BGM Partner Meeting

Zurich, 22nd November 2018

swissgrid

These are your contact persons at Swissgrid for balance group management

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Responsible for BGM Expert Group

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Agenda

10:00	Welcome address	Bastian Schwark
10:10	Winter outlook	Julius Schwachheim
10:30	News on cross border capacity allocation	Theodoros Sevdas
10:45	EPEX Spot market developments	Philippe Vassilopoulos, EPEX Spot
11:05	Current status of planned changes in the scheduling process	Hermann Feldmann, Thomas Eckert
11:25	Impact of separated secondary control net positions	Matthias Bucher
11:40	Balance Group Management and operational occurrences	Nicolas Schledermann, Marc Rüede
12:05	Imbalance pricing	Roger Wiget
12:15	Lunch break	
13:30	Introduction of the replacement reserves market (TERRE)	Alina Zigkiri
13:45	Security of supply Switzerland	Björn Rothe, ElCom
14:15	Revision electricity supply act – main elements of the consultation	Florian Kämpfer, SFOE
14:45	Current grid projects of Swissgrid	Susanne Landt
15:00	Feedback session	Bastian Schwark
15:15	End of event	

Winter outlook

Julius Schwachheim
Head of Market Operations Enhancement

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The past winter were characterized by national supply challenges – also Switzerland joined the rotation

2014 / 15

- Shutdown of conventional power plants
- Issues with nuclear
- Maximum 3'500 MW import feasible for a max. load of ca. 13'000 MW
  → Risk for **temporarily supply** issues

2015 / 16

- Low reservoir levels in the mountains
- Limited import capacity due to several factors (long maintenance, external flows, ..)
  → Risk for lack of **energy**

2016 / 17

- Low nuclear availability
- Cold weather
- High temperature sensitivity of consumption
- Limited capacity on IFA cable

2017 / 18

- Probably low nuclear availability in France
- Long term temperature forecasts do not foresee extremely cold weather
- … ??

… the initial slide of last years BG Partner meeting.

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2018/2019

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2015 / 16

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2016 / 17

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- Cold weather
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2017 / 18

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- … ??

… back to Belgium!

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A short recap of the Belgium situation and impact on Switzerland – Belgium's estimated needed import

NEWS

Belgium's creaky nuclear reactors raise risk of winter power outages

Source: https://www.dw.com/

- Prolonged maintenance of several nuclear power plants

  (6-7 nuclear reactors out of service)
- The first «cold» months October and November are impacted
- November was expected to be the month with the highest risk of undersupply in «severe conditions»

→ In «severe conditions» Belgium needed additional import capacities of ~700-900 MW (in addition to the assumed imports)

→ As capacities are not «guaranteed», national preparations and supportive exchanges with neighbours took place

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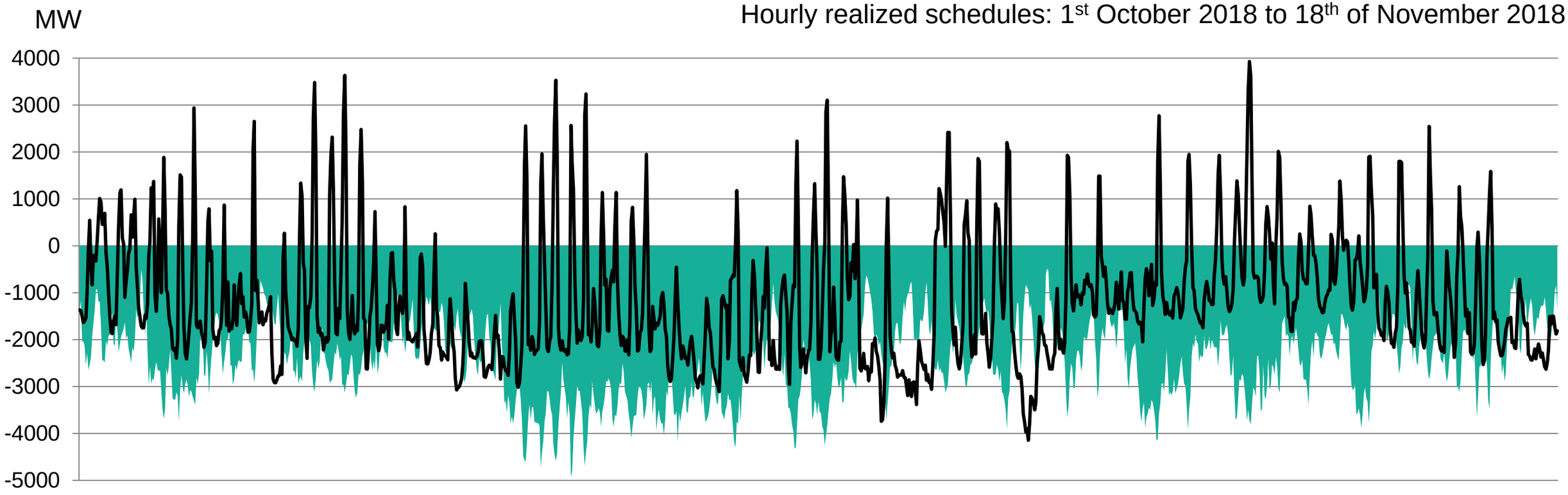
A short recap of the Belgian situation and impact on Switzerland – Belgium's realised import and the import/export situation of Switzerland



Belgium's net position

Switzerland's net position

Swissgrid's observations:

- Belgium's import peaked almost at 5'000 MW (reminder: severe conditions needed up to 4GW
- Several measures by CWE TSOs taken to ensure constantly high capacities
- Switzerland's export simply correlates to the usual peak hours

→ **The worst weeks have gone; the situation in Belgium seems relaxed**
(one nuclear recently came back into operation earlier than expected)

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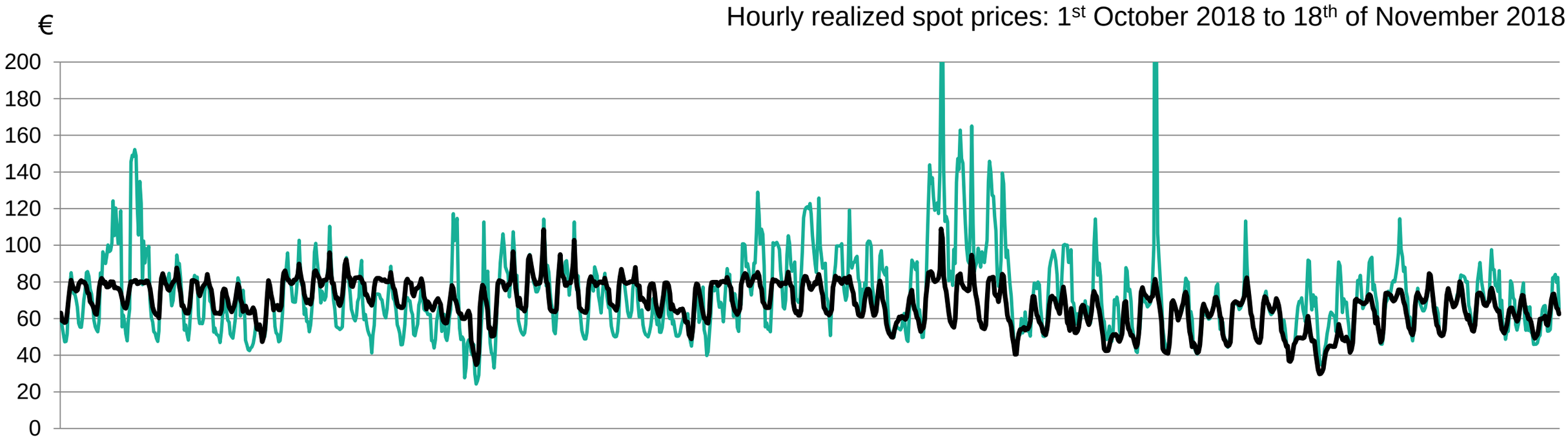
A short recap of the Belgian situation and impacts on Switzerland – Belgium's realised import and the import/export situation of Switzerland



Swissgrid's observations:

- Additional imports of Belgium are insufficient for significant impact on German, French and Italian prices
- Price spikes of Belgium do not make significant impact on the Swiss price
- Price spikes are lower than in the past winters (were up to 900€/MWh), however signalled tight margins
- The recent increase of the French price increases the demand for CH>FR and ITA>CH capacity during Winter 2018/2019

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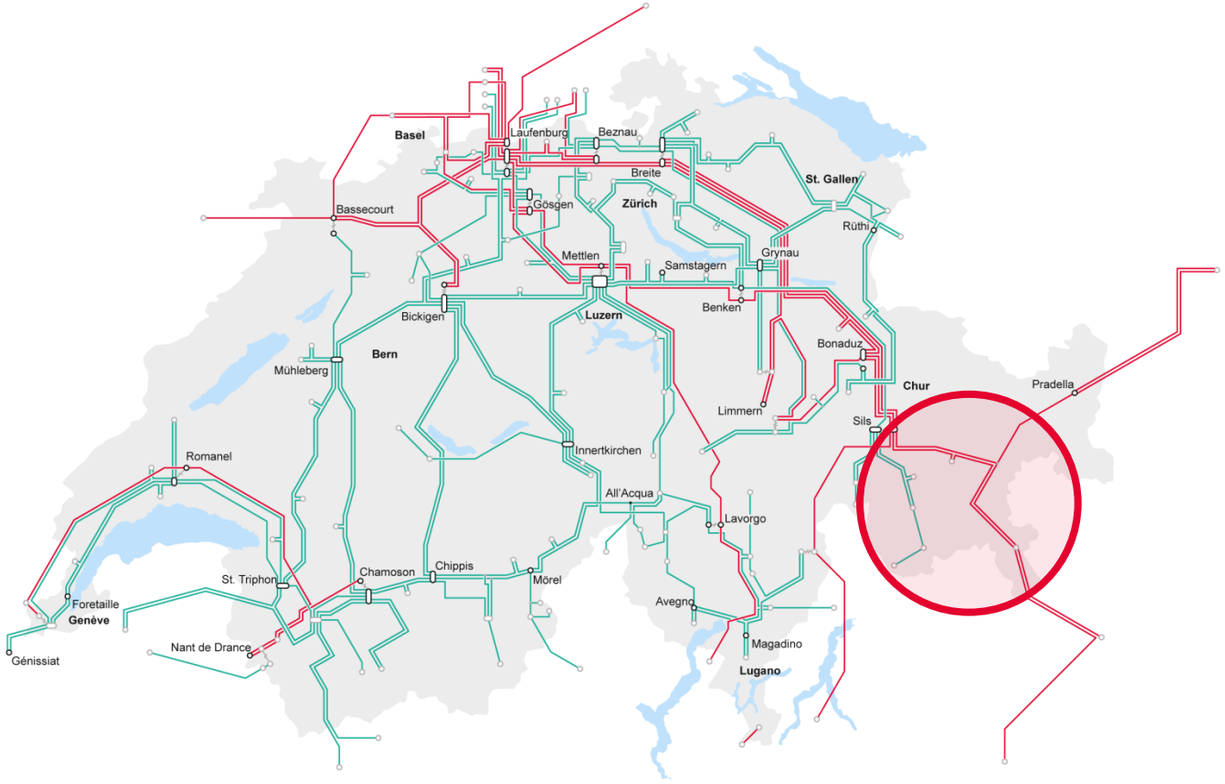
Whereas the adequacy situation in Western Europe seems to be secured – the alpine region is facing different issues: physical damages!



