E-CONTROL

The Austrian Electricity Market

(as of April 2013)

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1 Background

This document is meant to give the interested reader an overview of how the Austrian electricity market is organised; it describes the applicable rules and processes as well as the responsibilities of the parties that are involved.

After an explanation of the principles of the Austrian electricity market and a concise presentation of the relevant market participants and their roles, readers are introduced to the functioning of balance groups and all major market processes are described in more detail.

At the end of each chapter, readers are referred to the applicable legislative provisions and other sources of information for further details about each process. Renewable energy support and related procedures are not addressed in this document.[1]

For definitions of the technical terms used in this document, please refer to Chapter 1 of the Electricity Market Code.

2 Overview

2.1 Basic principles

The electricity market operates within a framework that consists of the relevant legislation at EU, Austrian and provincial level, the decisions handed down by the bodies of the regulatory authority E-Control Austria, the Market Rules and the market participants' general terms and conditions. (Interested readers will find a list of the basic legal texts concerned and further reading materials at the end of this chapter.)

When the Austrian electricity market was fully liberalised in 2001, a number of great technical and organisational changes resulted for market participants.

Nowadays, the liberalised Austrian electricity market builds on the following basic principles:

1. Operation of the grids is separate from competitive activities, such as generation, wholesale and retail. See *Figure* 1.
2. Responsibility for secure grid operation, for metering and for handling and processing grid user data generally lies with the distribution system operators (DSOs).
3. Transmission system operators (TSOs), apart from operating the transmission grids, also act as control area managers (CAMs). In this role, they must ensure that injection and withdrawal of electric energy are balanced at all times.

[1] For information about renewable energy support, please consult E-Control's annual Green Electricity Report and the website of the green power settlement agent OeMAG (www.oem-ag.at).

4. So-called balance groups were introduced to enable consumers, generators, suppliers and wholesalers to trade or conclude deals with each other. Whoever takes electricity off the grid, feeds in or trades must be member of a balance group.
5. Each grid user (consumer or producer) concludes a contract with the grid operator and another contract with the desired supplier or trader.
6. Feed-in and off-take of electric energy are forecast, cleared and settled according to 15-minute intervals. However, consumers and producers with connected capacities below 50 kW and producers with an output of less than 100,000 kWh/year (i.e. households and small enterprises, generally speaking) are usually only metered once a year. So-called standardised load profiles (SLPs) for different user categories (e.g. households, small businesses, agriculture, PV generation) are drawn up and used as proxies for the 15-minute meter readings. For all other grid users, generation and consumption are actually metered at 15-minute intervals.

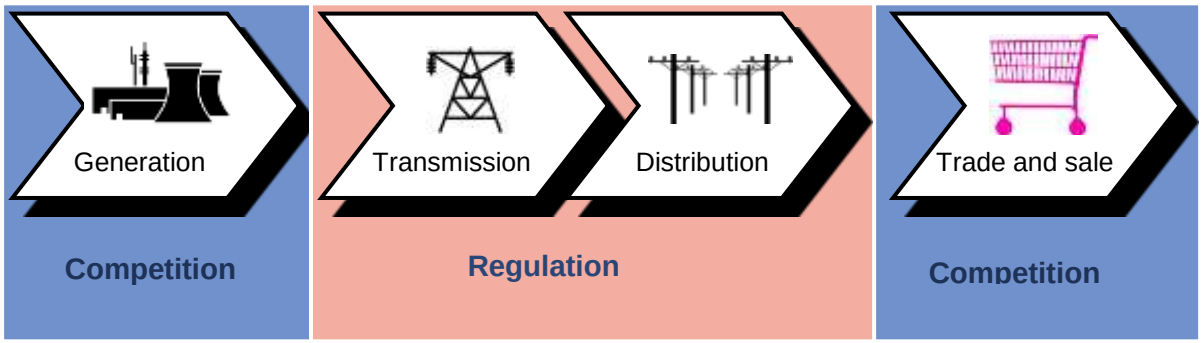

Figure – Breaking up the supply chain to enable liberalisation

2.2 Tasks and roles of the market participants

The opening of the energy markets created a number of new roles on the market as well as changing the rights and duties of existing players. Clearly defining each participant's role and responsibilities is crucial to enable the market players to work together closely, and guarantee smooth functioning of the market and secure electricity supply at all times.

The most prominent participants in the Austrian electricity market are:

Injecting party

A producer or electricity undertaking feeding electric energy into the grid.

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Control area manager (CAM)

The entity which is responsible for load-frequency control within a control area; this function may also be carried out by a third company based in another member state of the European Union.

System operator (SO)

The operator of a transmission or distribution grid with a nominal frequency of 50 Hz. The responsibilities of system operators also include metering, confidential handling of grid user data, and non-discriminatory submission of information to all market participants; at the same time, they must ensure that data is submitted only to those parties that are actually entitled to receive it.

Trader

A natural or legal person or a commercial undertaking selling electric energy with a view to profit.

Supplier / retailer

A natural or legal person or commercial undertaking that provides electric energy to other natural or legal persons.

Consumer

A natural or legal person buying electric energy for own use.

Clearing and settlement agent (CSA), aka balance group coordinator

A natural or legal person with an official license to operate a clearing and settlement agency for the purpose of organising, clearing and settling balancing within a control area.

Balance responsible party (BRP), aka balance group representative

The entity representing a balance group vis-à-vis other market participants and vis-à-vis the clearing and settlement agent.

Balance group members

Suppliers or customers joined into balance groups within which injection and withdrawal of electricity are balanced.

Transmission system operator (TSO)

A natural or legal person or a registered partnership that is responsible for operating, ensuring the maintenance of and, if necessary, developing the transmission system and, where applicable, the interconnectors to other systems, and for ensuring the long-term ability of the system to meet a reasonable demand for the transmission of electricity; transmission system operators in Austria are Verbund-Austrian Power Grid AG, TIWAG-Netz AG and VKW-Übertragungsnetz AG.

Distribution system operator (DSO)

A natural or legal person or a registered partnership that is responsible for operating, ensuring the maintenance of, and, if necessary, developing the distribution system of a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the system to meet reasonable demands for the distribution of electricity.

