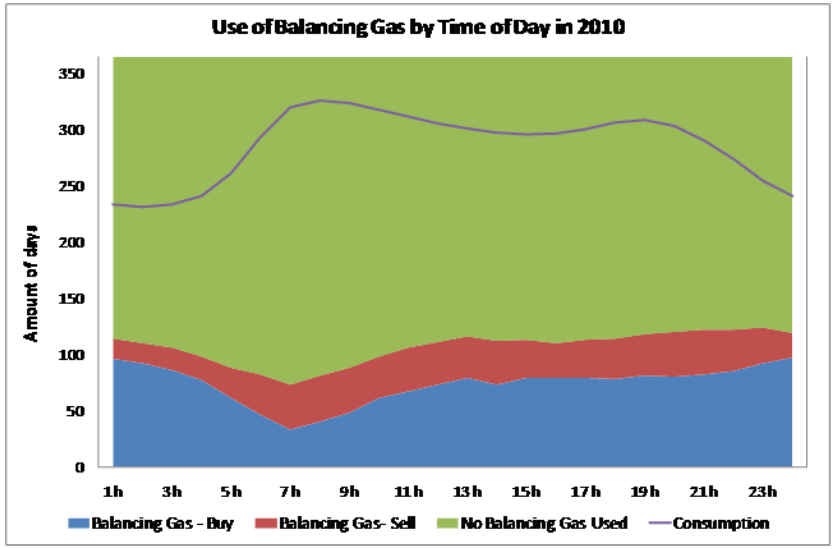


Daily Balancing: Suppliers' Point of View

Limited costs in current system are caused by structural errors in standard load profiles and determination of imbalance prices

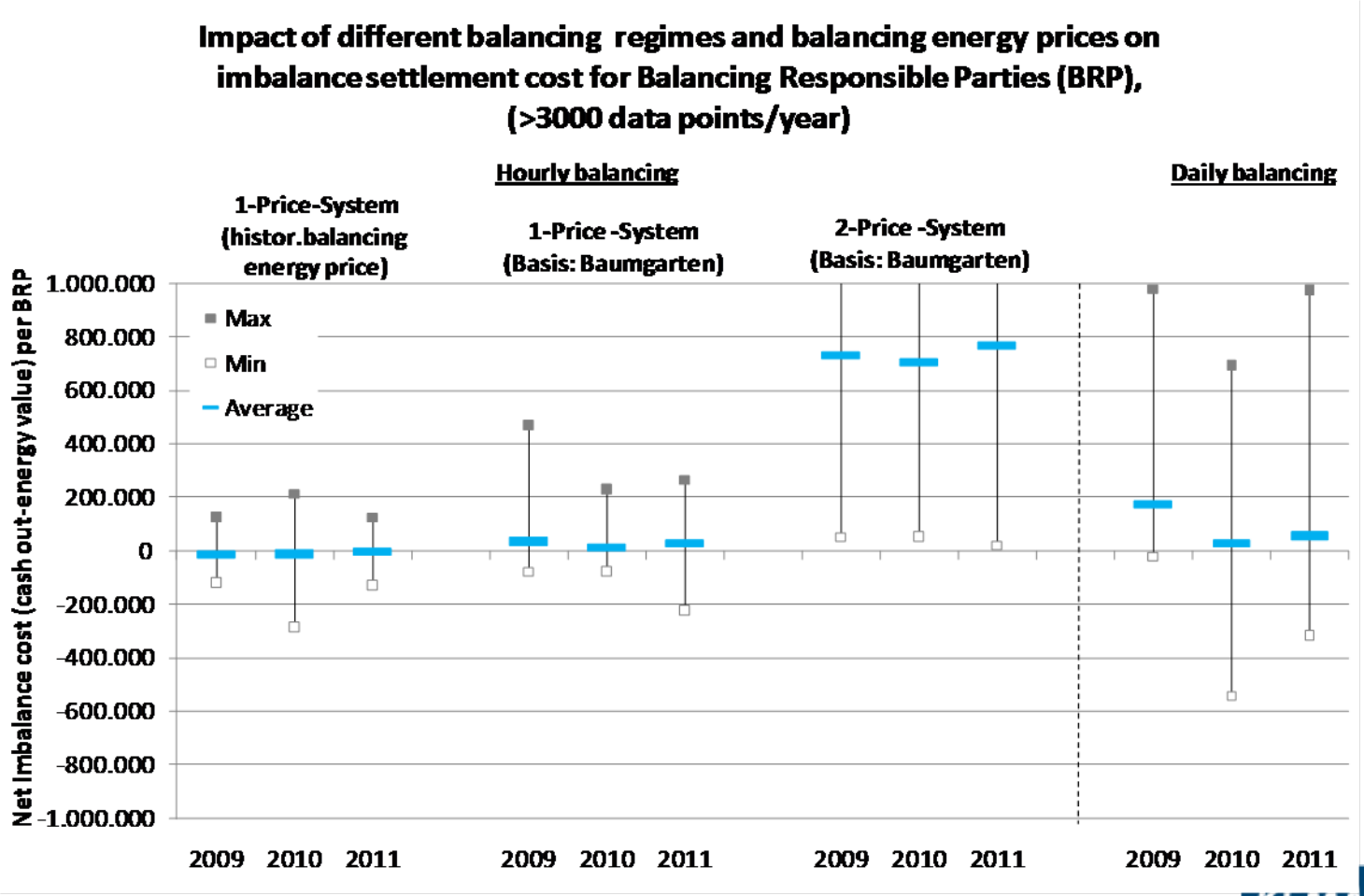
- Balancing groups of network operators clearly show structural errors in the standard load profiles, with peak load being significantly overestimated on average
- Coupling of imbalance settlement price to the aggregate imbalance of network operators and infrequent use of balancing gas enable shippers to "procure" balancing gas at favourable prices and at low risk





Daily Balancing: Suppliers' Point of View

1 price system for imbalance settlement remains favourable even under different assumptions on the pricing of imbalances



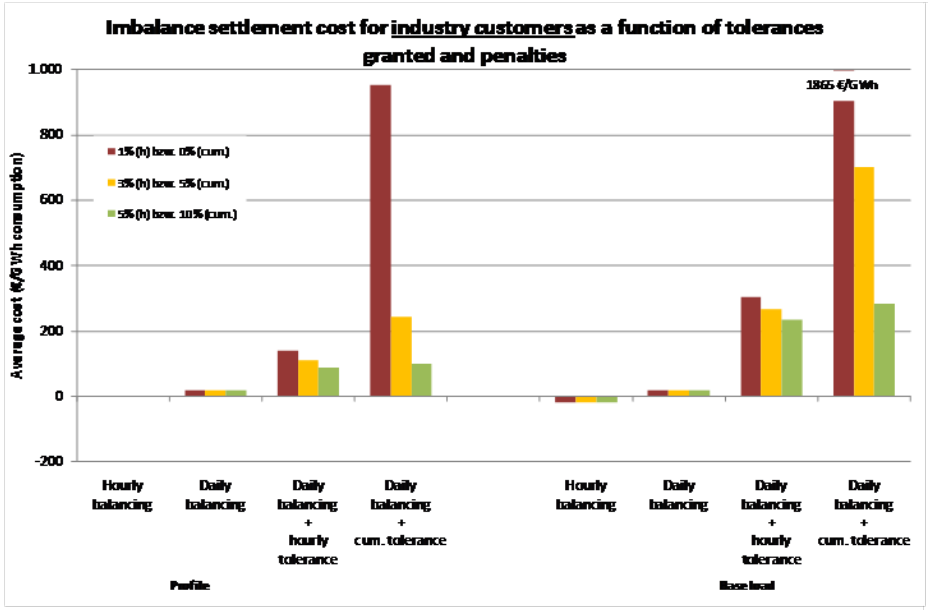
Daily Balancing: Suppliers' Point of View

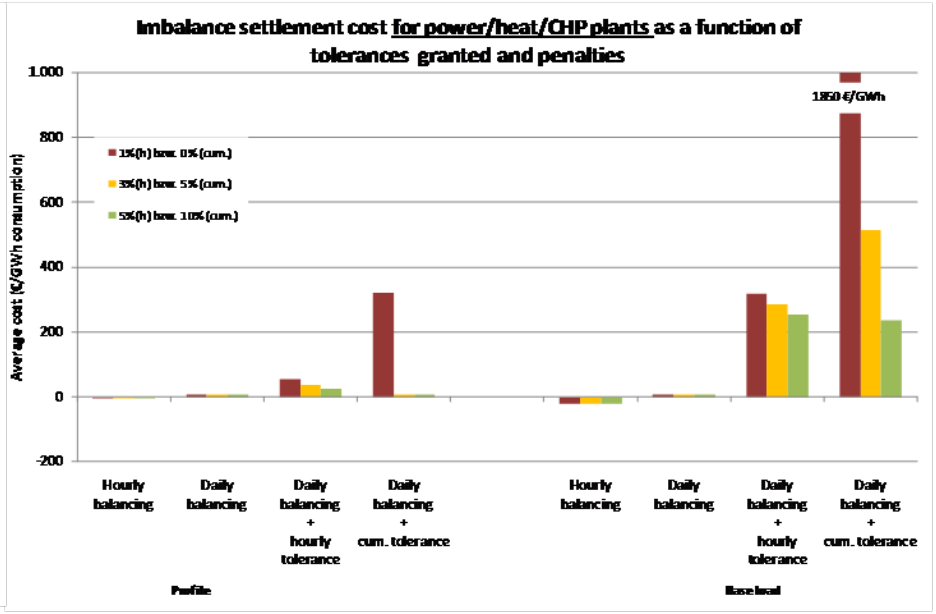
Principle of marginal pricing appears as a critical element when changing to a system of daily balancing