- The alpine region has been hit by massive storms
- Several **pylons of the transmission system** but also local villages have been damaged
- Mostly cross-border lines towards **Italy** are affected

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Duration of reduced cross-border capacity will be kept as short as possible

- The damaged lines can lead to reductions **between 500 and 1000 MW** of cross-border capacity to Italy – depending on the daily operational situation
- Swissgrid will repair the damaged pylons as soon as possible, given the dangerous situation on the Albula pass

It is necessary to keep in mind:

- Swissgrid is responsible for the safe operation of the Swiss high voltage electricity grid
- In order to cope with such natural events:

→ **Security margins** (with special regard to cross-border capacity) remain inevitable

→ **Coordinated operational processes** with our neighbours are inevitable and need to remain in place

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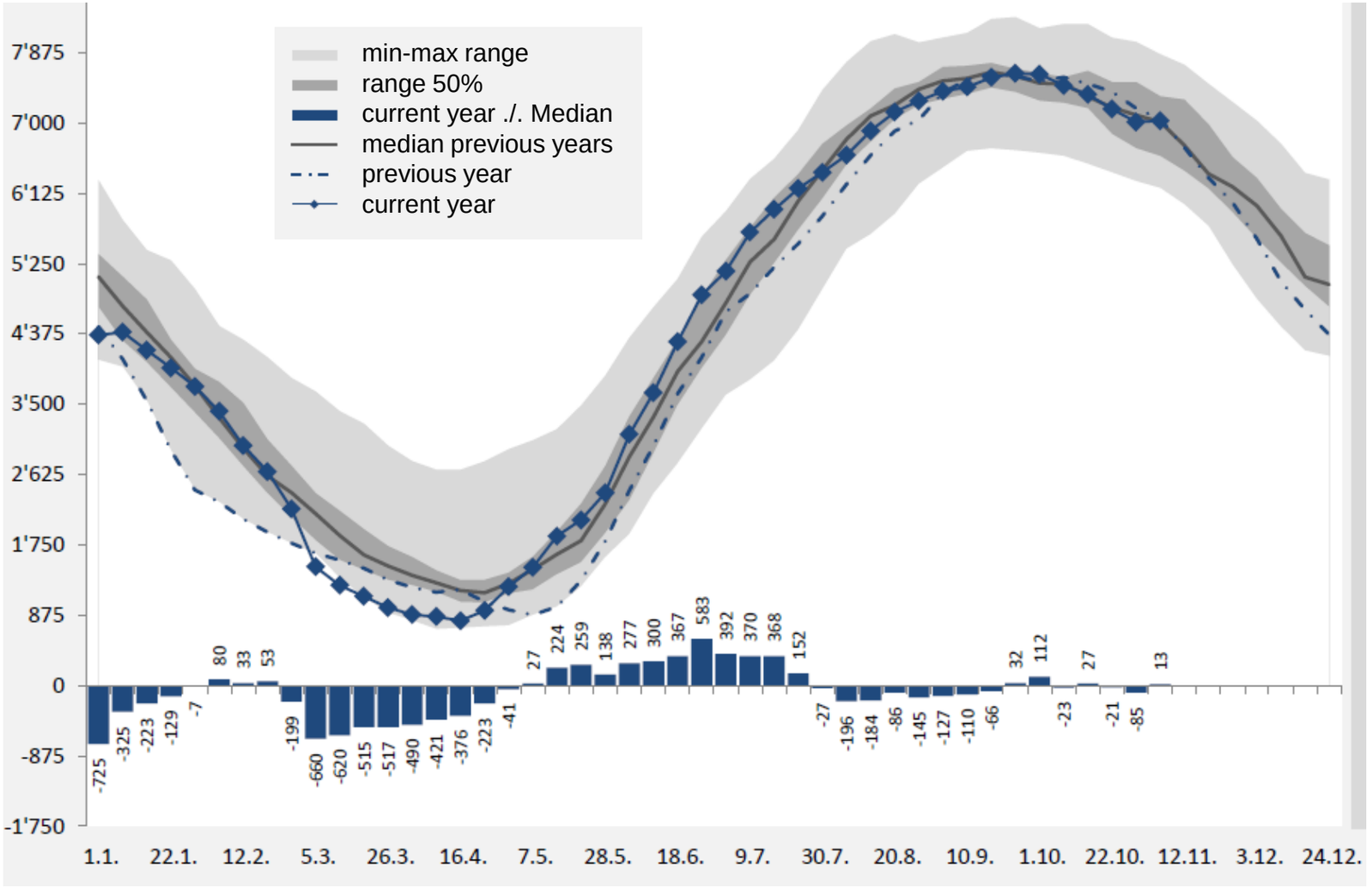
Swissgrid has currently not identified any risk for the safe grid operation during the upcoming winter



- Water reservoirs seem to be in a «normal» situation, despite:
  - the dry situation in the last months
  - the export volumes in the previous weeks
- All nuclear power plants are currently available (and no downtimes expected in winter so far)
- There are no strong reductions of import capacity know for the upcoming months

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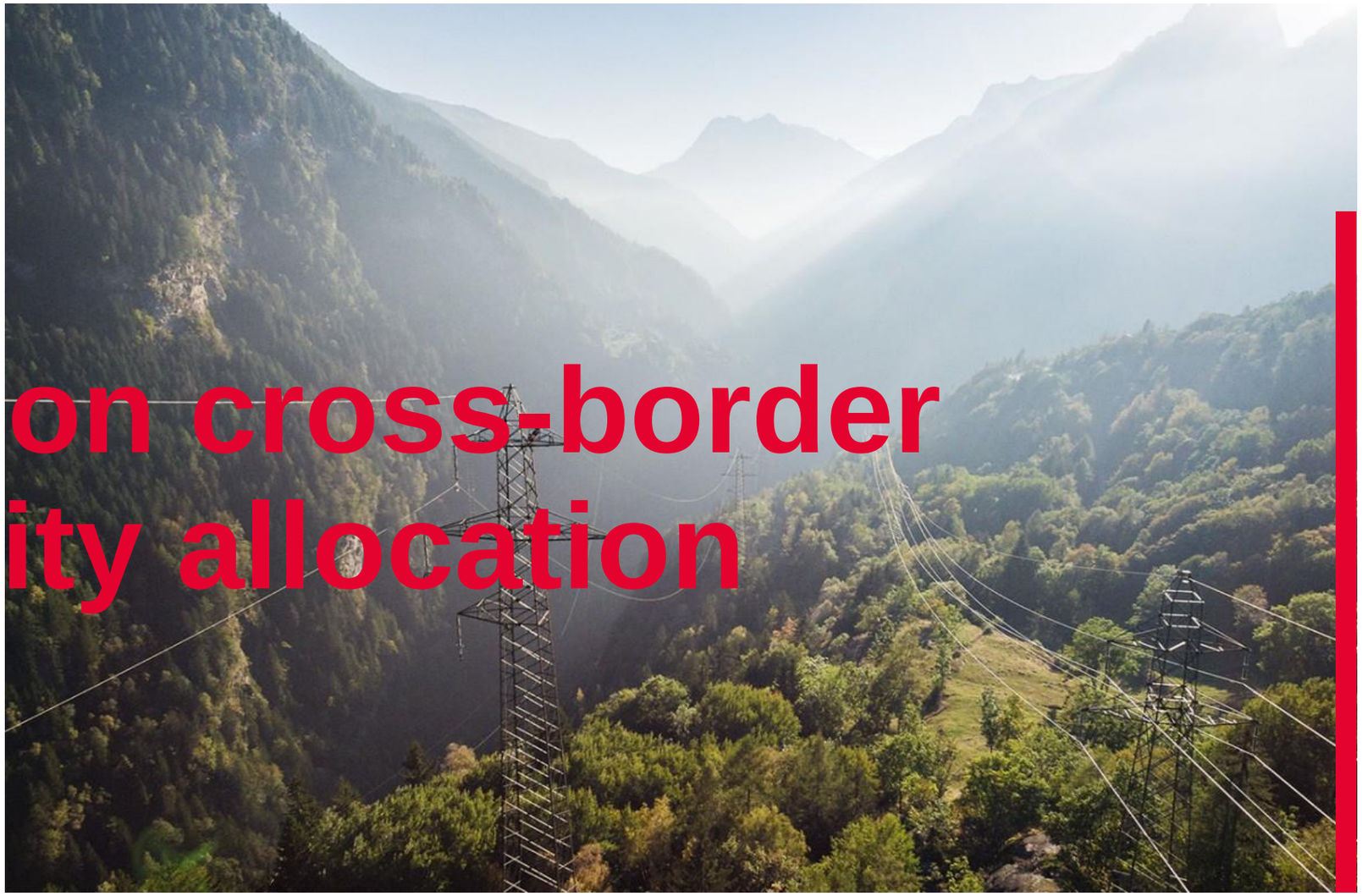
Swissgrid continues to monitor the situation. For the moment, regular operation is expected.