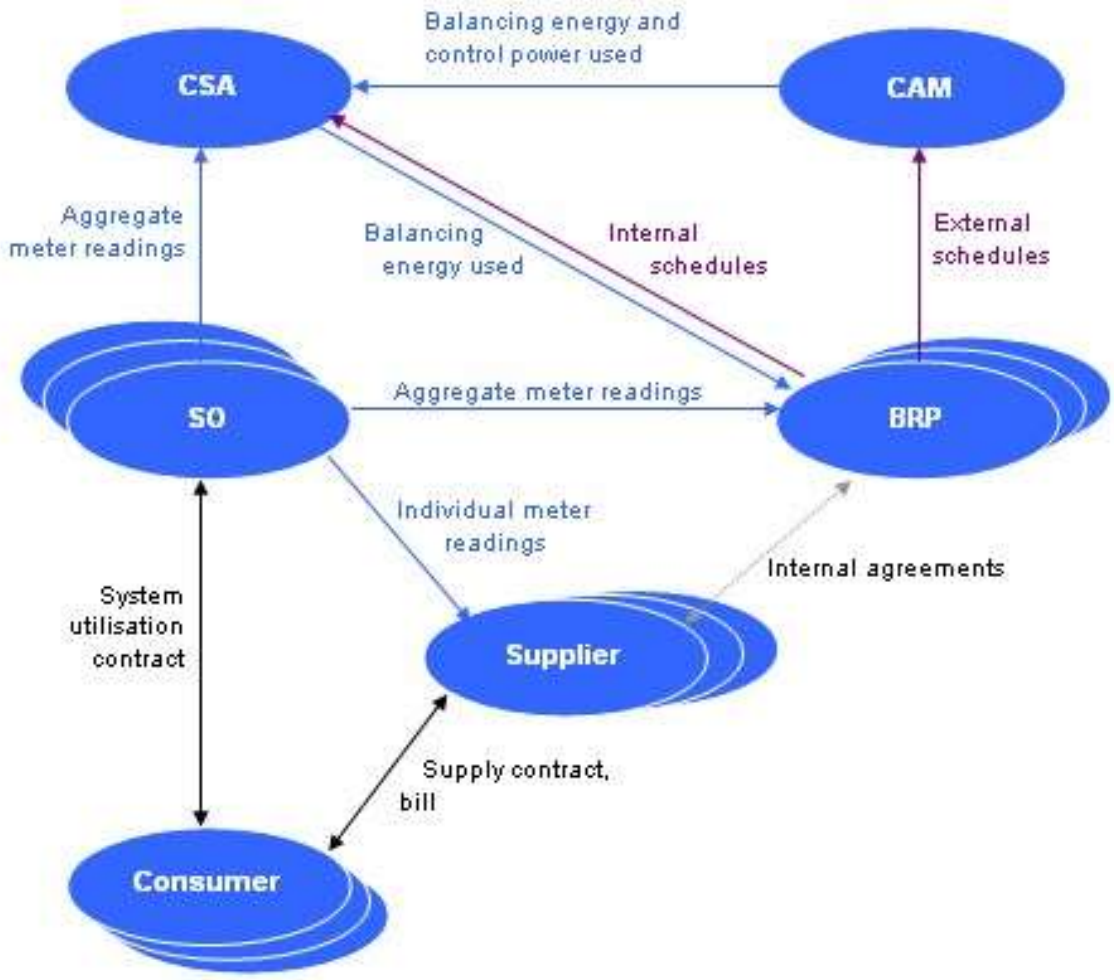

Figure – Schematic representation of contractual relations and information exchange among market participants

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2.3 Organising the electricity market in balance groups

In pre-liberalisation times, consumers were always supplied by the vertically integrated undertaking to whose network they were connected. Nowadays, they can choose to buy their electric energy from other suppliers.

To enable consumers to choose their supplier freely and guarantee that all trades and supply deals can be settled correctly, Austria introduced balance groups.

Balance groups serve a two-fold purpose: they reflect commercial flows (as opposed to physical flows through the grid) between the market players, and they enable the correct allocation of balancing energy to the market players. Therefore, all market players – be they producers, consumers, suppliers or traders – must be members of commercial balance groups.

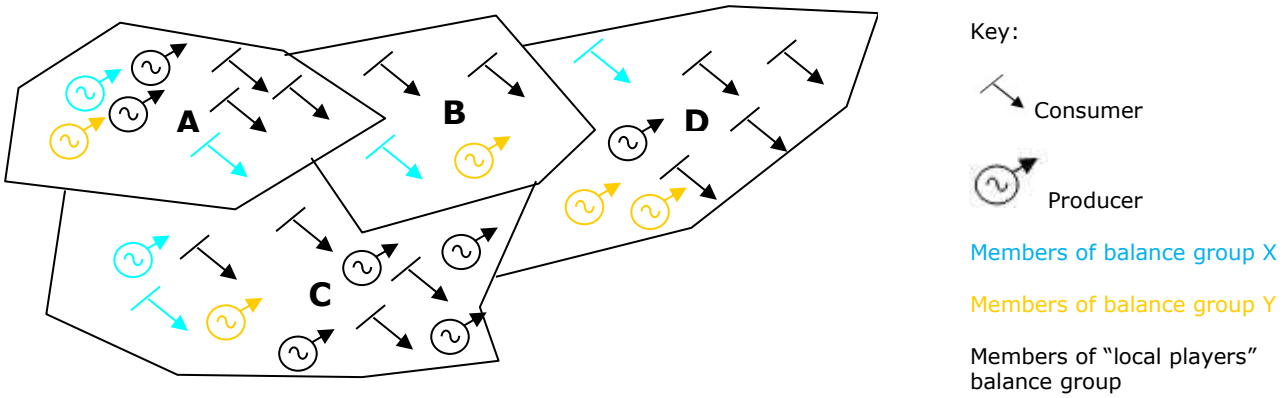

Figure – Schematic representation of four grid areas (A, B, C and D), the four local player balance groups (i.e. the balance groups of the former vertically integrated electricity undertakings) and two new balance groups (X and Y), whose members are connected in different grid areas

The *Elektrizitätswirtschafts- und -organisationsgesetz* (Electricity Act) defines a commercial balance group as a virtual group of suppliers and customers within which injection (procurement schedule, generation) and withdrawal (delivery schedule, demand) are balanced. In addition, each DSO must establish a dedicated balance group for the purpose of determining grid losses (balance group for grid losses).

Each balance group designates a person to act as balance responsible party (BRP), who is then responsible for contacts with the other market participants (data exchange) and assumes the balance group's financial risk, particularly regarding balancing energy. Anybody who wishes to act as a BRP must complete a licensing procedure that is managed by E-Control.