- Costs of imbalance settlement in present system with hourly balancing and 1 single imbalance price are regularly lower or comparable to the costs of daily balancing with marginal pricing
- Transition to hourly balancing with 2 price system (as required by FG Gas on Balancing for the settlement of daily imbalances) would result in much higher costs
- In contrast, the use of a 1 price system would reduce the costs of daily balancing as well
- Application of hourly and/or cumulative restrictions may result in significant additional costs for shippers (see following slide)

Daily Balancing: Suppliers' Point of View

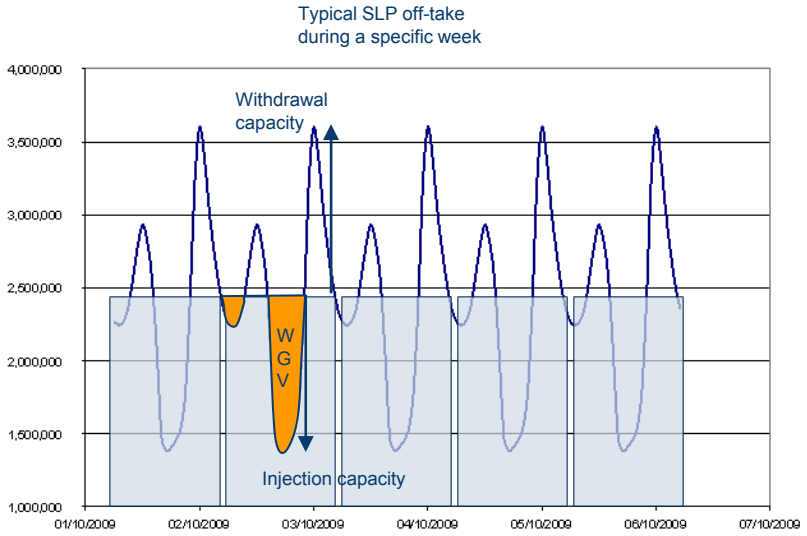
Small tolerances may lead to very high costs for individual customer groups in a system of daily balancing





Cost of Daily Structuring

Assumption: Under hourly balancing, the diurnal profile is generated via unbundled storage products



Consideration of following profiles:

- Standard load profile for heating gas customers
- Process gas smoothed and non smoothed
- 2 shift operations
- Chemical plants
- Steel processing
- Gas fired power plant
- CCGT and heating plants

- Cost for unbundled storage products:
  - Annual product
  - Average cost of storage products Haidach, 7Fields, OMV
  - The respective maximum value of storage requirements over a year is being selected – no monthly optimisation of sub-annual requirements

	Cost for daily storage	
Working Gas Vol	2.53	€/MWh/a
Withdrawal	8,188.1	€/MWh/h/a
Injection	7,282.0	€/MWh/h/a
Grid fees	1,130.0	€/MWh/h/a

Cost of Daily Structuring

Example: Diurnal structuring of single customers

- Consideration of individual off-take
- Cost of diurnal structuring for supplier
- No correction for portfolio effects

Cost for forecast hourly offtake

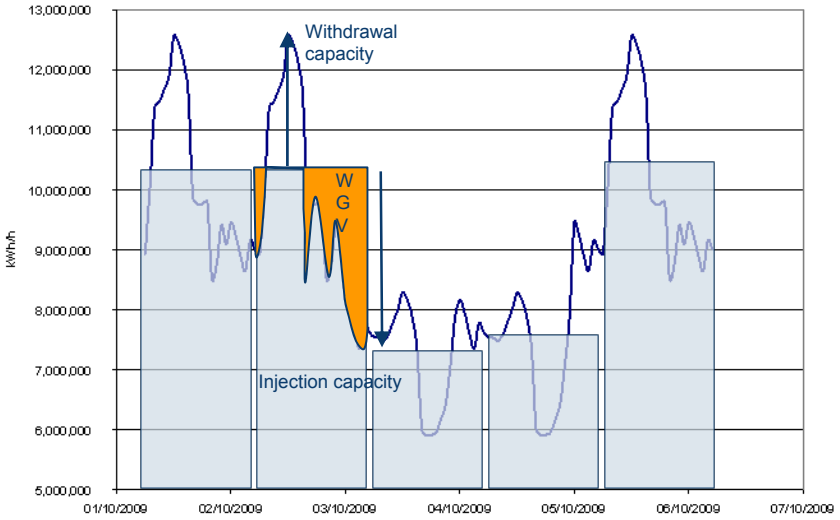
Cost for actual hourly offtake (incl. imbalances)

Specific Cost for within-day structuring	nominal	actual min	actual max	actual average
SLP	1.445 €/MWh	1.266 €/MWh	1.672 €/MWh	1.472 €/MWh
2 Shift	0.663 €/MWh	0.987 €/MWh	1.110 €/MWh	1.040 €/MWh
Process gas LP	0.855 €/MWh	1.472 €/MWh	1.613 €/MWh	1.521 €/MWh
process gas smoothed	0.852 €/MWh	1.259 €/MWh	1.263 €/MWh	1.260 €/MWh
Chemical	0.432 €/MWh	0.400 €/MWh	0.400 €/MWh	0.400 €/MWh
Steel	0.117 €/MWh	0.129 €/MWh	0.129 €/MWh	0.129 €/MWh
Gasturbine	2.665 €/MWh	2.665 €/MWh	2.665 €/MWh	2.665 €/MWh
CCGT	1.784 €/MWh	1.782 €/MWh	1.787 €/MWh	1.784 €/MWh

Based on Monte Carlo simulations

Cost of Daily Structuring

In a similar way, the cost for daily structuring can be calculated for the aggregate portfolio of a supplier



To calculate the cost of diurnal structuring for typical supplies, we consider typical supply portfolios

Portfolio (test)	Energy *TWh/a*
Total Austria	1.82
SLP mixed	1.02
Industry (process)	1.23
Industry (baseload)	2.80
Power generation (GT)	3.97
Power generation (heating plants)	4.06
Industry and power generation I	2.93
Industry and power generation II	3.29

	SLP	2 Shift	Process gas LP	Process gas smoothed	Chemical	Steel	Gasturbine	CCGT
Regional supplier (Typ Austria)	26.0%	15.9%	2.9%	2.8%	14.1%	19.8%	6.2%	12.3%
SLP mixed	69.4%	0.0%	30.6%	0.0%	0.0%	0.0%	0.0%	0.0%
Industry (process)	0.0%	58.8%	0.0%	41.2%	0.0%	0.0%	0.0%	0.0%
Industry (baseload)	0.0%	0.0%	0.0%	0.0%	46.2%	53.8%	0.0%	0.0%
Power generation (GT)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	70.7%	29.3%
Power generation (heating plants)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Industry and power generation I	0.0%	24.5%	0.0%	17.2%	0.0%	0.0%	42.5%	15.9%
Industry and power generation II	0.0%	0.0%	0.0%	11.5%	29.4%	34.3%	24.8%	0.0%

Cost of Daily Structuring

Non-aggregated cost of a portfolio corresponds to the weighted sum of all single off-take profiles.