News on cross-border capacity allocation



Theodoros Sevdas
Senior Specialist Market Operations Enhancement

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European target model in intraday: Continuous coupling of the markets

Intraday coupling of the energy markets in Europe since 2011

2011 Explicit continuous cross-border Intraday capacity allocation

2013 Regional cross-border Intraday Market via EPEX Spot

2015 Extension of cross-border Intraday Market via EPEX Spot

2018 European cross-border Intraday Market (XBID)
Go live of 1st wave on 12 June 2018

2019 / 2020 / 2021
European cross-border Intraday Market (XBID)
Go live of 2nd and 3rd wave

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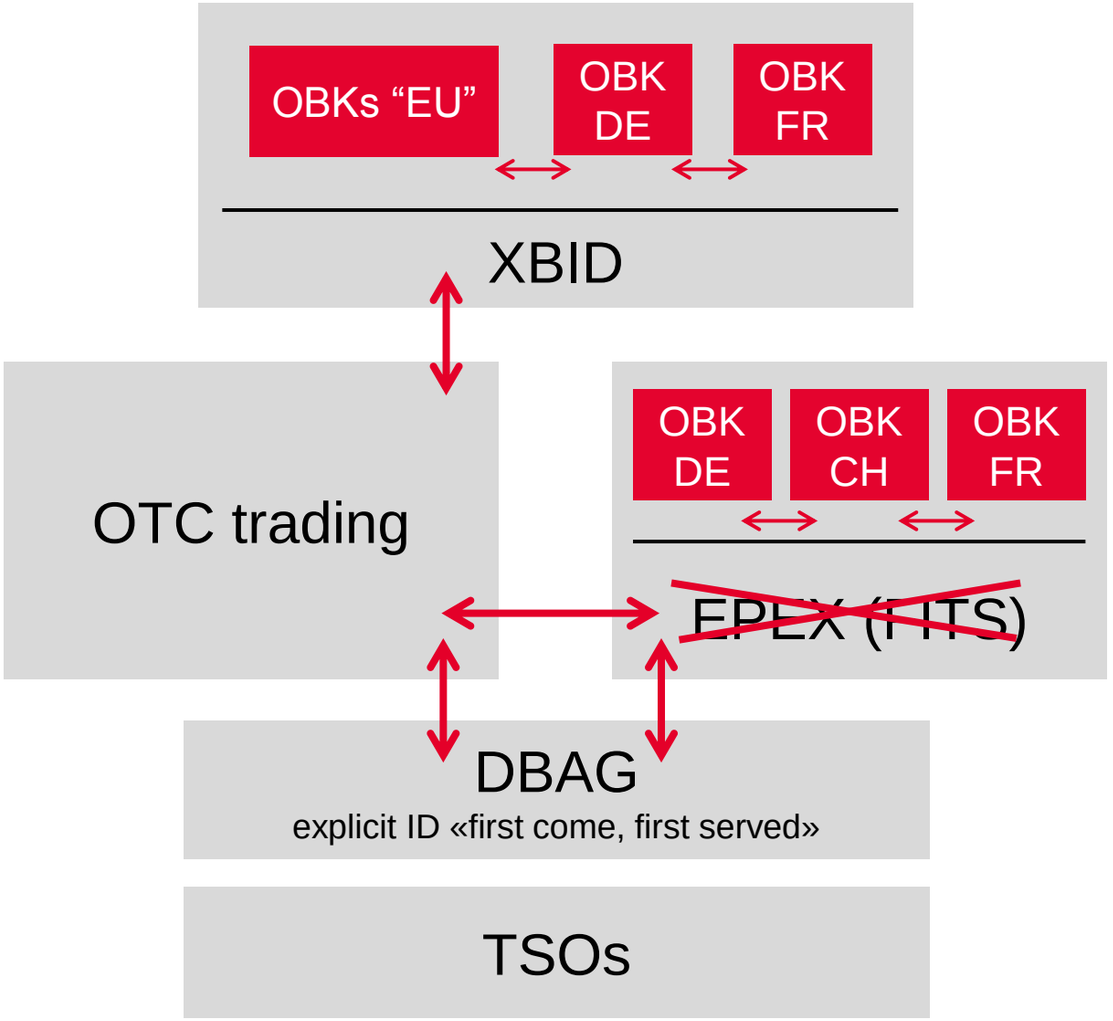
On CH-FR / CH-DE borders, market participants are adapting to the allocation of intraday capacity only via the «first come, first served» explicit allocation



New situation without FITS

- Drop of liquidity of Swiss EPEX Spot ID segment
- Market participants trade on liquid XBID markets in DE and FR
- In order to bring the energy to/from CH, market participants have to reserve capacity on the DB AG platform
- «First come, first served» is particularly exposed to inefficient behaviour

Important rules

- Reserved ID capacity must always be immediately nominated to Swissgrid with schedules
- There must always be a clear link between capacity reservation and electricity trades

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Swissgrid and APG have defined the requirements to introduce an IT based intraday allocation on CH-AT border

The introduction of 4.9 GW limitation on DE-AT border on 1st October 2018 has changed the price spread between CH-AT

- A more volatile price spread is an additional reason to have a more agile intraday trading platform
- Swissgrid and APG wish to further develop the intraday allocation and to implement a mechanism for intraday capacity allocation similar to CH-DE / CH-FR
- TSOs have to implement extensive changes in their scheduling systems and processes in order to accommodate an IT based allocation
- According to the current time plan an implementation of the DB AG platform on the CH-AT border is planned for end of 2019

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Swissgrid is aiming for the introduction of implicit intraday auctions on the border CH-IT

Swissgrid, Terna, EPEX Spot, and GME are working on the implementation of implicit auctions on the CH-IT border

- The project is based on an initiative of the two regulatory authorities of Switzerland and Italy and is out of the scope of the CACM Guideline
- Once implemented, two implicit auctions will substitute the current two explicit ID auctions performed by JAO
- On Swiss side EPEX SPOT will introduce two new auctions
- The auction times will be synchronised with the timings of the Italian intraday auctions (MI2 and MI6)

	Auction time	Delivery time	Type of product
Implicit auction 1	16:30, d-1	0 – 24	hourly
Implicit auction 2	11:15, d	16 – 24	

- Traders do not need to submit cross border nominations anymore
- The TSOs will make the capacity available, that has not been allocated or used in previous allocations
- The design has been accepted by the NRAs. The actual Go live date will also depend on regulatory approval planned for Q1 / Q2 of 2019

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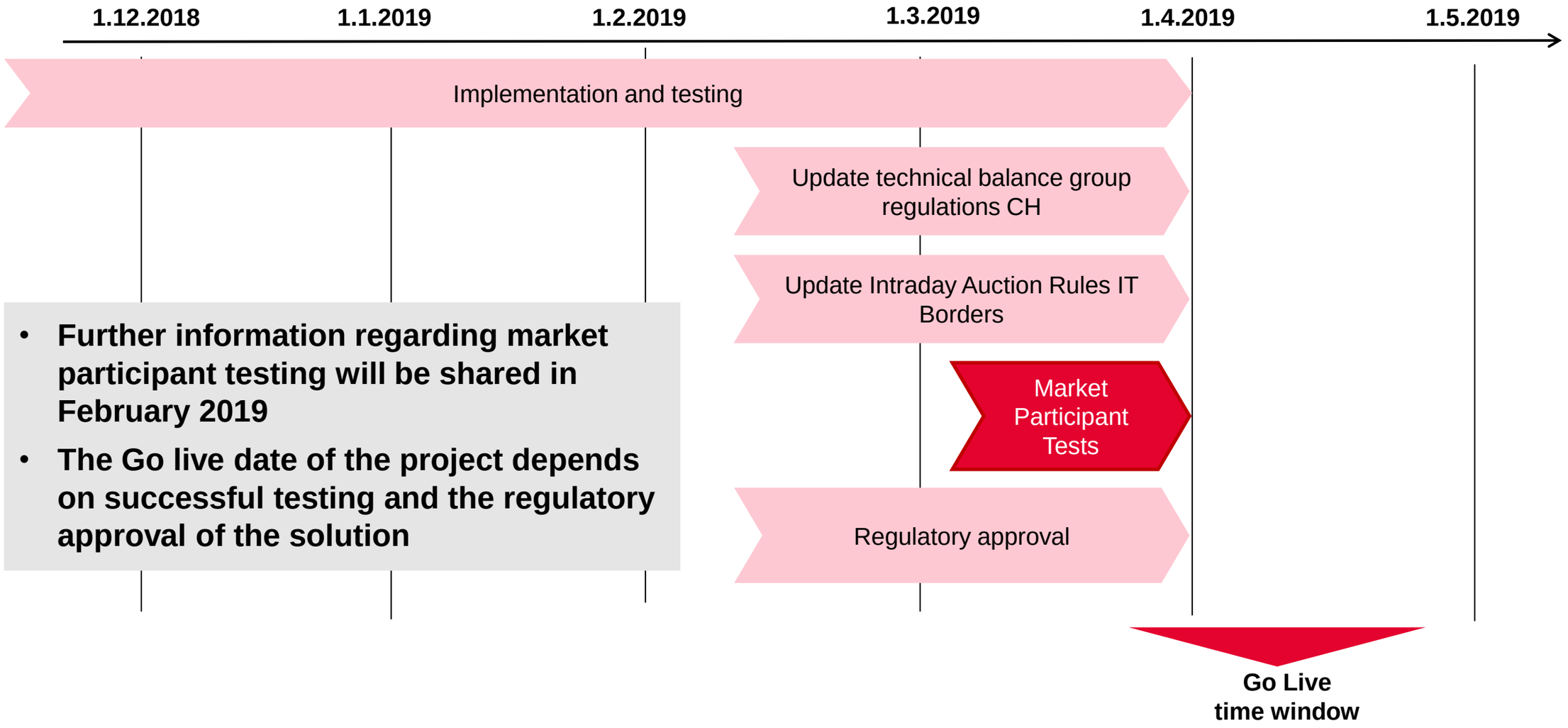
Planning and next steps for the introduction of implicit intraday auctions CH-IT



- **Further information regarding market participant testing will be shared in February 2019**
- **The Go live date of the project depends on successful testing and the regulatory approval of the solution**

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Swissgrid – BGM Partner Meeting

Zürich, 22nd November 2018

Philippe Vassilopoulos – Director of Product Development
EPEX SPOT

part of eex group

Agenda

1. 2017 / 2018 Spot trading activity
2. Market developments – Day-Ahead Market
3. Market developments – Intraday Market
4. Future of the Swiss Intraday Market
5. Q&A

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1. Trading activity in 2017 / 2018