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The balance groups form the basis for the processes that ensure the functioning of the Austrian electricity market, particularly supplier switching, scheduling, balancing and information exchange among market players.

For additional information, please consult

- EU law: Electricity Directive (2009/72/EC)
- Austrian law: *Elektrizitätswirtschafts- und organisationsgesetz* (Electricity Act) 2010
- Provincial law: e.g. the *Wiener Elektrizitätswirtschaftsgesetz* (Vienna Electricity Act) 2010
- Chapters 1 to 10 of the Electricity Market Code (www.e-control.at)
- The website of the clearing and settlement agent APCS (www.apcs.at)

2.4 Contracts

To ensure proper functioning of the market, the participants must conclude contracts with one another. The contents of these contracts are determined in each player's GTC, which are in turn subject to approval by the regulatory authority. The below table provides an overview of the statutory contracts and parties to them:

	CAM	CSA	BRP	Supplier / retailer	Trader	TSO/DSO	Consumer	Producer
CAM								
CSA	Information exchange contracts							
BRP	Information exchange contracts	BRP contract						
Supplier / retailer	-	Information provision contract	Information exchange contracts	-				
Trader	-	-	Information exchange contracts	Electricity supply contract	Electricity trade contract			
TSO/DSO	-	Information exchange contracts	Information exchange contracts	-	-	System access contract		
Consumer	-	-	-	Electricity supply contract	-	System access contract		
Producer	Information exchange contracts	-	Information exchange contracts	Electricity supply contract	Electricity supply contract	System access contract	-	

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3 Market processes

3.1 Overview

The table below displays the main electricity market activities as they usually happen one after the other and names the players concerned. Further down, these activities are discussed in more detail.

What	Who	When
Forecasting: Producers/suppliers/traders forecast their future output/sales/trades.	Traders, producers, suppliers	May take place several years ahead
Trade: Market players trade electricity bilaterally or through exchanges. For cross-border trades, capacity might need to be reserved.	Traders, producers, suppliers, CAMs	May take place several years ahead
Balancing energy offers: Accredited balancing energy providers post their bids for primary, secondary and tertiary control capacity and energy	Accredited producers, CAM	Normally weekly. See the CAM's auction calendar
Schedule submission: BRPs submit their internal and external schedules to the CSA and CAM; these are the final schedules that are used for calculating balancing energy later on.	BRP, CSA, CAM	By 14.30 hrs on the day ahead
Intraday trade: BRPs notify the CSA and CAM of any intraday changes to their schedules.	BRP, CSA, CAM	From 18.00 hrs on the day ahead
Load-frequency control: CAM ensures system stability by way of load-frequency control.	CAM, producers	Realtime
Metering: SO meters or calculates actual consumption and production.	SOs	After the electricity has actually been consumed/produced, e.g. on a daily, monthly or annual basis
Submission of meter readings: SO submits the meter readings to CSA, BRPs, other SOs, CAM and suppliers.	SOs, CSA, BRPs, suppliers, CAM	By about the 10th working day of the next month

First clearing: CSA determines each BG's imbalances and bills accordingly. BRPs pass this cost on to their members.	BRPs, CSA	In the next month. See the CSA's clearing calendar
Second clearing: Same process for calculating imbalances as in the first clearing.	BRPs, CSA	14 months after the first clearing

3.2 Prerequisites for suppliers and traders

All suppliers and traders that want to become active on the Austrian market must be balance group members. Balance groups are established by BRPs, who are also their representatives towards the CSA and the CAM. Licences for BRPs can be applied for with E-Control.

Suppliers/traders can choose whether to join an existing balance group or form a balance group of their own. The CSA centrally records each supplier's and trader's balance group membership.

As representative of the balance group, the BRP is responsible for sending the schedules to the CSA and CAM and for settling imbalances with the CSA.

The two options – joining an existing balance group and forming a new one – are described in detail below:

Joining an existing balance group

When joining an existing balance group that is represented by a licensed BRP, suppliers/traders merely need to notify the CSA and the governments of the provinces they wish to be active in.

Establishing a new balance group

To establish a new balance group, a BRP licence must be obtained. Licensing is a two-stage process:

First, the CSA checks whether the applicant fulfils all technical and financial requirements.

As part of this process, the prospective BRP must deposit collateral with the CSA. The amount of such collateral is determined in the GTC of the CSA (approved by E-Control) and increases with a company's turnover. In the case of recently founded companies, their forecast turnover is used as a proxy in the first year.

The second step of the licensing process involves E-Control checking whether the legal requirements are fulfilled; if this is the case, the authority issues a BRP licence.

The documents needed to obtain a licence include:

I. Contracts which are required to fulfil the tasks and obligations determined in the applicable provincial legislation, in the Electricity Act and in the *Verrechnungsstellengesetz* (Settlement Agencies Act), in particular with regard to administrative and commercial matters:

   a) with the CSA; and

   b) with the CAM;

II. Proof of the applicant's entry in the commercial register and proof of the company's seat, if this does not correspond to the address recorded in the commercial register; for natural persons: proof of the company address and of the principal place of residence;

III. Proof of the technical qualification of the management (e.g. leadership, sufficient theoretical and practical knowledge in settling imbalances) and all bodies authorised to represent externally;

IV. Proof of the technical qualification of at least one member of the applicant's authorised representative body, a personally liable partner or an executive staff member;

V. Proof that the balance responsible party disposes of the liable equity capital necessary to perform its activities.

Besides, suppliers/traders must notify the governments of the provinces they wish to be active in.

For additional information, please consult

- Chapter 4 of the Electricity Market Code (www.e-control.at)
- The website of the clearing and settlement agent APCS (www.apcs.at)
- Provincial electricity acts

3.3 Data exchange

The below table lists the most important information exchange processes on the Austrian electricity market, names the players involved and specifies the formats used and the submission modality.

Details are given further down.

Process	Market participants	Format	Submission
Scheduling	BRP, CAM, CSA, producer	ESS (xml)	E-mail attachment

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Switching, enabling and disabling	Supplier, SO, producer	(xml)	Through the switching platform
Exchange of meter readings	SO, supplier, BRP, trader, CAM, CSA, producer	MSCONS	E-mail attachment
Billing and invoicing	Supplier, SO	ebUtilities (xml)	E-mail attachment

For additional information, please consult

- Chapters 2, 3, 5, 6, 7 and 10 of the Electricity Market Code (www.e-control.at)

3.4 Metering

Reading and submitting metered data is indispensable for customer billing, forecasting and supplier switching.