	Specific cost for within-day structuring			Proportion
	nominal	actual	average	
SLP	1.445 €/MWh	1.445 €/MWh	1.445 €/MWh	26%
2 Shift	0.663 €/MWh	1.022 €/MWh	0.842 €/MWh	16%
Process gas LP	0.855 €/MWh	1.471 €/MWh	1.163 €/MWh	3%
process gas smoothed	0.852 €/MWh	1.471 €/MWh	1.162 €/MWh	3%
Chemical	0.432 €/MWh	0.400 €/MWh	0.416 €/MWh	14%
Steel	0.117 €/MWh	0.190 €/MWh	0.154 €/MWh	20%
Gasturbine	2.665 €/MWh	2.665 €/MWh	2.665 €/MWh	6%
CCGT	1.784 €/MWh	1.784 €/MWh	1.784 €/MWh	12%
Average portfolio structure cost	0.999 €/MWh	1.102 €/MWh	1.050 €/MWh	

Non-aggregated cost of a portfolio

Cost of Daily Structuring

Due to not-synchronous off-takes, there is an overall benefit for a single portfolio as well as for the market

Aggregated cost of a market portfolio

Specific Cost for within-day structuring				
	nominal	min	max	average
Volume	1,814,953,060 kWh	1,773,686,583 kWh	1,866,706,787 kWh	1,818,870,937 kWh
Total cost	€ 1,111,558.89	€ 1,185,677.74	€ 1,266,193.09	€ 1,224,410.78
specific cost	0.612 €/MWh	0.66 €/MWh	0.685 €/MWh	0.673 €/MWh

Correcting customer-specific cost of structuring

	correted cost structure			
factor for correction	61%	60%	62%	61%
	nominal	actual min	actual max	actual average
SLP	0.886 €/MWh	0.866 €/MWh	0.898 €/MWh	0.882 €/MWh
2 Shift	0.407 €/MWh	0.612 €/MWh	0.635 €/MWh	0.624 €/MWh
Process gas LP	0.525 €/MWh	0.881 €/MWh	0.914 €/MWh	0.898 €/MWh
process gas smoothed	0.523 €/MWh	0.881 €/MWh	0.914 €/MWh	0.898 €/MWh
Chemical	0.265 €/MWh	0.240 €/MWh	0.249 €/MWh	0.244 €/MWh
Steel	0.072 €/MWh	0.114 €/MWh	0.118 €/MWh	0.116 €/MWh
Gasturbine	1.634 €/MWh	1.597 €/MWh	1.657 €/MWh	1.628 €/MWh
CCGT	1.094 €/MWh	1.069 €/MWh	1.109 €/MWh	1.090 €/MWh

Cost of Daily Structuring

Depending on its composition, each portfolio has its own cost of diurnal structuring

- Composition based on typical supply portfolios that may develop in a competitive energy market
- Composition varies with regard to the volume of respective off-take profiles
- Hourly structure exclusively created via the storage product

	Min	Max	Average
Portfolio (test)	*€/MWh*	*€/MWh*	*€/MWh*
Total Austria	0.66	0.68	0.67
SLP mixed	1.03	1.14	1.08
Industry (process)	0.92	1.01	0.95
Industry (baseload)	0.24	0.24	0.24
Power generation (GT)	2.41	2.41	2.41
Power generation (heating plants)	1.78	1.79	1.78
Industry and power generation I	1.68	1.71	1.69
Industry and power generation II	0.90	0.91	0.90

Daily Balancing: Suppliers' Point of View

Interim conclusion

- Current system predictably leads to low costs, as long as massive imbalances in the network can be avoided
  (=> self-regulating system)
- However, current imbalance settlement prices are not cost reflective, as in many cases they do not reflect the (market) value of imbalances
- Except for large industrial consumers with a more constant consumption, the need for diurnal supply profiles creates significant costs

Agenda

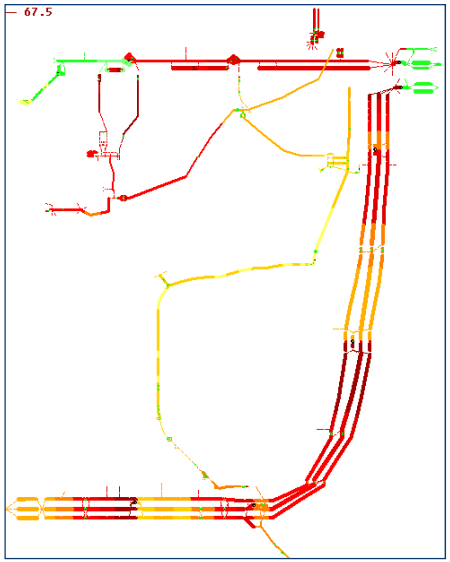
- Background
- Hourly vs. daily balancing: Suppliers' point of view
- Technical feasibility of daily balancing
- Costs of daily balancing
- Potential competition effects
- Conclusions

Technical Feasibility of Daily Balancing

Network simulations are based on an integrated network model of the transport network of the market area 'East' (incl. network level 1)

- Development of a network model (transit and network level 1)
- Detailled illustration (despite various simplications)
- Validation of historic test runs with network operators

Source: OMV



Source: KEMA

Technical Feasibility of Daily Balancing

Different scenarios have been considered, in order to test the limits of flexibility in the Austrian gas network

- Initial simulations indicate substantial flexibility in the different sub-networks (incl. network level 1)
- As an alternative to numerous incremental changes, we have simulated several extreme variants, such as:
  - Import reduction by 40%, starting from maximum initial linepack level (winter and summer case)
  - Winter day with maximum load (e.g. AGGM network 2.2 MCM/h), without active contribution from storages (base load consumption)
  - Winter day with base load supply (storages and import) to network level 1
  - Winter day with maximum transit and base load supply from storages

Note: All simulations are based on year / network status 2010

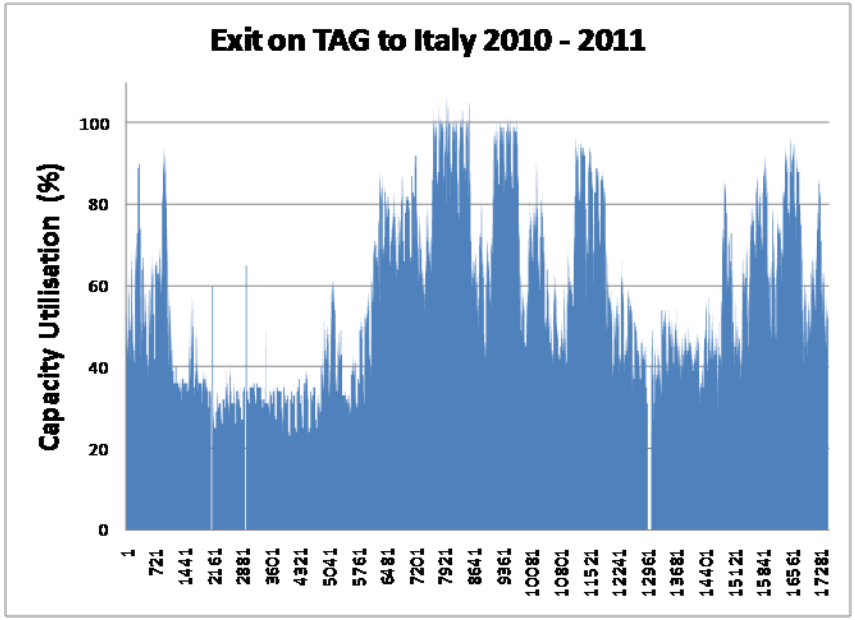
Technical Feasibility of Daily Balancing

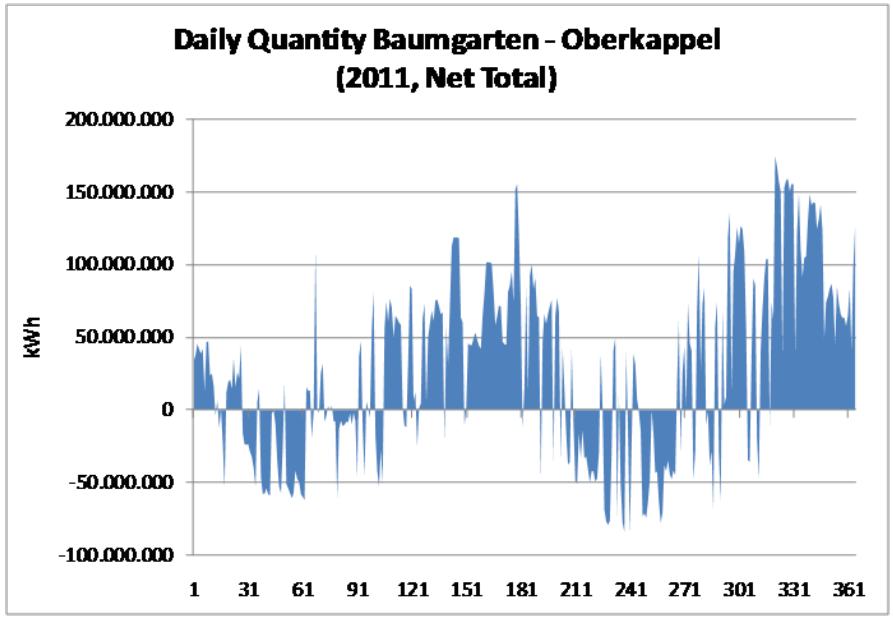
Simulations confirm availability of considerable flexibility, but reveal clear limits as well

- Results confirm assumption of high flexibility in the network
  - No serious problems encountered in simulations with ‘normal’ transit flows
  - Theoretically available linepack sometimes larger than 50 GWh
- From our point of view there remain doubts about the technical feasibility of ensuring daily balancing from the network (linepack) alone:
  - Extreme imbalances of exports/imports cannot be controlled
  - Network level 1 partly operated at (or very close to) pressure limits
  - Uncertainty on actual consumption patterns and extreme outages at network level 1 (e.g. from power stations or large industrial consumers)
  - Possible locational problems and simplified consideration of known local issues (e.g. Oberkappel/Rainbach, PVS)

Technical Feasibility of Daily Balancing

Although maximum transit flows occur, a considerable part of transport capacity remains unused in many cases