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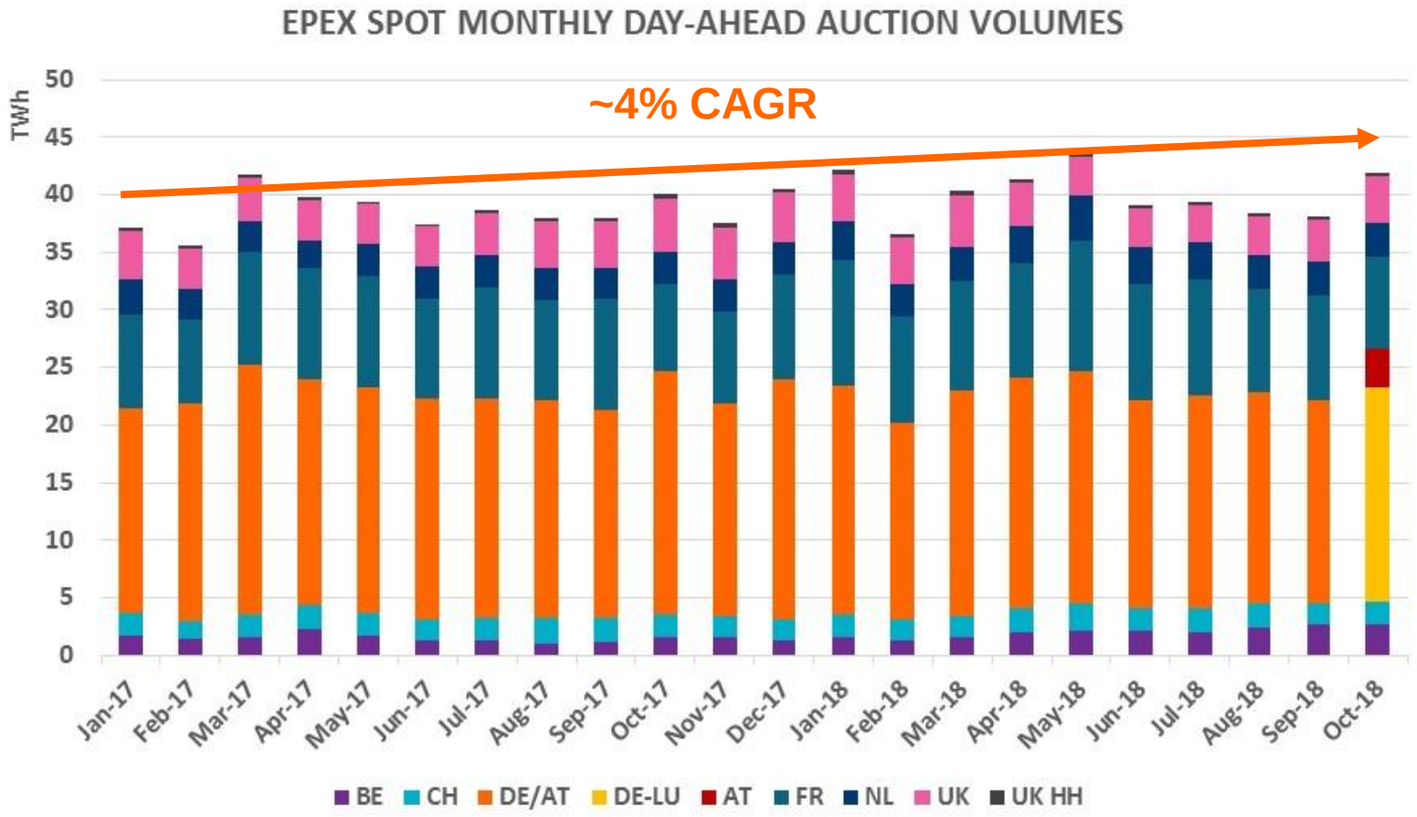
Your single gateway to value power

› eex › epexspot

FUTURES MARKET	CAPACITY MARKET	DAY-AHEAD AUCTION	INTRADAY CONTINUOUS
Year/Month/Week before delivery	Year(s) before/ after delivery	One day before delivery	Until 5 min before delivery
HEDGE fluctuations	Value **CAPACITY / DEMAND-RESPONSE**	Value **PRODUCTION CONSUMPTION**	Value **FLEXIBILITY**

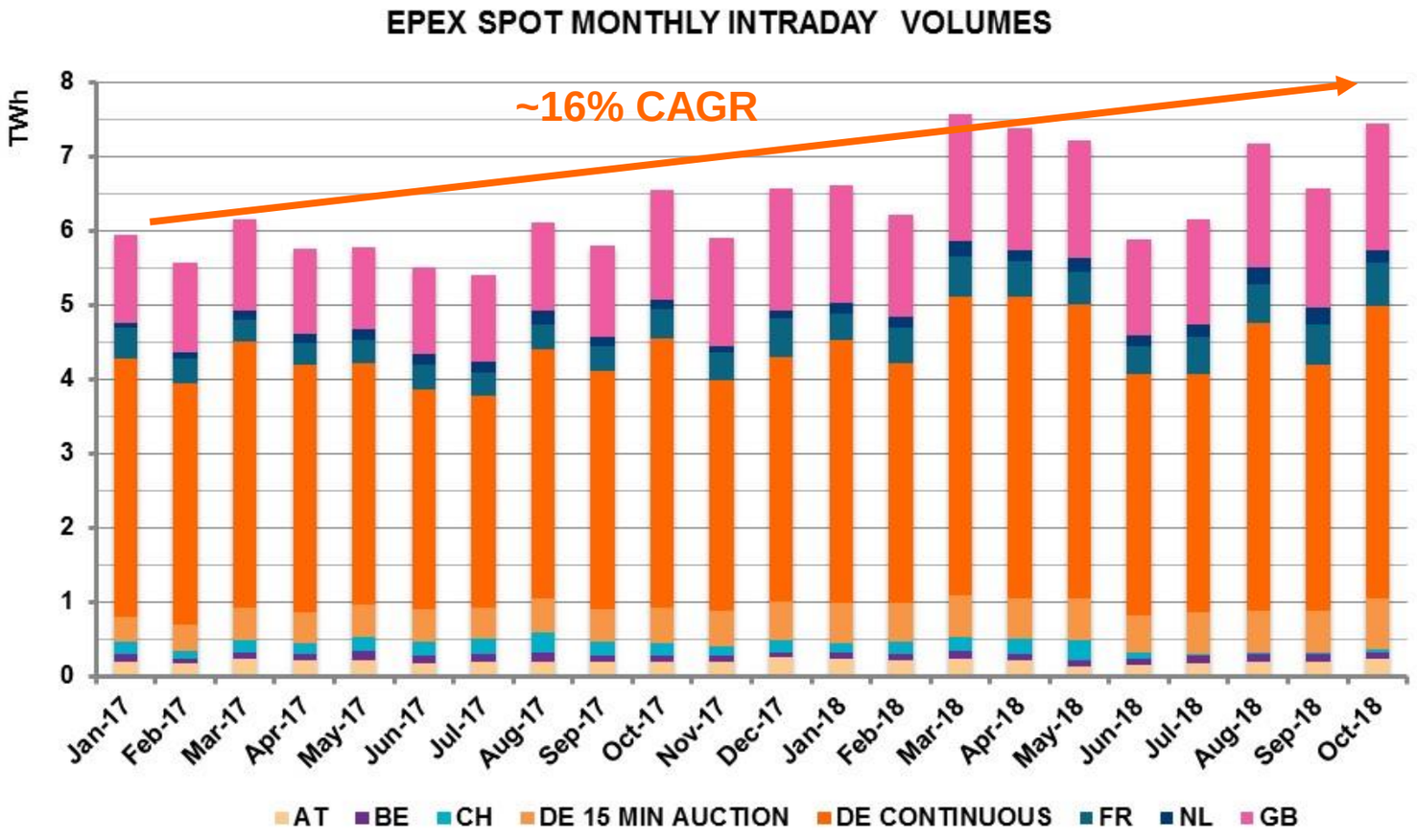
› ecc **Integrated & Secure Clearing Solution**

The Day-Ahead market: mature but still growing



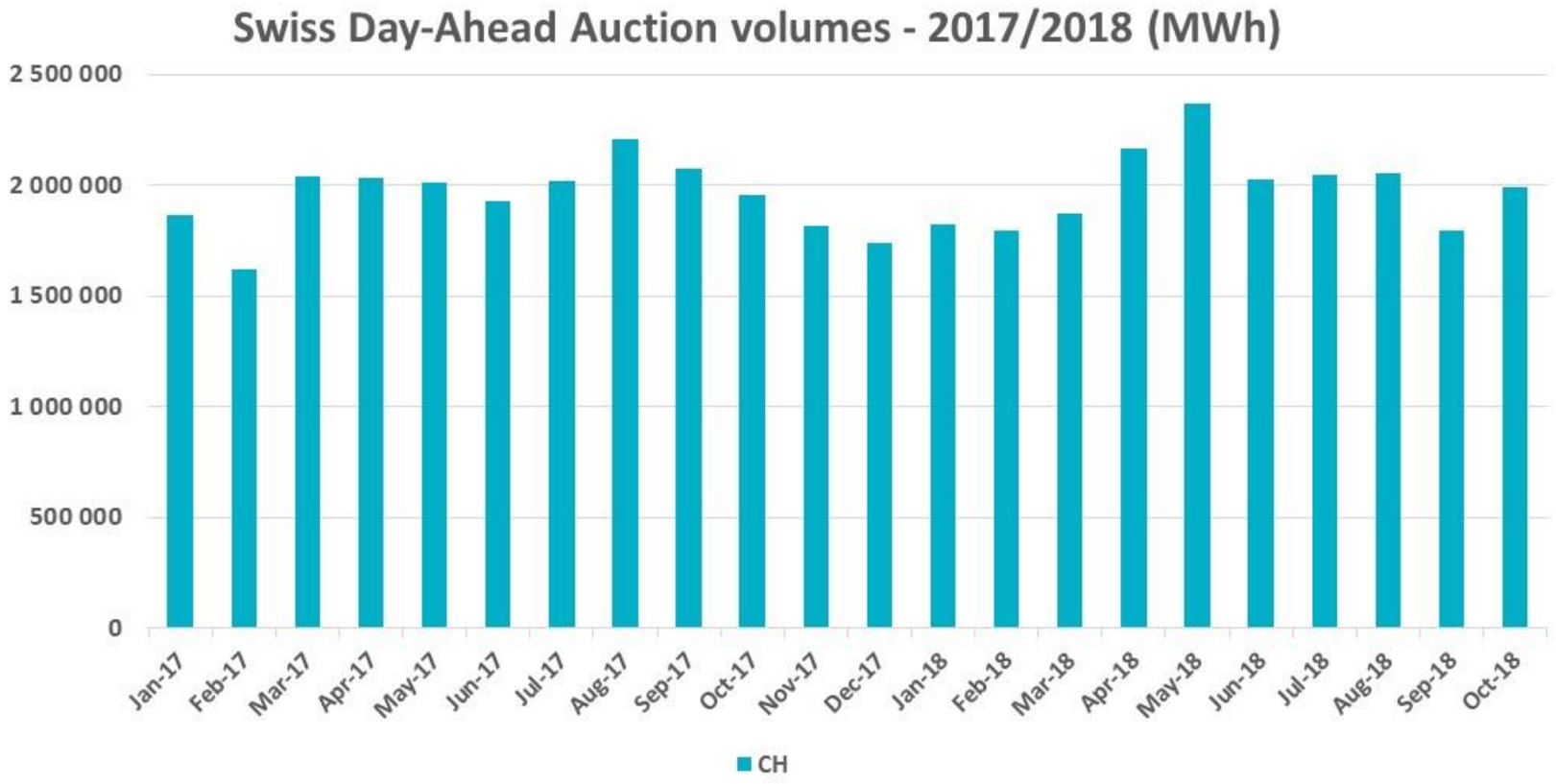
- **401 TWh already traded in 2018 (Jan. – Oct.)**
- **4% year-to-year increase compared to 2017**