Installation, removal and maintenance of metering equipment as well as meter reading and submission of the data to the relevant market participants are all duties of the SO. Customers may also provide their own metering devices if they correspond to the SO's requirements.

3.4.1 Identifying metering points

Metering points are defined as injection or withdrawal points where electricity is metered and registered.

By way of metering point registration numbers (MPRNs, also called metering point administration numbers, MPANs), each metering device can be identified.

SOs must ensure that each MPRN (this may be derived from the device number or the geographical coordinates, for instance) in their grid area is unique – even if a metering point ceases to exist, its MPRN may not be assigned elsewhere again. Even if changes to an SO's legal setup, changes to the postcode or replacement of the metering equipment occur, this requirement continues to apply.

An MPRN has 33 characters. Starting with the country letters AT, it consists of:

- A 6-digit ID of the SO (determined by the responsible CSA);
- The 5-digit postcode (with a leading 0) of the metering device's location; and
- A unique, 20-digit ID of the metering point.

Figure – Standard MPRN

3.4.2 Types of meters

Flow metering devices

Such devices are usually installed at the facilities of small consumers (particularly households and small businesses) or producers with an annual consumption/production of less than 100,000 kWh or with a connected capacity of less than 50 kW. The exact type of device depends on what needs to be metered; this is, in turn, determined in the system access contract concluded between the grid operator and the customer.

The options are:

- Alternating current (AC) meters;
- Three-phase meters; and
- Multiple-tariff meters.

Load meters

At all facilities with an annual withdrawal/injection of over 100,000 kWh and a connected capacity of over 50 kW, SOs must install load meters.

If these thresholds are not reached during three years in a row, grid users may request that load metering be stopped and they again be assigned a standardised load profile. Load meters are usually read remotely and on a monthly basis.

Quarter-hour maximum meters

This type of meter records the electric energy consumed as well as the highest quarter-hourly mean load that occurs during a given period of time.

The thresholds for the installation of quarter-hour maximum meters vary between SOs and are laid down in their GTC. Normally, they are used for larger customers that do not meet the thresholds for load meters. Customer facilities that have quarter-hour maximum meters are still assigned standardised load profiles.

Standardised load profiles

The legal framework foresees that standardised load profiles (SLPs) be drawn up for customers with an annual withdrawal/injection below 100,000 kWh or a connected capacity below 50 kW.

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In Austria, the SLPs developed by the German VDEW are used. However, not all customer types are covered by the VDEW's profiles, so E-Control and the Austrian grid operators and suppliers jointly established SLPs for these typical Austrian situations:

- Injection from hydropower, wind power or biogas facilities;
- Injection from PV plants;
- Interruptible supply;
- Facilities with remote capacity reduction options at a single metering point;
- Mobile phone stations; and
- Public lighting.

Assignment of SLPs to grid users is the SO's task.

The SLPs used in Austria are administered by the CSA and published and updated on its website.

For additional information, please consult

- Part F of the Technical and Organisational Rules (www.e-control.at)
- Currently applicable *Systemnutzungsentgelte-Verordnung* (System Charges Ordinance) (www.e-control.at)
- Chapter 6 of the Electricity Market Code (www.e-control.at)
- The website of the clearing and settlement agent APCS (www.apcs.at)

3.5 Scheduling

Schedules fulfil two main purposes: the CAM must be informed about the planned dispatch of power stations and electric energy flows across control area borders; the CSA needs them to calculate each balance group's imbalance charges.

In Austria, we distinguish between:

- External schedules for electricity trading between balance groups in different control areas (to be sent by the BRP to the CAM, then checked by the CAM and sent to the CSA); and
- Internal schedules for electricity trading between balance groups in the same control area (to be sent by the BRP to the CSA).

Besides, there are

- Schedules for generation and pumping;

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- Power station maintenance schedules;
- Schedules for the allocation of green electricity.
- Schedules for grid losses; and

Trades between market players in different control areas must be notified to the CAM by way of external schedules by 14.30 hrs on the day ahead. The CAM checks whether there is sufficient capacity; if this is not the case, it may suggest changes to the schedules or reject them. Accepted schedules are forwarded to the CSA, where they are used to calculate imbalances afterwards. Short-term changes to the schedules - after submission on the day before - must be notified with a 45-minute lead time. Cf. section *"Cross-border trade"*.

Internal schedules, for trading among balance groups in the same control area, must also be submitted to the CSA by 14.30 hrs on the day before the trade, so that imbalances can be calculated. Short-term changes to the schedules - after submission on the day before - must be notified with a 15-minute lead time. Each balance group sends the CSA only its net transactions with each other balance group.

As a rule, each balance group nets all its relevant external and internal schedule time series that refer to the same day and recipient (CAM or CSA) and submits them in one message. This means that each balance group sends one daily external schedule with all its external schedule time series to the CAM and one daily internal schedule with all its internal schedule time series to the CSA.

In the interest of operational security, larger power plants are required to send the CAM and SOs their daily power plant schedules (i.e. generation and pumping schedules, both separated and as netted time series for the entire balance group) and their maintenance schedules; the latter are annual schedules with weekly information.

In addition, the Austrian green power support regime requires retailers that supply consumers in Austria to buy a certain share of supported green power, at a price that is set by way of ordinance (and is usually higher than the market price). The green power settlement agent notifies the BRPs of the amount of green power to be bought on the next day and the day after by way of a schedule.

Besides, system operators must notify forecast grid losses to the BRP by way of dedicated schedules. Cf. section *"System losses".*

The data format used for schedules in Austria is ESS (ETSO Scheduling System); this xml-based format has been defined and recommended by ETSO. It enables clear versioning, automated checking mechanisms and confirmation of the schedules sent.

For additional information, please consult

- Chapters 3 and 8 of the Electricity Market Code (www.e-control.at)

3.6 Clearing and settlement

Normally, neither actual electricity consumption nor actual electricity production can be forecast 100% accurately and deviations of meter readings from schedules result. Balance groups address such imbalances by procuring balancing energy. Financially, the CSA uses metered consumption and generation information and schedules to calculate the imbalances and invoices the corresponding amounts to each balance group. For a definition of 'control power' vs. 'balancing energy', please consult the chapter *"Control power and balancing energy"* below.