Source: KEMA, based on data from www.taggmbh.at and www.bog-gmbh.at

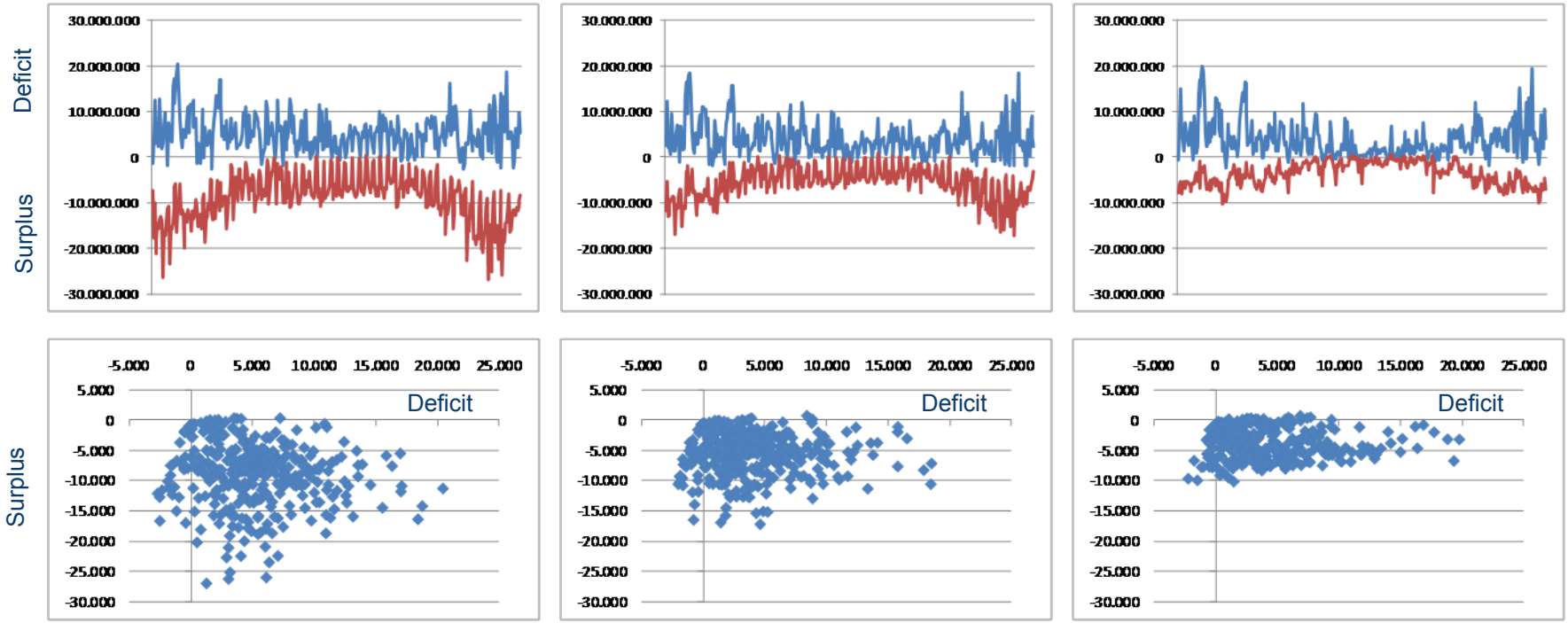
Technical Feasibility of Daily Balancing

Need for flexibility ranges between +20/-27 (swing of 35 GWh) for all customers and +20/-10 (swing: 26 GWh) for SLP consumers

Hypothetical values for max. / min. cumulative imbalances per day (2010)

Scope of daily balancing

All customers | Small customers | SLP customers

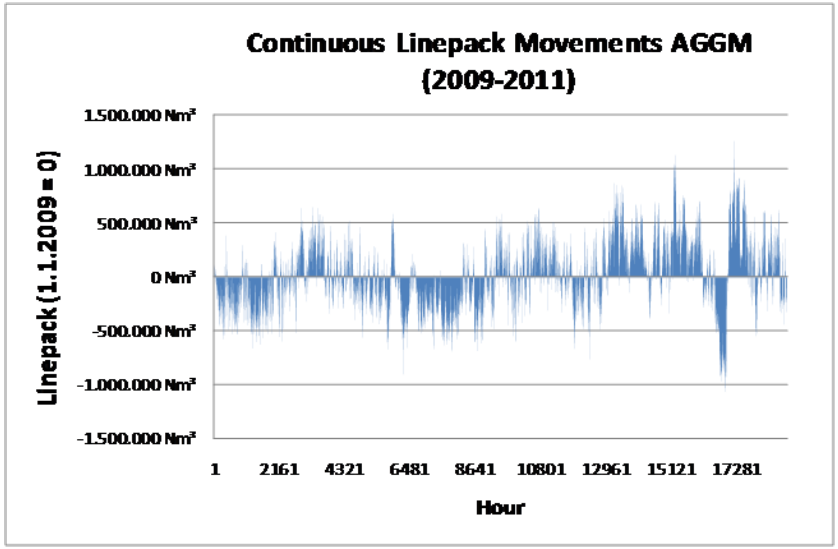


Estimated load profile for small / SLP customers

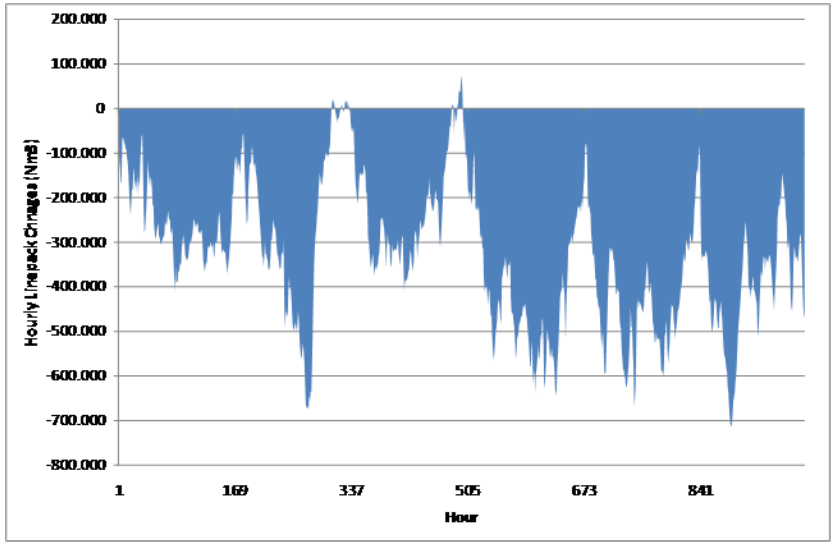
Technical Feasibility of Daily Balancing

In network level 1, more than ±5 GWh of linepack seems to be available on a regular basis, but often remains unused

Linepack ±5 to ±10 GWh



Weekly cycle in summer 2010?



Source: KEMA, based on data from www.aggm.at

Technical Feasibility of Daily Balancing

Transition to daily balancing should be technically feasible in principle (within certain limits)

- Pure daily balancing for all customer groups and entry/exit-flows seems impossible without additional restictions
  (without consideration of flexibility from storages etc.)
- In many cases, however, it should be possible to wholly or partially source the required flexibility (as derived from historical values) from linepack
- In the following, we consider two possible cases:
  - Daily balancing for all small consumers (< 100,000 kWh/h)
    (approx. 50% of total annual consumption)
  - Daily balancing for all SLP customers
    (approx. 25% of total annual consumption)

Agenda

- Background
- Hourly- vs. Daily balancing: Suppliers' point of view
- Technical feasibility of daily balancing
- Costs of daily balancing
- Potential competition effects
- Conclusion

Cost of Daily Balancing

Reliable cost estimates require assumptions on the available linepack and possible products / prices for balancing gas

- Due to dominance of transit flows, available linepack can be predicted with limited accuracy only
  - Consideration of different scenarios (0 to ±25 GWh)
- Moreover, the persistence of current prices for balancing gas within a system of daily balancing should not be taken for granted
  - Considerable volatility of prices in previous years (spread 1 – 6 €/MWh)
  - Risk of higher spreads in case of increasing need for balancing gas?
  - Can experience from abroad (e.g. Germany) be applied to Austria ?
- Note: Based on our analysis, the incremental costs of compression for linepack management are negligible

Cost of Daily Balancing

The volumes needed are calculated from three scenarios that evaluate different off-take combinations in the daily system.