Europe’s most liquid power Intraday market

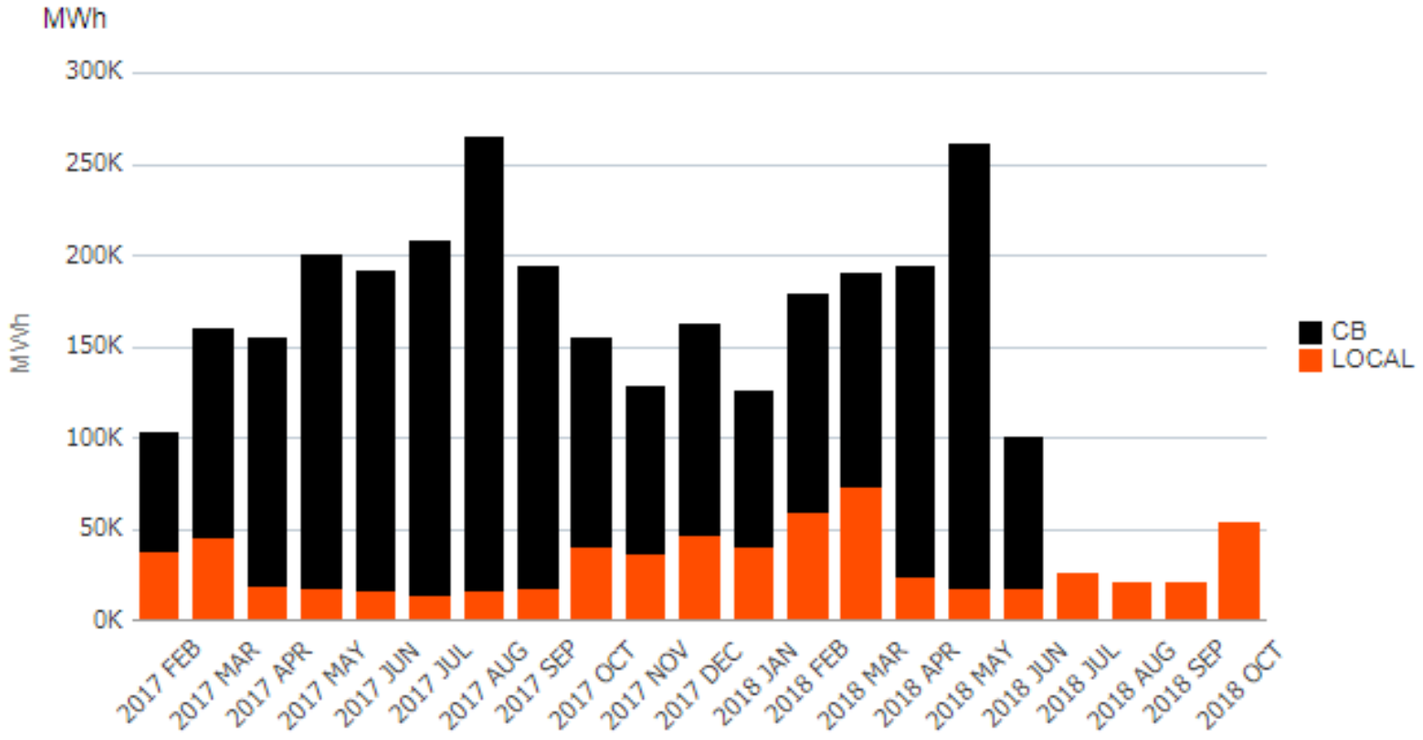


- **66.6 TWh already traded in 2018 (Jan. – Oct.)**
- **16% year-to-year increase compared to 2017**

Stable Swiss volumes in Day-ahead



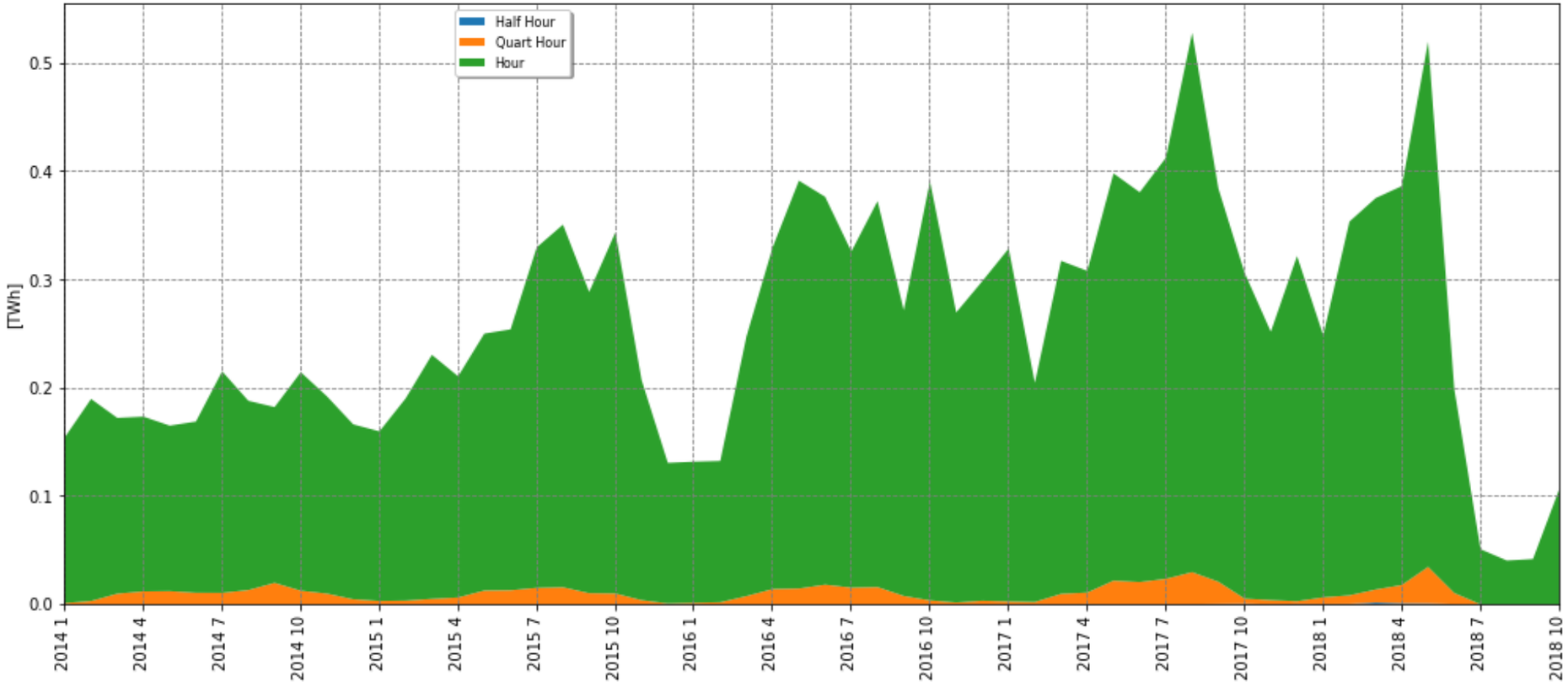
Impact of the XBID Go-Live on CH Intraday



90% decrease of volumes in the CH markets, due to disconnection of implicit access to the other EPEX intraday continuous markets – average daily volume in CH Intraday market :

- Before XBID : **7,4 GWh/day**
- Since XBID : **1 GWh/day**

CH 15-min not traded anymore since XBID go-live



Day-Ahead Market Developments

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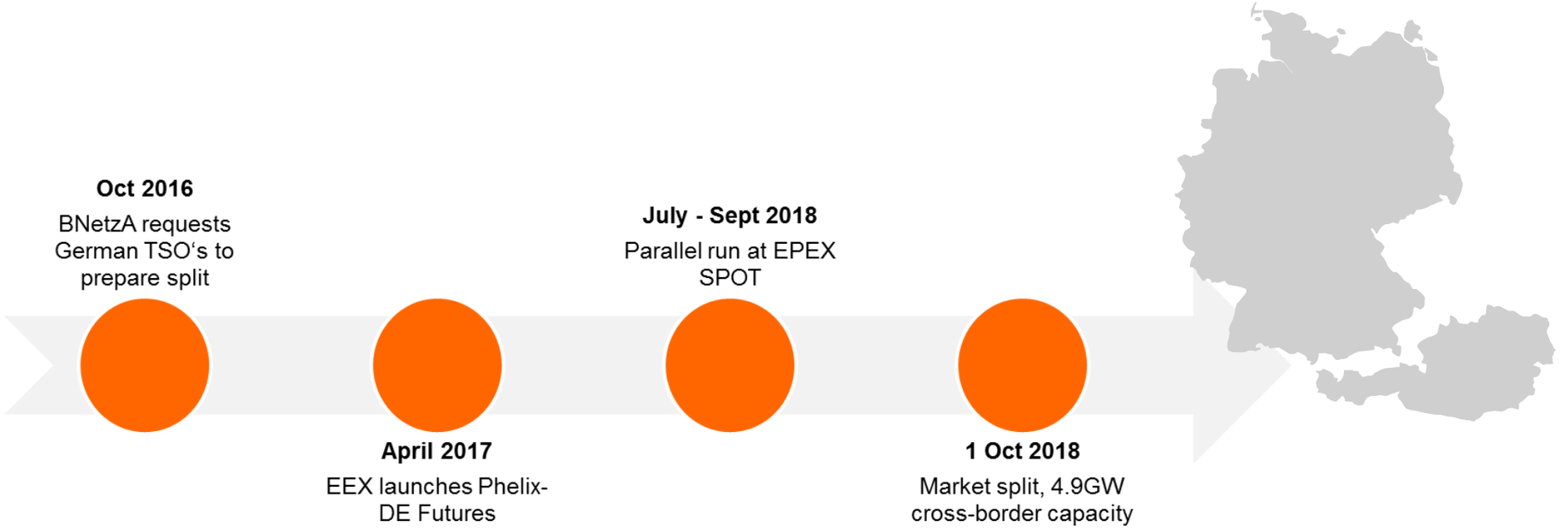
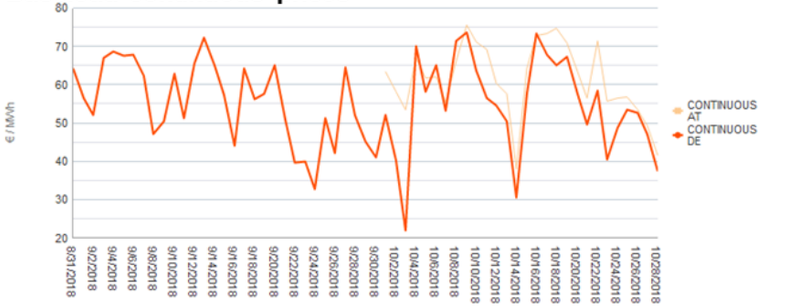
DE/AT bidding zone split since 1 October 2018