Clearing and settlement with the balance groups can be divided into two stages. Clearing takes place once a month; in this process, the BRPs' internal and external schedules are compared with the SOs' meter readings to calculate the imbalances that occurred during the previous month. Imbalances are calculated according to the same 15-minute interval as the netted schedules and the total monthly meter readings.

In the financial settlement process, the market prices for balancing energy are combined with the calculated amount of imbalances to determine the sums to be charged or credited to each BRP.

Each month, two clearings are executed: on the one hand, the first clearing for the month before is done on the 10th working day of the month; on the other hand, the second clearing for 15 months ago is done.

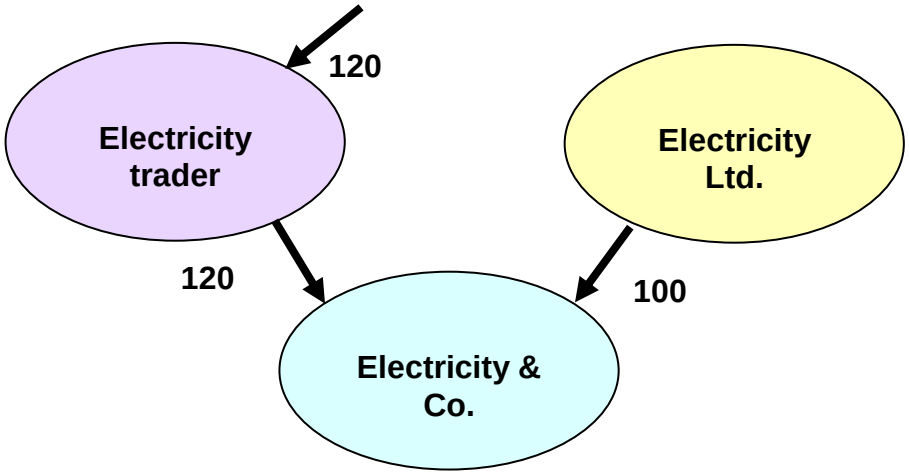
This second clearing takes into account the fact that the meters of small consumers (with standardised load profiles) are only ready once a year, i.e. information about the actual consumption of such small consumers only becomes available once a year. This is also an opportunity to adjust the billed volumes, which might become necessary due to erroneous readings, retroactive supplier switches etc. Once a quality check has been conducted on the second clearing, the process is concluded for this month.

In Austria, it is the CSAs that are entrusted with clearing, i.e. in their role as independent market participants they are responsible for calculating balancing energy volumes and billing balance groups. How balancing energy cost is distributed and passed on to suppliers and consumers within each balance group is not subject to the Market Rules but rather to individual agreements among balance group members.

Example: calculation of imbalances

The calculation of imbalances is exemplified using three imaginary balance groups. The two balance groups "Electricity & Co" and "Electricity Ltd." both have consuming and producing members in the grid areas x and y. "Electricity trader" is a pure trading balance group, i.e. one without consumers; it serves the sole purpose of electricity trading.

Schedules



- Generation in the balance group “Electricity & Co” is not sufficient to cover all its consumers’ demand during a certain time interval (e.g. 15 minutes); therefore, additional electric energy for this interval is procured from “Electricity Ltd.” (100 MW) and from “Electricity trader” (120 MW).
- The BRPs of all involved balance groups send schedules with this information to the CSA.
- The CSA keeps accounts for each balance group; the amounts are written onto the credit side of the receiving balance group and onto the debit side of the delivering balance groups.

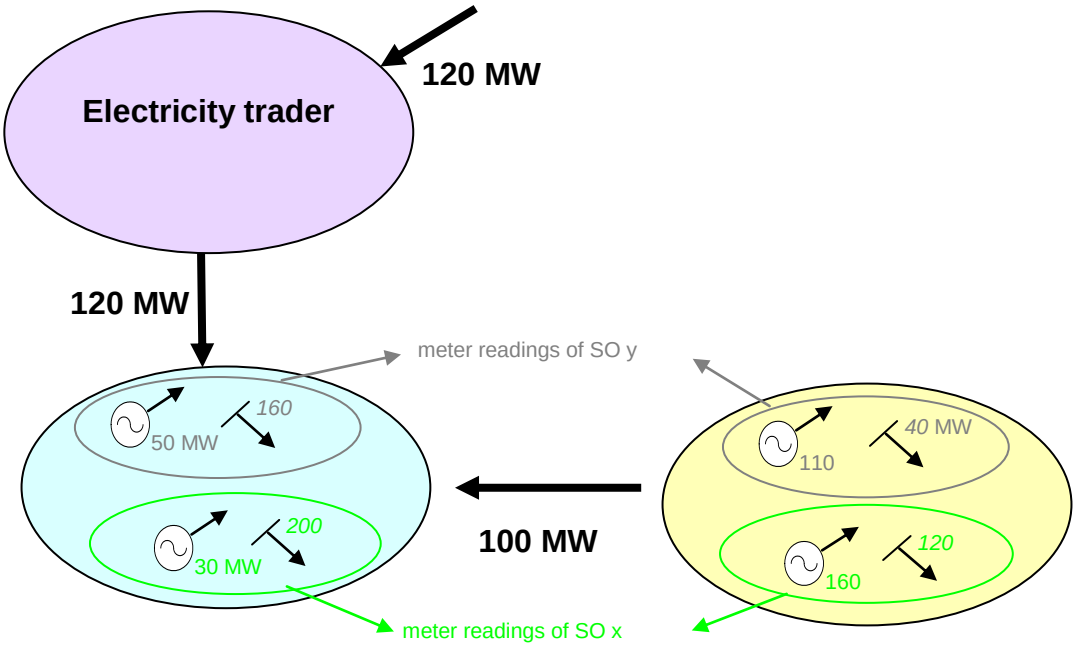
Trader	
Debit	Credit
120	120

Electricity & Co.	
Debit	Credit
	100
	120

Electricity Ltd.	
Debit	Credit
100	

The accounts of the balance group “Electricity trader” are usually balanced, as it does not need to rely on consumption or generation forecasts. “Electricity trader” supplies 120 MW to “Electricity & Co.” and at the same time, procures this amount of electric energy, again by way of schedules, from another balance group in the same or another control area. If it intends to trade with another control area, the balance group must submit the corresponding schedules to the CAM. After checking the schedule, the CAM forwards it to the CSA, which records the electricity volumes in the balance group’s accounts.