Hybrid Balancing:

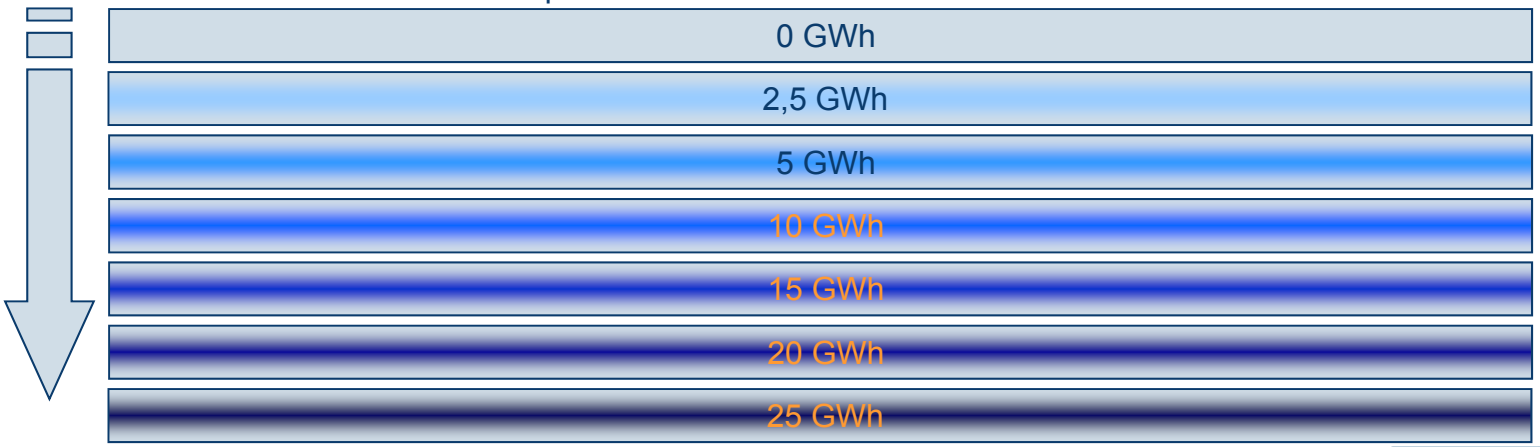
Daily Balancing:
Network operator has to supply hourly profile but receives (forecast) daily consumption as base load

Hybrid I:
Daily balancing for SLP customers, all others are subject to hourly balancing
a) Bottom-up (SLP)
b) Top-down (remaining load)

Hybrid II:
Hourly balancing for large consumers but daily balancing for small consumers

Considering the historic hourly deviations.

Six variations of available linepack



Cost of Daily Balancing

Available linepack leads to a significant reduction in the need for diurnal flexibility

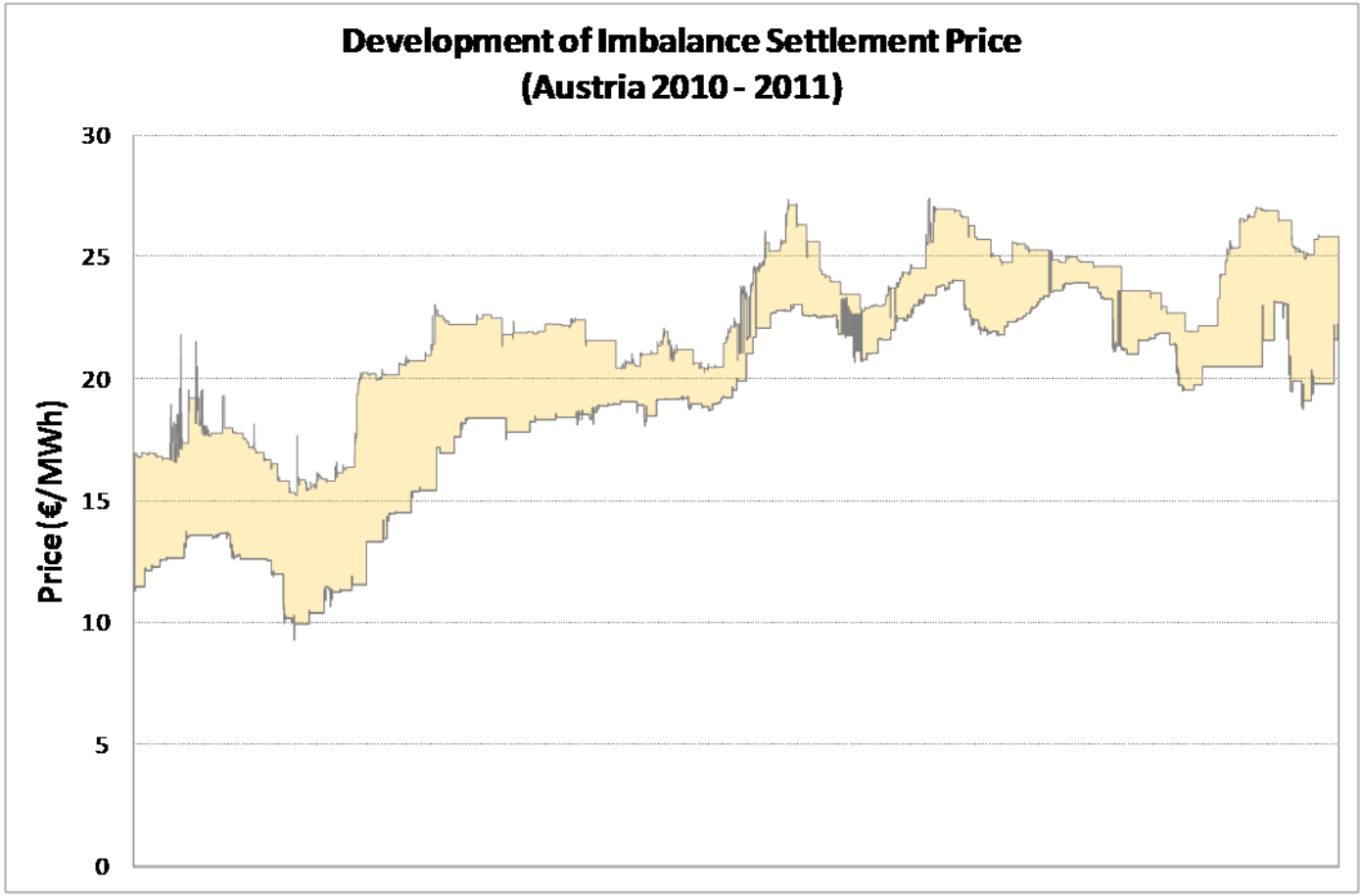
- Differentiation between balancing gas to be provided within the day, or as rest-of-day balance
- Need for within-day flexibility already converges to zero for a limited linepack of between ±5 and ±10 GWh

Need for balancing gas depending on available linepack (GWh/a)

GWh	Reine Tagesbilanzierung (alle Kunden)				Großabnehmer (ca. 50%)				SLP (ca. 25%)			
	Positiv (within day)	Negativ (within day)	Positiv (rest of day)	Negativ (rest of day)	Positiv (within day)	Negativ (within day)	Positiv (rest of day)	Negativ (rest of day)	Positiv (within day)	Negativ (within day)	Positiv (rest of day)	Negativ (rest of day)
Netzpuffer 0 GWh	5.149	-4.648	0	-0	3.463	-2.952	0	-0	2.826	-2.315	0	-0
Netzpuffer 2,5 GWh	3.394	-2.612	87	-454	1.799	-1.246	188	-222	1.235	-601	153	-276
Netzpuffer 5 GWh	1.915	-1.625	408	-189	723	-596	570	-186	468	-182	434	-210
Netzpuffer 10 GWh	353	-573	937	-205	87	-95	797	-278	102	-0	705	-296
Netzpuffer 15 GWh	25	-164	921	-271	14	-8	798	-293	21	0	786	-296
Netzpuffer 20 GWh	0	-38	839	-291	0	0	807	-296	0	0	807	-296
Netzpuffer 25 GWh	0	-4	808	-293	0	0	807	-296	0	0	807	-296

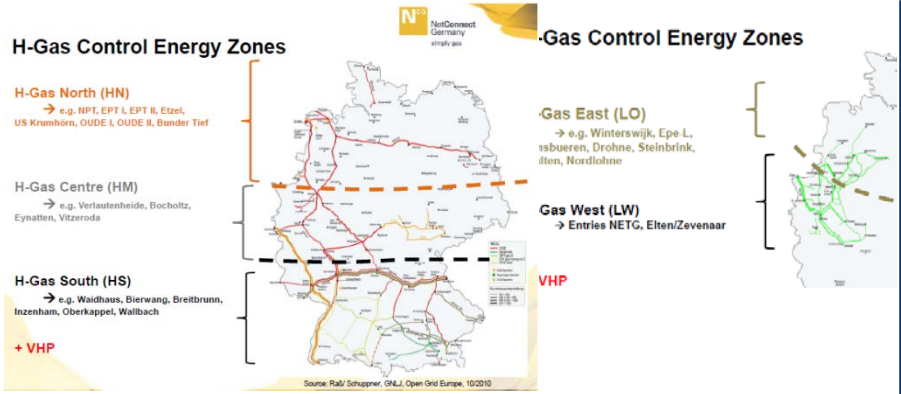
Cost of Daily Balancing

Spread for balancing gas from the Austrian balancing mechanism has varied between 1 and 6 €/MWh (max. ca. 9 €/MWh) over the past years



Cost of Daily Balancing

NCG procures balancing gas for 5 different zones, over the long and short term and based on three different products