Baseload auction prices

	Average Base (EUR)	Average Peak (EUR)
Spread AT-DE	8.6	10.5

Baseload continuous prices

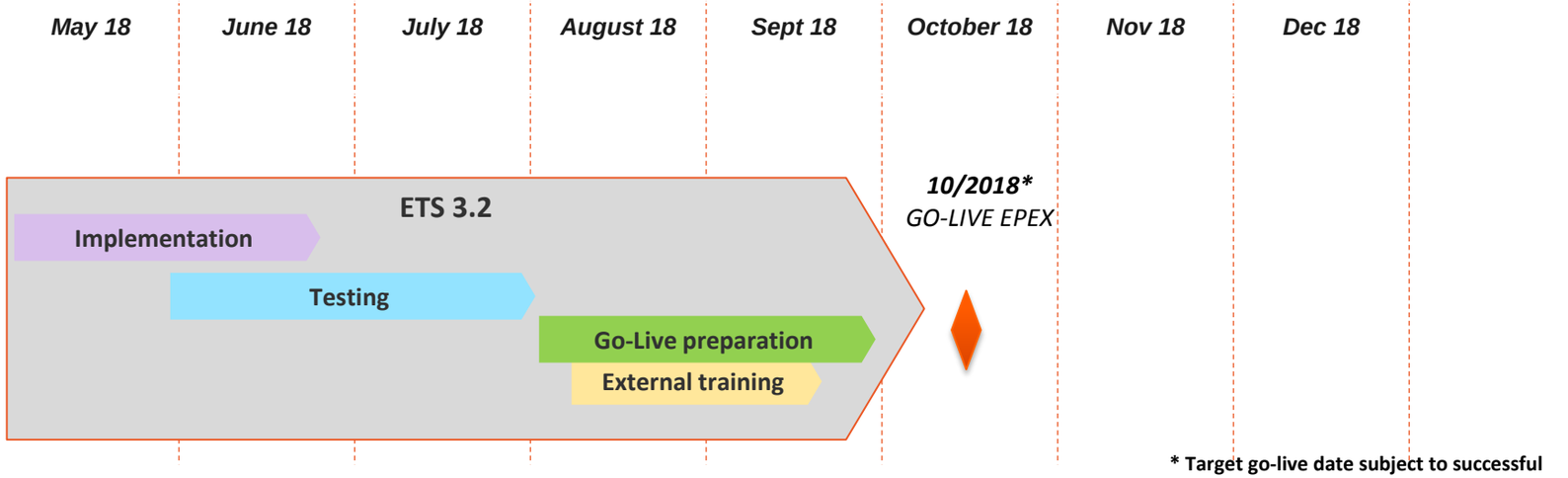


	Average (EUR)	Max (EUR)
Spread AT-DE	6.6	66.9

ETS 3.1 and 3.2 developments

ETS 3.1 was successfully deployed for :

- EPEX Continental members in late February 2018
- EPEX GB members at the start of Q2, taking over Eurolight for Auction trading



* Target go-live date subject to successful testing

What's new in ETS 3.2?

Curtailable Blocks
ETS capability to better model modulation of a generation / demand unit

Loop Blocks
ETS capability to better model storage units

Enhanced user experience
View more data in market results file

Improvements in system security and robustness

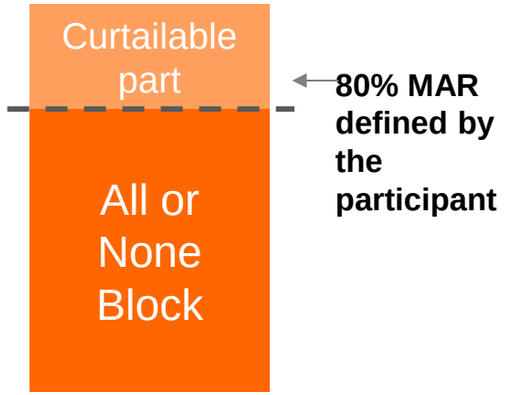
New blocks for day-ahead auction: Curtailable Blocks

Classic blocks are improved with a new feature: **they become curtailable**

You determine a *Minimum Acceptance Ratio* (MAR) of your block orders. The blocks remain All or None below the MAR, and can be executed between the MAR and 100%

For example, a MAR of 0.80 means that the block can be executed between 80% and 100% of submitted volume

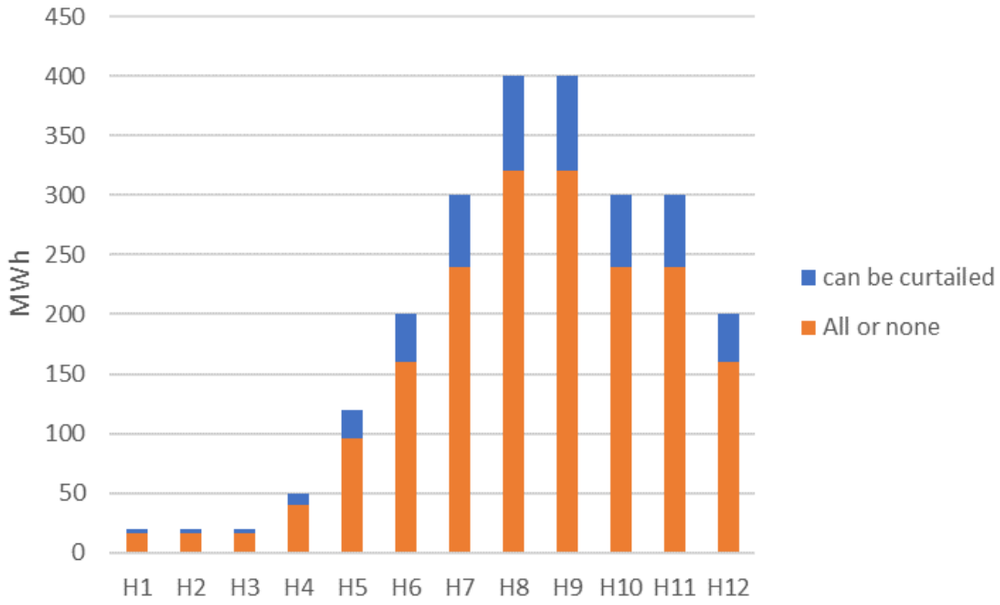
It reduces the risk of your block to be rejected or paradoxically rejected



Curtailable Blocks benefits

Curtailable blocks can better model **thermal units** :

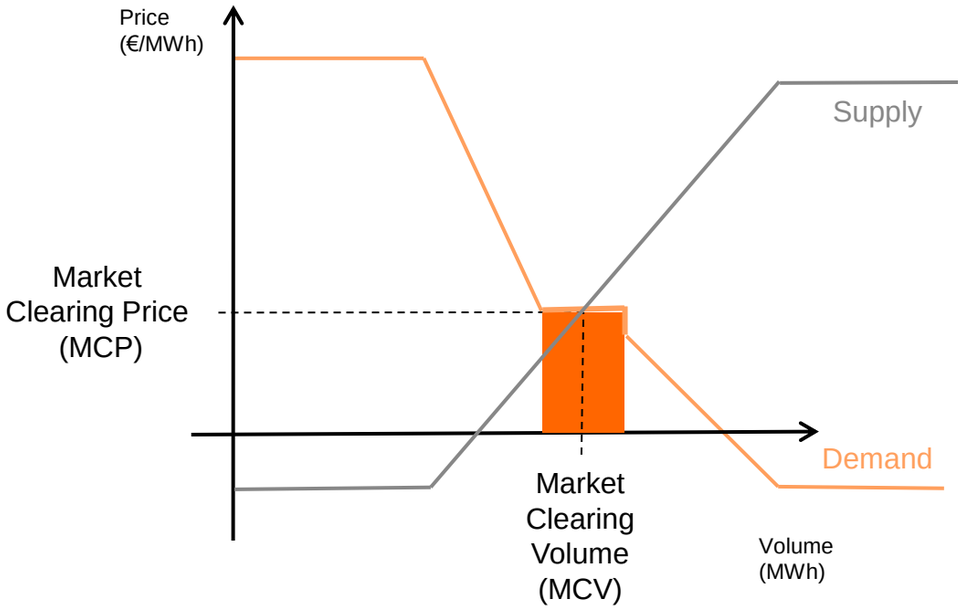
- The part below the MAR is representing the min. **stable generation**
- The part above the MAR represents the **modulation of the unit**



Curtailable Profile block, MAR = 0.80

Curtailable blocks examples

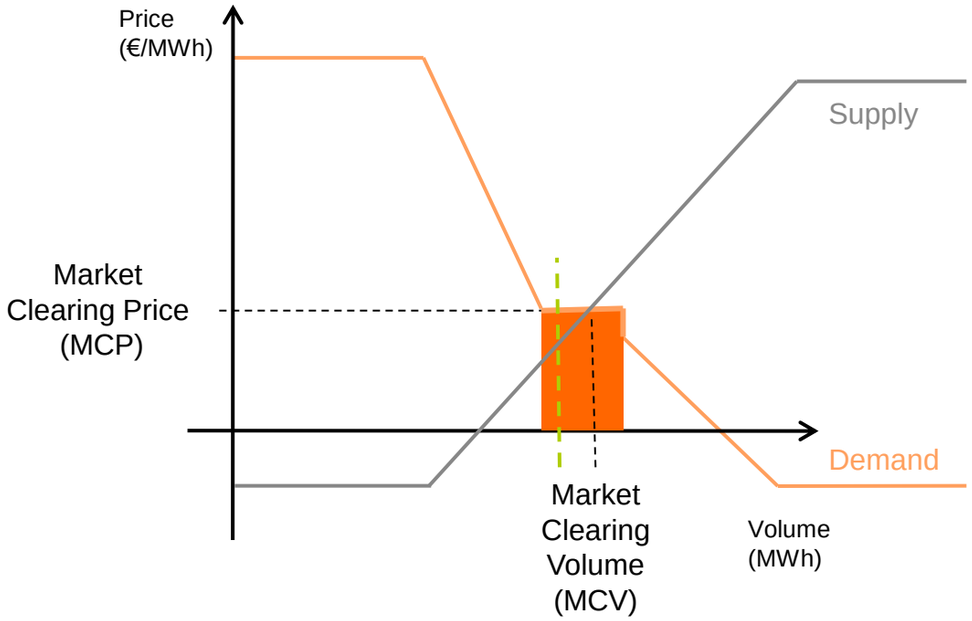
Case 1. The classic buy block ▮ is at the money: all or none acceptance