Forecast and actual volumes



At the end of each month, the CSA calculates each balance group's imbalances:

- The operators of the grid areas x and y submit aggregate meter readings for the interval relating to all customers of these balance groups that are connected to their grids to the CSA.
- The readings are fed into each balancing group's accounts and compared to the scheduled amounts. Again, production goes onto the credit side of the accounts, consumption onto the debit side.

Trader	
Debit	Credit
120	120
120	**120**
In balance	

Electricity & Co.	
Debit	Credit
160	100
200	120
	50
	30
360	**300**
Negative imbalance of 60 MW	

Electricity Ltd.	
Debit	Credit
100	110
40	160
120	
260	**270**
Positive imbalance of 10 MW	

The two balance groups among whose members are also consumers have caused imbalances because forecasts did not exactly match actual consumption. "Electricity & Co." consumed more electric

energy than was generated or procured through schedules, while “Electricity Ltd.” consumed less than forecast, and thus injected too much electric energy into the grid.

This process is used to determine all balance groups’ imbalances for each 15-minute interval.

To determine the price for balancing energy, the CSA refers to the bids called; a more detailed description of how balancing energy prices are determined is given in the annex to the CSA’s GTC.

For additional information, please consult

- Chapters 2 and 10 of the Electricity Market Code (www.e-control.at)
- GTC of the CSA and annexes (www.e-control.at)
- The website of the clearing and settlement agent APCS (www.apcs.at)

3.7 Control power and balancing energy

It is physically necessary for an electricity grid to be balanced at all times, i.e. at each moment, injection and withdrawal must match and balance each other. In the European interconnected system, the control area managers use load frequency control to ensure proper functioning and stability of the system.

In Austria, the TSO assumes the role of the CAM.

To balance the grid, the CAM may use primary, secondary and tertiary control (minute reserve); “involuntary exchanges” between control areas may also happen. The control mechanisms differ from each other in terms of the time needed for activation and adjustments.

In the event of a major load fluctuation in the European interconnected system, such as a power station outage or other unpredictable variation in injection or withdrawal, the control area managers’ primary reserve is activated; this is available almost immediately. Contributions of reserve capacity are voluntary. The amounts are expressed by an agreed formula based on generation output. This system maintains frequency stability.

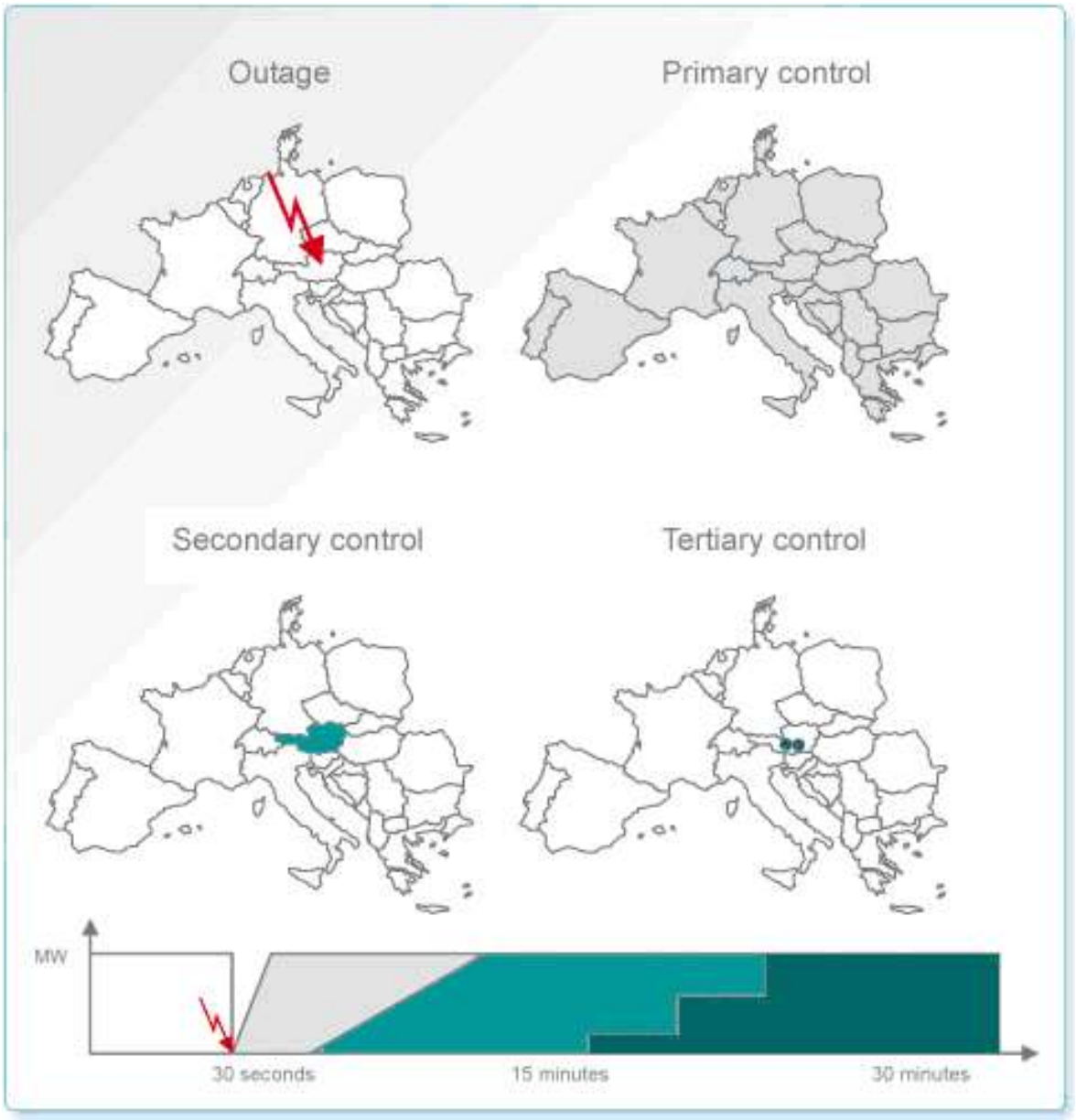


Figure – Control mechanisms and stages

Where there is only a brief power deficit or surplus, primary control is sufficient to stabilise the system. It is defined as “an automated reestablishment of the balance between generation and consumption within no less than 30 seconds following imbalance”.