- Procurement of balancing gas mainly via EEX if:
  - The market price is less than or equal to (buy) or greater than or equal to (sell) the weighted arithmetic mean of the MOL prices
- Bidding platform (Merit Order List) is also used if:
  - The procurement time lies outside the market opening times
  - Required quantities of balancing gas cannot be procured on the EEX

1) 'Baseload'' procured via EEX (both long-term and short-term)

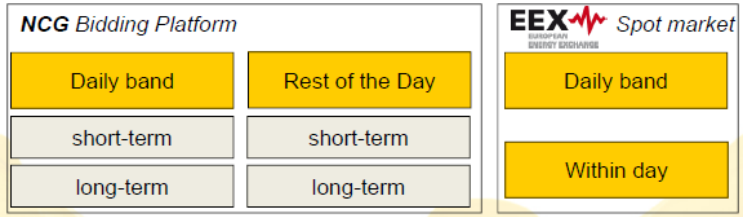
Procurement of balancing gas from separate platform

2) 'Rest of the Day long-term'
- Tendering period: 1 quarter
- Call: min 1 hour; max. 1 quarter

3) 'Rest of the Day short-term'
- Tendering period: 1 gas day
- Call: min 1 hour; max. 1 gas day

Both:
- Lot size: 30.000 kW; Type: firm delivery
- Lead time: min. 3 hours before start by edig@s REQEST

Provision: at a nominated entry or exit point in the market area or the relevant VP



Source: Operational Procedure for balancing gas Procurement at NCG (www.net-connect-germany.de)

Cost of Daily Balancing

As an alternative reference, we have also used prices for balancing gas procured by NCG

Procurement via VP NCG/TTF:
- Short term: daily products
- Energy price only
- Gas Day
- Rest of Day

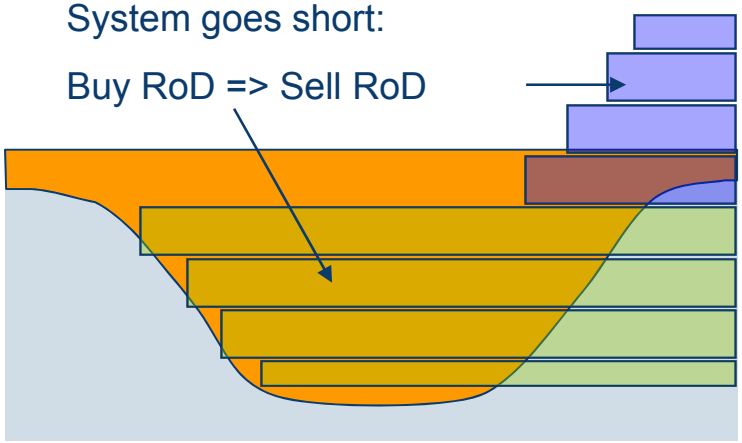
Procurement via platform :
- Long-term: Quarterly products
- Short term: Daily products
- Capacity price
- Energy price
- Gas Day
- Rest of Day

Structuring (L-Gas only):
- Capacity price
- No energy supply
- Park and loan product of up to 12 times capacity

Procurement of balancing gas

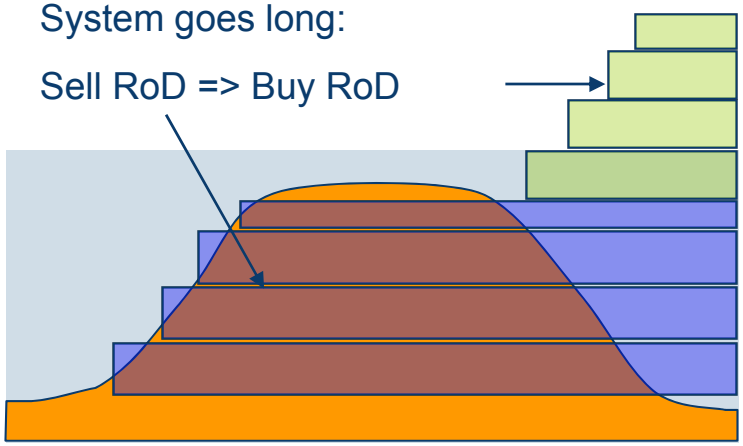
System goes short:

Buy RoD => Sell RoD



System goes long:

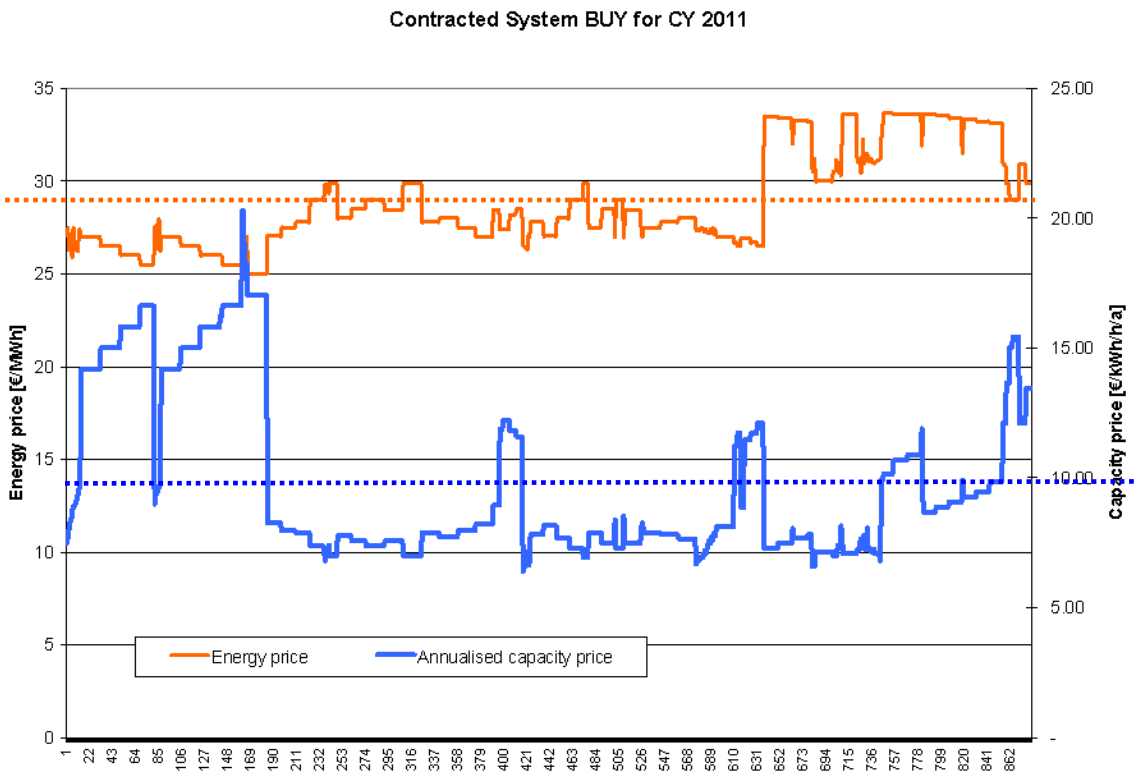
Sell RoD => Buy RoD



Cost of Balancing Gas

Cost for advance procurement of positive balancing gas (buy) is characterised by capacity prices and high energy prices