- The block ▮ is rejected as PRB

Curtailable blocks examples

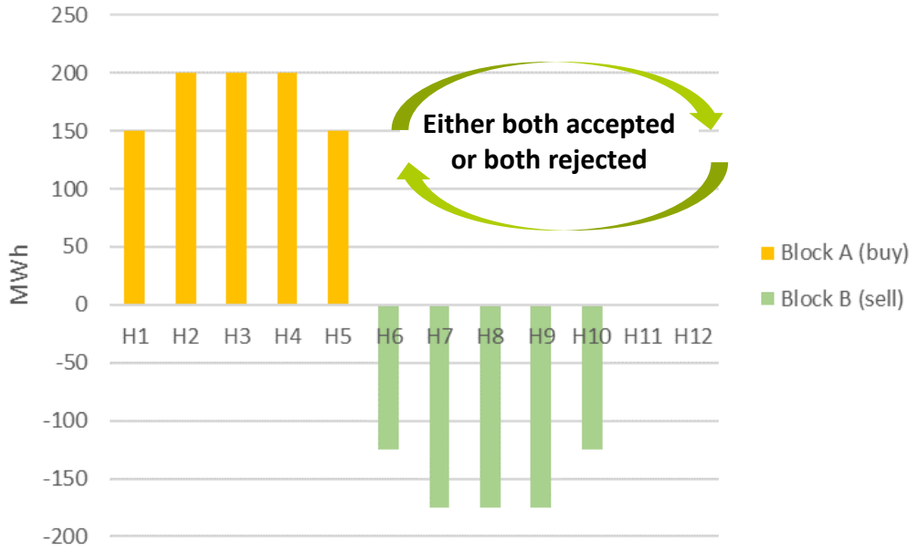
Case 2. The curtailable buy block ▮ is at the money : it can be partially accepted



- With a MAR ¦ at 0.25, the block is accepted

New blocks for day-ahead auction: Loop blocks

Loop blocks are defined as a set of **2 classic profile blocks** (1 sell and 1 buy block for instance) that are **either both accepted, either both rejected**



3. Market developments – Intraday Market

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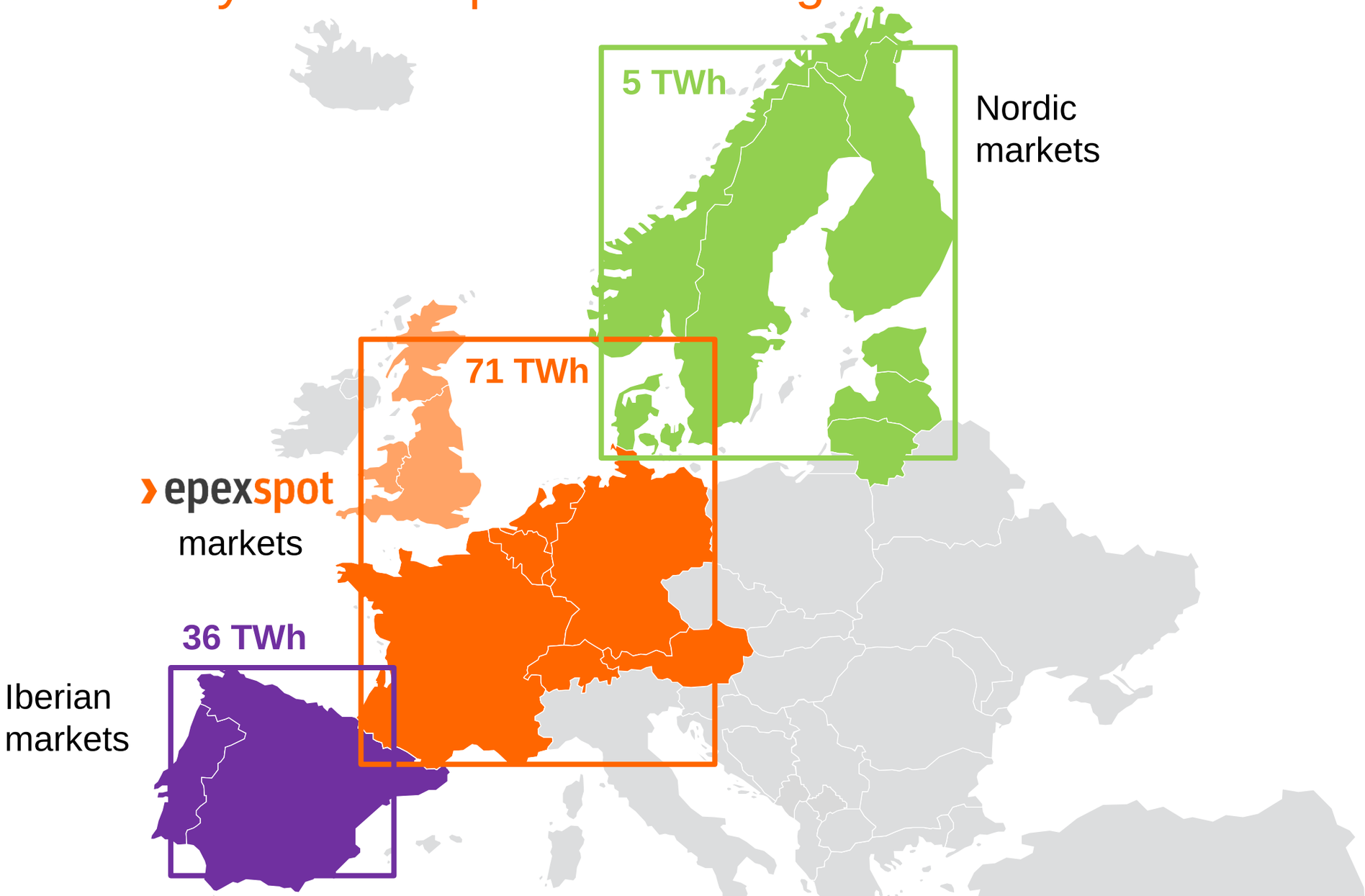
Coupled Intraday markets prior to XBID go-live



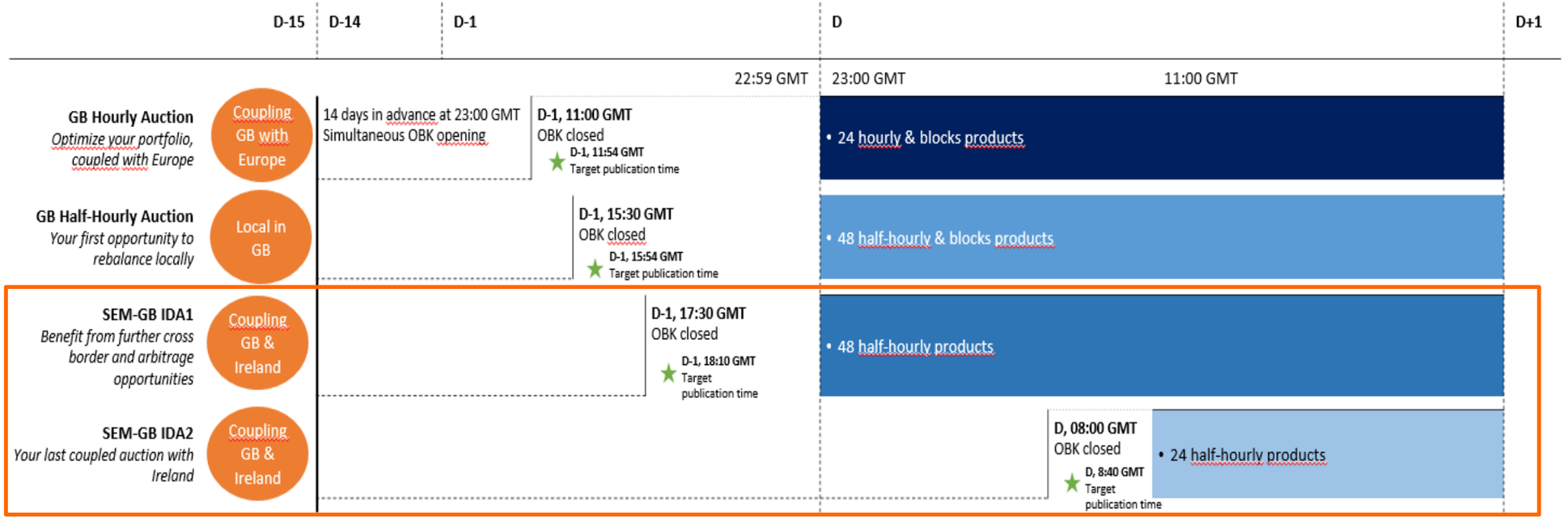
Successful XBID go-live on 12/06 (with delivery on 13/06), accross 10 LIPs