If a longer disturbance occurs secondary control is activated after a defined period (max. 30 secs) or simultaneously with primary control, in order to relieve the burden on the primary reserve and free it to perform the above function. While primary control ensures system stability across control areas, secondary control compensates imbalances within a control area. It may take several minutes until balance is restored to the system.

If a surplus or deficit lasts even longer than that (>15 minutes), tertiary control takes over or is activated alongside secondary control already. This is done either automatically or manually; tertiary control

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must be ready for dispatch no later than 15 minutes after the imbalance starts. Secondary control covers a period of up to 15 minutes; tertiary control must not necessarily be concluded after this time.

Tertiary control power is traded on a dedicated market where electric energy is bought or sold to re-establish system stability. This balancing energy market is only open to producers and consumers that have been accredited by the CAM. They post bids for positive or negative balancing energy into this market by 16.00 hrs on the day ahead.

Auctioning of tertiary control lies with the CAM. The bids are ranked according to a number of criteria to form a merit order list; this specifies the order in which the bids are called if needed, i.e. the order in which the power plants are called ten minutes before they should start injecting or withdrawing. Information about the bids that have been called is sent back to the CSA to enable (first and second) clearing and settlement of imbalances with the balance groups.

There can of course be overlaps between the three control mechanisms; the main reason for a differentiation is that only few power plants fulfil all the requirements for primary control, while secondary control can already be covered by plants with short activation times, such as storage or gas-fired power plants.

The cost of control

Costs for primary control are borne by electricity producers with a maximum capacity of more than 5 MW. They are distributed according to annual output.

Secondary control causes costs for the availability of reserve capacity and for the actual supply of control power. The costs for secondary control reserve are covered through the charge for system services, which is directly billed to the producers. It is argued that the other components of the system charges are borne by withdrawers, so that it is fair for part of the cost burden to fall on generators. The costs for secondary control power are charged to the BRPs (which pass them on to consumers).

Tertiary control power is billed to the BRPs in the clearing and settlement process. Once the amounts of balancing energy have been determined during clearing, the costs for these imbalances are settled with the balance groups - and credited to the balancing energy providers.

The manner in which these costs are passed on to suppliers and consumers is a matter for internal agreement in each balance group.

Balancing energy vs. control power

Control power and balancing energy have the same purpose — that of balancing generation and consumption. A deviation from forecast supply or demand in a balance group, e.g. as a result of an outage, gives rise to the need for balancing energy. The net balancing energy in all the balance groups in a control area is the control power demand that the CAM must meet. The total quantity of balancing energy may be many times the control power, as the balance groups' needs may offset each other.

Put simply:

- Control power is needed in the case of deviation from forecast in a control area;
- Balancing energy is needed in the case of deviation from forecast in a balance group.

For additional information, please consult

- The annexes to the GTC of the CSA (www.e-control.at)
- Chapter 3 of the Electricity Market Code (www.e-control.at)
- The websites of the CSA and CAM (www.apcs.at, www.apg.at)
- Part A of the TOR (www.e-control.at)

3.8 System losses

Framework

Even though in theory, we can distinguish between technical and commercial losses, this distinction is hardly feasible in practice.

Technical losses amount to a certain percentage of total generation and are caused by the flow of electric energy through individual components of electric grids such as lines, transformers etc.

Commercial losses, on the other hand, may be caused by theft, faulty billing, misreadings, overlooked facilities, estimation errors for flat-rated facilities etc. In practice, precise metering of grid losses is not possible.

Therefore, most network operators determine their grid losses by way of their own formulae or by netting their numbers. The latter involves comparing metered injection and imports with metered withdrawals and exports during a certain period of time; the resulting difference is then considered to represent grid losses. Of course, this includes technical as well as commercial losses.

Treatment of losses in the Austrian market model

Grid losses are electric energy that is taken from the grid and therefore, they must be accounted for in the market model. Each SO is obliged to form a dedicated balance group for grid losses or to join an existing such group.

Just as all other balance groups, the balance groups for grid losses must submit daily schedules to the CSA. Information for these loss schedules is derived from the total grid losses on that day one year before; in accordance with the *Systemnutzungsentgelte-Verordnung* (System Charges Ordinance), this is in turn determined from the percentages stated in the expert report by Haubrich/Swoboda, calculated or metered by the SO.

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The Market Rules specify that balance groups for grid losses do not give rise to balancing energy during first clearing, i.e. the time series from the losses schedules are cleared directly. Any imbalances are accounted for during second clearing; by the time this takes place, meter readings are available and imbalances can be determined.

SOs must procure the power they need to cover grid losses in a market-based, transparent and non-discriminatory procedure. Most SOs have opted for joint procurement, which is handled through a dedicated balance group. The electric energy necessary is purchased and assigned to the balance groups for grid losses via schedules. Schedules are offset against each other among the dedicated balance group and the individual balance groups for grid losses to ensure that imbalances can only arise at the former, but not at the latter.

Charge for system losses

SOs are compensated for covering grid losses through the charge for grid losses, which is set in the System Charges Ordinance.

For additional information, please consult

- *Systemnutzungsentgelte-Verordnung* (System Charges Ordinance) (www.e-control.at)
- Chapter 8 of the Electricity Market Code (www.e-control.at)

3.9 Cross-border trade

With the exception of the border to Germany, all of Austria's borders with neighbouring countries are congested. There is congestion at the borders with the Czech Republic, Hungary, Italy, Slovenia and Switzerland. There is no interconnection between Austria and Slovakia. The CAM holds explicit auctions at the congested borders. *Figure 6* depicts cross-border flows between Austria and its neighbouring countries (here for the time period 15.00-15.15 on 22 January 2013).