Ø EP_{Buy}: 28,85 €/MWh



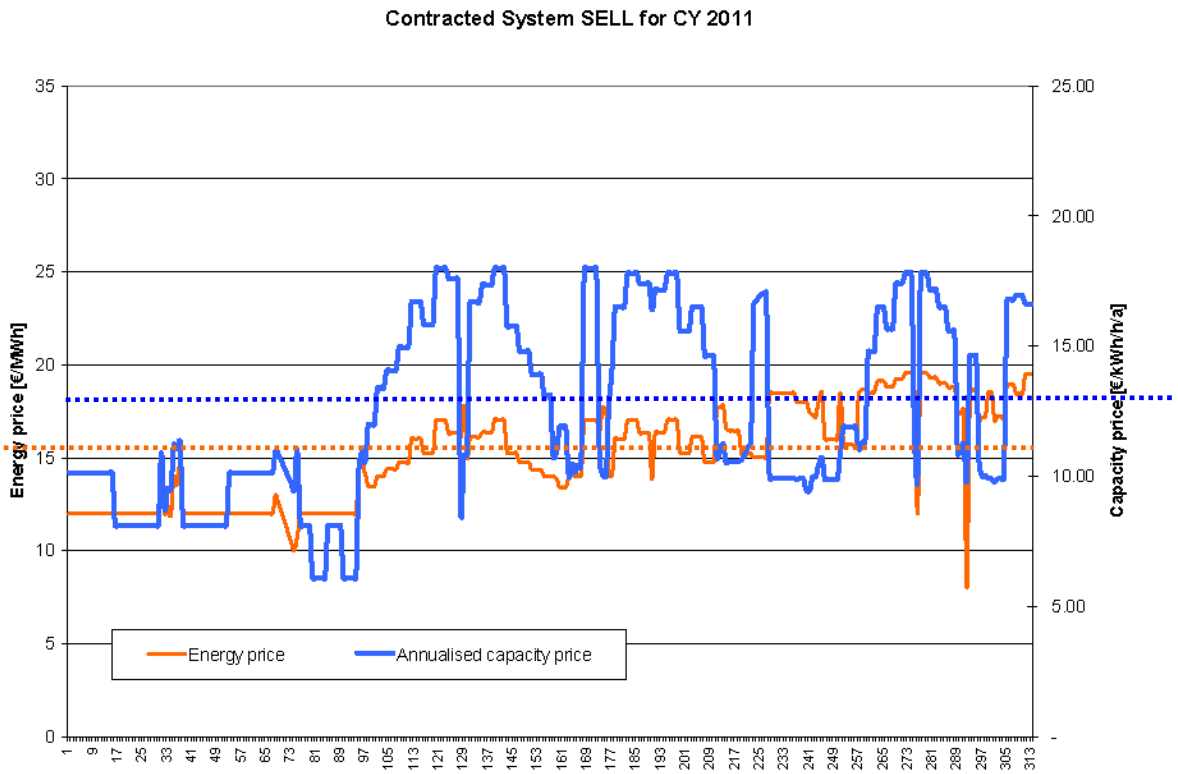
Ø CP_{BUY} : 9,81 €/kWh/h/a

Note: X-Axis is consecutive order of offers contracted, no time axis
Source: www.net-connect-germany.de

Cost of Balancing Gas

Cost for advance procurement of negative balancing gas (sell) is characterised by higher capacity prices and low energy prices

Ø EP_{Sell}: 15,19 €/MWh

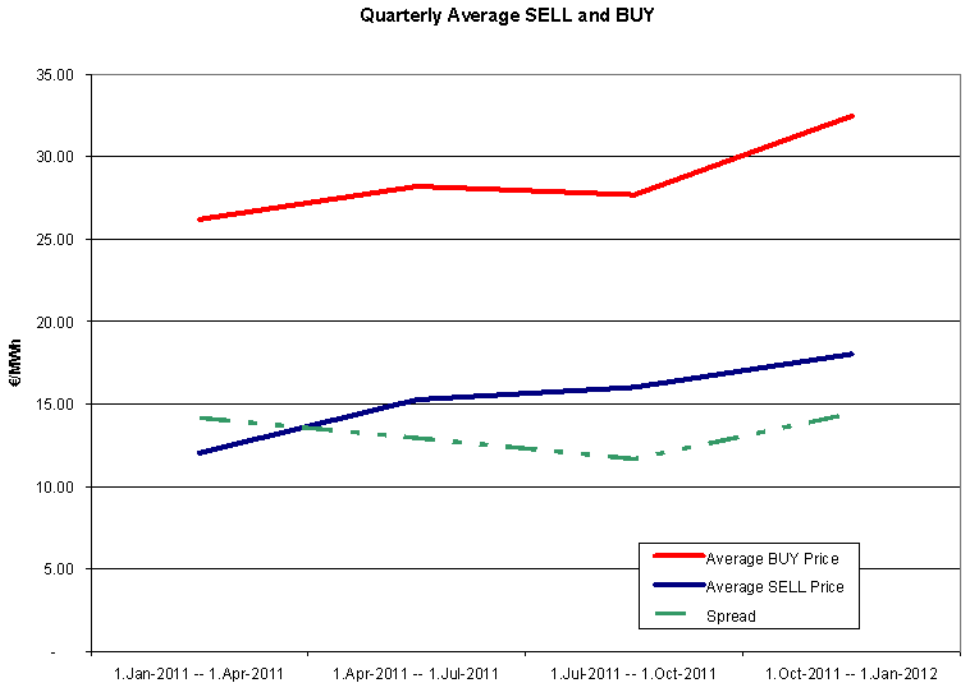


Ø CP_{BUY}: 12,59 €/kWh/h/a

Note: X-Axis is consecutive order of offers contracted, no time axis
Source: www.net-connect-germany.de

Cost of Balancing Gas

In total, the energy prices of contracted balancing gas at NCG reveal a fairly constant spread



- Average (2011): 13,66 €/MWh
- Quarterly average of the contracted tranches shows an increasing tendency (market)
- Spread stays relatively constant (12 – 15 €/MWh)

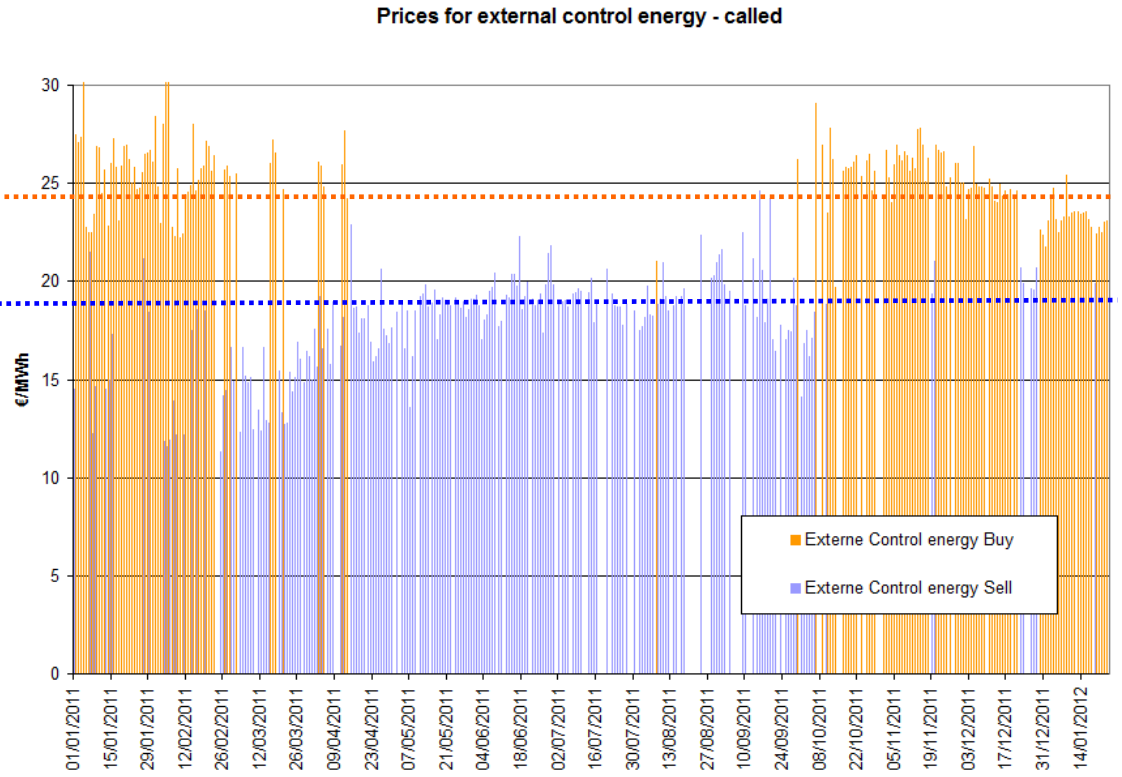
Cost of Daily Balancing

Activated balancing gas displays a significantly lower buy/sell spread

Ø Buy: 24,36 €/MWh

Ø Sell: 18,39 €/MWh

Ø Spread: 5,97 €/MWh



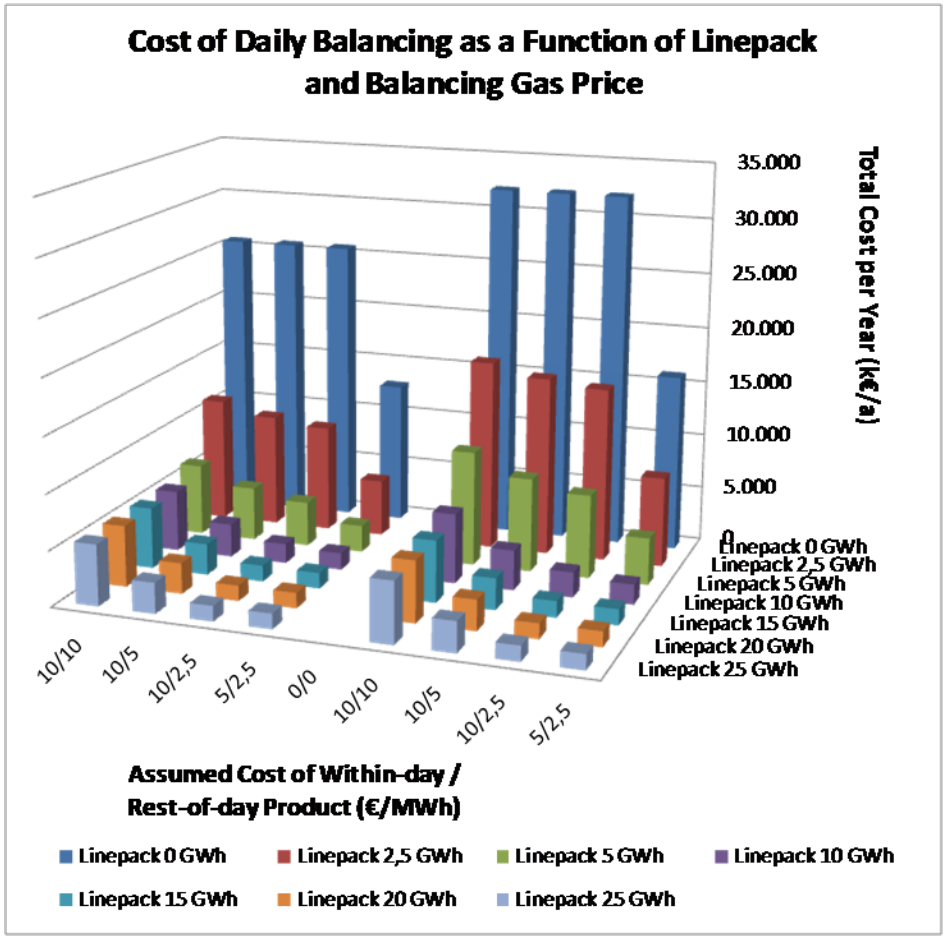
Quelle: www.net-connect-germany.de

Note: For more than one call per day the average of called prices is being calculated.
The daily average value is the arithmetic average of daily average prices