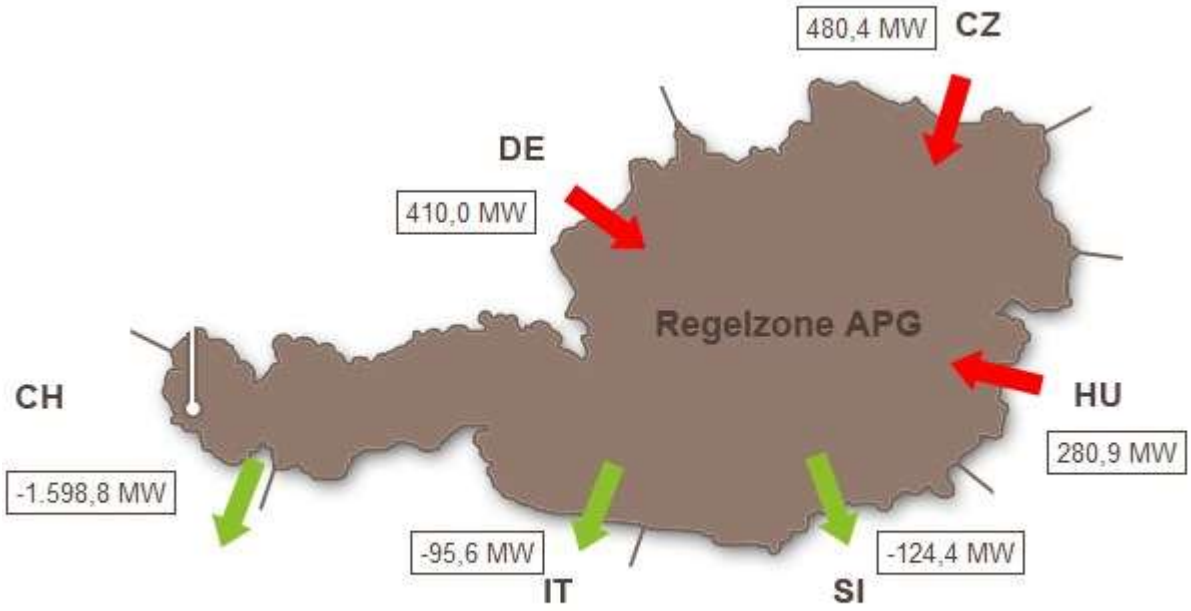

Figure - Cross-border flows during the time period 15.00-15.15 on 22/1/2013 (source: APG)

In the interest of transparent and non-discriminatory capacity allocation, cross-border transmission capacity is auctioned off in annual, monthly and daily explicit auctions and in intraday auctions. With the exception of the latter, they are conducted through dedicated auction platforms. For the borders with Switzerland and Italy, this is the Capacity Allocation Service Company (CASC); auctions for cross-border capacity with Slovenia, Hungary and the Czech Republic are conducted by the Central Allocation Office (CAO) in Freising, Germany. Intraday capacity auctions are split between the Austrian and neighbouring CAM.

The capacity on offer, auction dates, rules and results are published on the websites of the auction offices and the Austrian CAM Austrian Power Grid.

For additional information, please consult

- Austrian Power Grid website (www.apg.at)
- CASC website (www.casc.eu/en)
- CAO website (www.central-ao.com)
- Chapter 3 of the Electricity Market Code (www.e-control.at)

3.10 Supplier and balance group switching, enabling and disabling

The supplier switching process ensures that system users (consumers or producers) can smoothly transfer from their current supplier to another one; switching, enabling and disabling are crucial for the liberalised market.

As processes in the open market, supplier switching and enabling/disabling are subject to a set of harmonised rules. These rules – deadlines, responsibilities, data formats etc. – are laid down in the regulatory authority's *Wechselverordnung Strom* (Electricity Switching Ordinance).

The Electricity Switching Ordinance regulates the following sub-processes:

- Supplier switching with ex-ante data validation
- Enabling a metering point
- Disabling a metering point

As a rule, the SO or supplier should rely on automation to conduct these processes. All data exchange must take place on the central switching platform operated by the CSA. Storage of consumer data is decentralised at the SOs and suppliers. All SOs and suppliers must register with the CSA as users of the switching platform and install and operate electronic interfaces with the platform. Particularly with smaller SOs and suppliers in mind, the CSA's services include a so-called “self-storage service”, which enables users to automate switching processes by uploading the relevant switching information through a web interface.

Normally, suppliers are authorised by their customers to execute the processes on their behalf; as a matter of proof, the supplier submits a written authorisation by the customer to the other relevant market players - again through the switching platform. Customers may initiate a supplier switch or the process for enabling/disabling a metering point on any working day. The switching date itself, or the date for enabling/disabling, can be any day.

In these processes, customers are identified by way of their MPRN; if customers do now know their MPRN, their supplier can find it out using name (family name or company name) and address (post code, town and street) in an ex-ante data validation process.

Supplier switching with ex-ante data validation

The switching process includes two optional data validation sub-processes that serve to double-check customer data with the current supplier and the SO. Both these processes must be automated (under exceptional circumstances, they may take up to 24 hours, but in no case longer than that). The time for the entire switching process is 12 working days as a maximum, with the sub-processes all being automated. In exceptional cases, the deadlines for individual sub-processes may be extended within the 12-day period. The current supply contract must be terminated by the consumer or the new supplier by way of the switching platform.

Non-binding English version, E-Control

Enabling metering points

To enable a metering point, the corresponding process with the SO must be kicked off either by the customer or the future supplier; this must be done before the customer can start using the grid.

There are different procedural steps to be taken for operational facilities as opposed to non-operational ones.

(Please note that enabling a metering point and establishing grid connection are two different processes. The process for establishing new connections to the grid is not addressed in the Electricity Switching Ordinance.)

The SO validates the enabling data received from the supplier or customer and, within 96 hours (operational facility) or 48 hours (non-operational facility), either confirms that the point has been enabled or aborts the process and states its reasons for doing so.

Once enabled, non-operational facilities are to be activated within a deadline that depends on whether and which kind of metering device is already installed.

Disabling metering points

The SO can be notified that a metering point is to be disabled by the consumer or by the supplier. The SO checks the notification for validity and either confirms it to the supplier or aborts the process, stating grounds, within 120 hours.

Switching balance groups

This process is defined by BRPs and SOs on a bilateral basis.

For additional information, please consult

- Electricity Switching Ordinance (www.e-control.at)
- For descriptions and technical specifications, cf. the website about the switching platform (www.energylink.at)

3.11 Electronic exchange of billing information

Vertically integrated undertakings usually issue combined bills for network charges and energy cost to grid users. To enable also new suppliers to issue such combined bills, SOs are obliged to send the respective supplier the required information relating to its consumers, if so requested.

The efficiency principle requires that the information provided by the SO to the supplier comply with a predefined electronic format. This minimises the administrative effort involved at the supplier's and promotes automated processes for combined billing.

The format chosen for the information transmission process involved builds on the international open standard eXtensible Markup Language (XML). Based on this, the harmonised ebUtilities format has been developed. It meets the requirements for the contents of bills and includes a digital signature.

For additional information, please consult

- Chapter 7 of the Electricity Market Code (www.e-control.at)