Cost of Daily Balancing

The commodity costs of balancing gas are limited when daily balancing is restricted to certain customer groups.

- Cost varies by corresponding assumptions on:
  - Availability of linepack
  - Price of balancing gas
- With a minimum linepack of ±2,5 - 5 GWh cost ranges from less than 2 M€/a to :
  - 5 - 10 M€/a (SLP) or
  - 10 – 15 M€/a (small consumers)



Cost of Daily Balancing

Additional contracts for guaranteed provision of balancing gas may become necessary to ensure network integrity

- A purely energy-related analysis neglects the risk of insufficient volumes of balancing gas being available
- Experience in Austria to date indicates that sufficient offers have been available even without advance contracting (up to +1,6/-1,0 GWh/h in singular cases)
- Under daily balancing, the maximum demand for within-day products may increase to ±1,8 GWh/h (SLP) and +2,0/-2,8 GWh/h (other small customers), except for very few occasions
- Diurnal profile of SLP could probably be realized even within the current balancing mechanism
- Extension of daily balancing to all small customers may result in increased need for negative balancing gas (sell)

Cost of Daily Balancing

Costs of daily balancing are less than the cost of diurnal structuring for most customer groups

- Except for industrial customers, the costs of daily balancing tend to be less than the cost of supplying a diurnal profile

Customer group	Balancing model	
	Cost for diurnal profile (€/MWh)	Cost of daily balancing (€/MWh)
Mixed SLP portfolio	> 1,0	0,2 – 0,45
Portfolio of small customers	> 0,67	0,1 – 0,5 [(a)]
Process gas	0,52	
Industry (2-shift)	0,40	
Chemical industry	0,20	

[(a)] – Upper value incl. 10 M€/a for procuring ±0,5 GWh of balancing gas via Market Maker contracts

Cost of Daily Balancing

Interim result: Daily balancing is economically feasible provided that adequate access to linepack is provided

- Net costs of daily balancing (≤ 0,5 €/MWh) are below the costs of supplying a diurnal profile
  (exception: industrial consumers with base load consumption)
- Actual costs may vary considerably due to
  - Variable availability of linepack
    (in particular at times of high load)
  - Development of prices for balancing gas
- Effective and efficient use of available linepack and market-based procurement of balancing gas are essential preconditions for daily balancing

Cost of Daily Balancing

Efficient daily balancing requires the procurement of balancing gas to be compatible with the wholesale market

- Similar to shippers, network operators should aim to avoid any residual imbalances at the end of each day
- Availability and access to liquid physical products are an essential precondition for meeting this goal
- Most relevant products:
  - Base load product to compensate expected imbalances anticipated for the next day(s) (as determined by MGM/VGM)
  - Rest-of-day product for balancing within the day
- Procurement of standard commodity products leads to common reference point for setting / calculating imbalance charges
- Procurement via MOL and/or tender should be limited as far as possible (see also provisions of GWG)

Agenda

- Background
- Hourly vs. daily balancing: the suppliers' point of view
- Technical feasibility of daily balancing
- Cost of daily balancing
- Potential competition effects
- Conclusions

Potential competition effects

Most probably, SLP customers would clearly benefit from a transition to daily balancing

- With daily balancing, delivery of SLP customers would effectively be risk free, as neither structuring cost would occur, nor would there be a significant risk for imbalance payment
- As a consequence, we would expect increasing competition (see experience from Germany)
- We also assume that the costs of daily balancing are lower than the costs of individual provision of diurnal supply profiles
- Overall, we expect SLP consumers to clearly benefit from daily balancing

Potential Competition Effects

The impact on other small consumers is less clear, but we expect that the benefits for them will also outweigh any potential disadvantages

- The net effect for other small consumers is a function of their consumption profile and the forecasting accuracy:
  - Avoided costs from structuring may enhance competition and reduce costs, although the 2 price system applied under daily balancing may increase costs
  - In addition, we expect the balancing of unexpected deviations by means of rest-of-day products to be generally easier and less expensive than the purchase of hourly products
- Overall, we anticipate a positive impact.

Potential Competition Effects

Implications for large industrial consumers primarily depend on the treatment of balancing requirements within the day

- Incorporation of **large industrial consumers** into daily balancing might lead to higher costs for them, since structuring the market portfolio is overall more expensive than self-structuring of this group
- Corresponding disadvantages would be mitigated if the resulting costs were socialized through network charges (higher operating hours)
- Whether there is a net advantage or disadvantage from hourly balancing of large industrial customers highly depends on the treatment of within-day deviations

Potential Competition Effects

Effect on power and heating plants is similar to other large consumers, but more critical due to higher volatility.

- Extension of daily balancing to (large) power plants is not recommended due to their size and the volatility of their consumption
- Similar to large industrial customers, the primary concern is the design of appropriate rules for the settlement of deviations within the day

Potential Competition Effects

Despite potential risks, positive effects and attractive prices can be expected in the balancing market

- The following factors might lead to increasing prices and spreads in the balancing market:
  - Increasing demand in combination with high concentration on the supply side
  - Possibly predictable demand of MGM/VGM (as today!)
- This risk is contrasted by the chance for stimulating trading activities at the VP (see experience from Germany!)
- Preferential use of rest-of-day products would increase compatibility with local and foreign wholesale market
- In total, we would expect positive competition effects and increasing integration between the market for the procurement of balancing gas and general commodity trading

Potential Competition Effects

Increasing competition and facilitated access to within-day flexibility services increase competition for storage services

- Decreasing demand for hourly flexibility vs. additional income from the provision of balancing gas and sales on the within-day market
- Generally expect positive impacts on competition in the storage market
- May promote the formation of market-based prices for storage services, which in turn can lead to a decrease in within-day price spreads and a reduction in the cost of balancing gas
- Overall, we expect increasing integration of the market for the procurement of balancing gas and the commodity trading market

Potential Competition Effects

Overall, daily balancing may provide the preconditions for higher liquidity on the wholesale gas market

- Positive effects in the retail market are beneficial for new entrants, who can be expected to trade at the VP for portfolio optimization
- The interaction of the balancing market with the wholesale market and the additional demand and supply from MGM / VGM will increase the liquidity and attractiveness of the VP, particularly for within-day trading (see experience from Germany)
- Overall, one may expect that the transition to daily balancing improves general liquidity and intensifies competition in the wholesale market

Agenda

- Background
- Hourly vs. daily balancing: the suppliers' point of view
- Technical feasibility of daily balancing
- Cost of daily balancing
- Potential competition effects
- Conclusions

Conclusions

Transition to daily balancing for small customers seems to be technically and economically feasible

- Study shows that the transition to daily balancing in Austria is:
  - Technically feasible; and
  - Economically affordable.
- For reasons of network integrity, it appears necessary to provide for restrictions on daily imports, exports and storage as well as on large customers with highly fluctuating consumption patterns
- For industrial consumers with ‘constant’ consumption, it may also be more attractive to remain subject to hourly balancing
- Overall, it seems sensible to focus on the group of SLP and/or small customers

Conclusions

Daily balancing promotes competition but requires an effective and efficient procurement of balancing gas

- In our view, the transition to daily balancing would clearly have positive impacts on competition in various market segments, such as:
  - Retail market (small / SDL consumers)
  - Wholesale market
  - Balancing market
  - Perhaps also storage services
- Pre-conditions for transition to daily balancing
  - Effective use of available linepack
  - Alignment between the procurement of balancing gas and typical traded products in the wholesale market

Christian Hewicker
Regional Director | Topics & Innovation
Tel : +49 (0) 228 44 690 56
E-mail: christian.hewicker@kema.com

KEMA Consulting GmbH
Kurt-Schumacher-Str. 8, 53113 Bonn
Tel: +49 (0) 228 44 690 00
Fax: +49 (0) 228 44 690 99
www.kema.com