Countries coupled in 1st wave

Countries coupled in 2nd wave

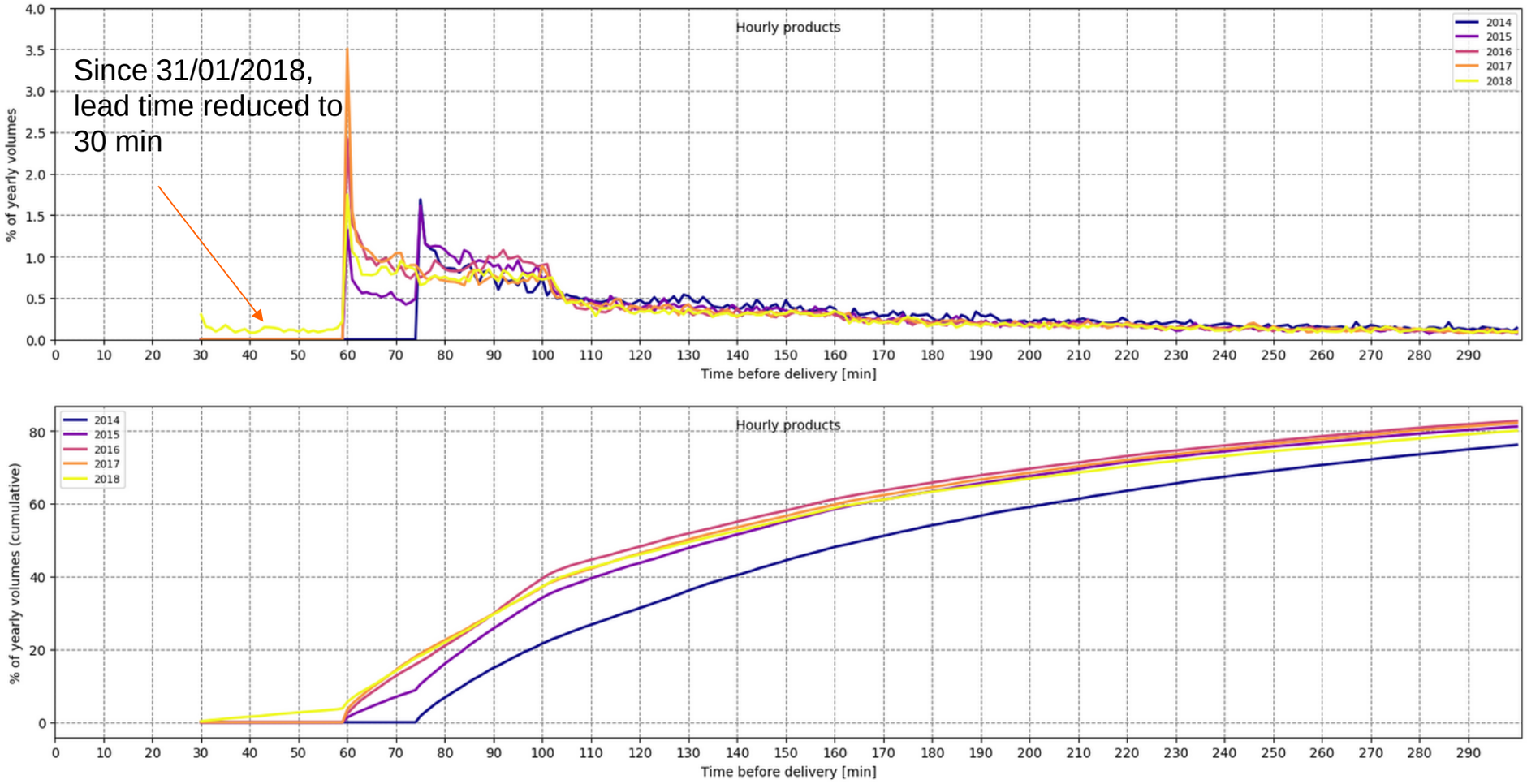
Launch of new Intraday auctions in GB

Since the 1st of October 2018, EPEX launched two new Intraday auctions in GB, coupled with Ireland



Bulk of volumes is traded closer to real-time

Lead time of all trades of 60 min products with at least 1 leg in CH

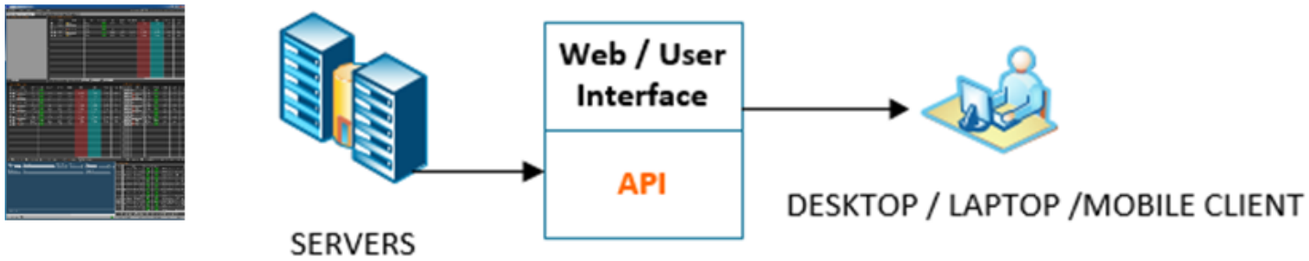


In 2018, 60% of total volumes have been traded between 0 and 160 minutes before physical delivery

An increasingly automated power trading

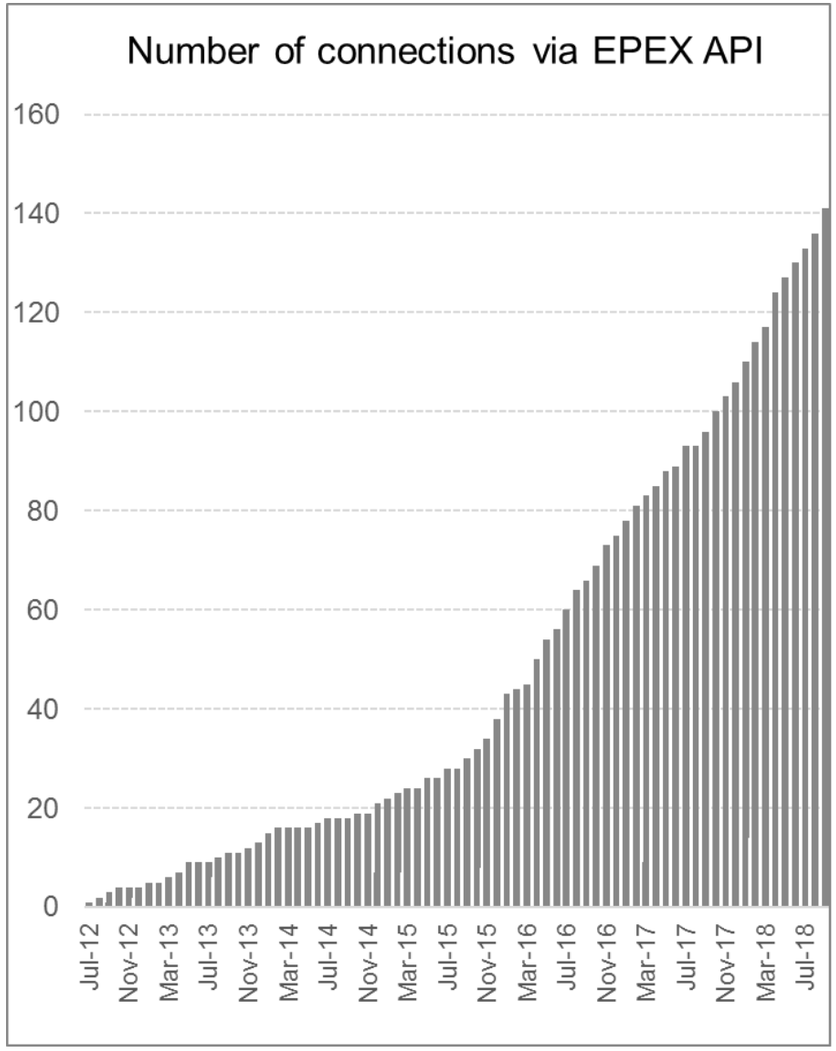
Trading automation helps market participants :

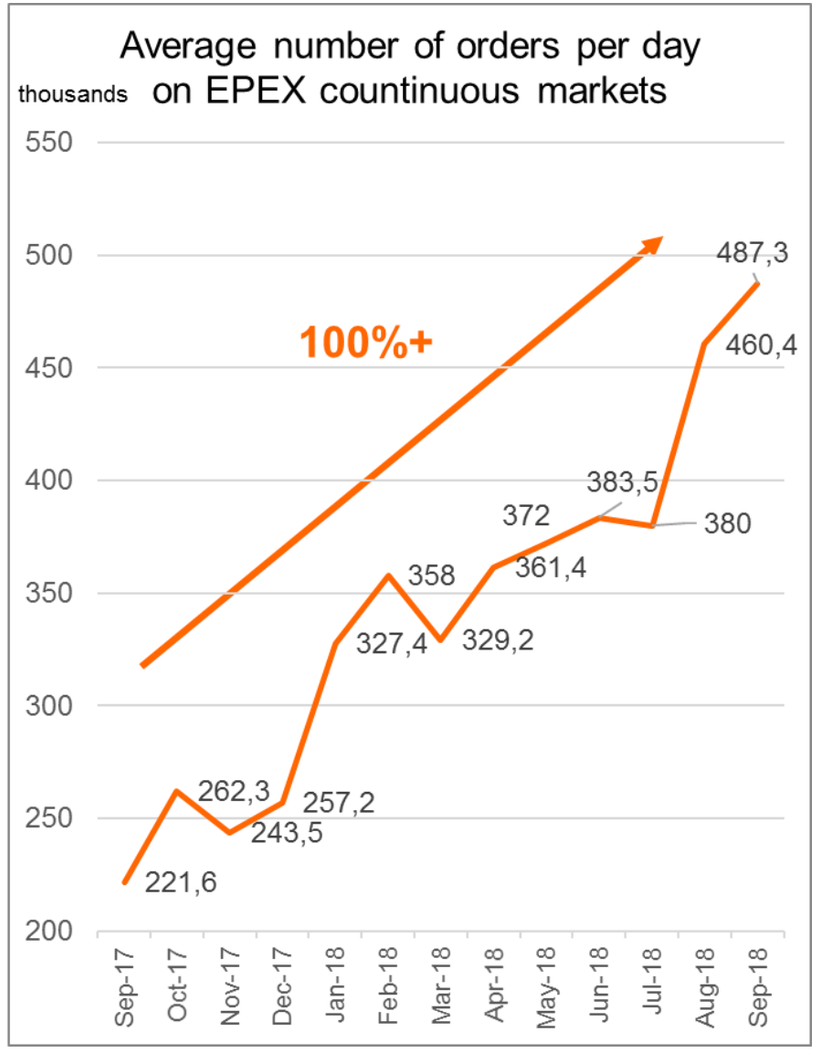
- Pre-define and customized strategies
- Trade outside of regular business hours
- Achieve better prices



- ~**100 members are using our API** (on ETS and M7)
- EPEX offers an **API-friendly ecosystem** since more than 6 years : ~**20 ISV API-certified**
  http://www.epexspot.com/en/membership/list_isv

A trend supported by more automated and performant trading solutions





Continuous intraday service improvement

✓ Following the successful launch of the XBID solution…

… we focus on the delivery of new functionalities in M7:

Functionality		
XBID Gate Opening Time	✓	XBID Gate Opening Time advanced to 15:00 for all XBID markets except Germany (18:00)
Trade Recall automation	✓	Trade recall possibilities are extended (locally and XB*) and automated * when technically possible
GB market on M7	✓	Migration of the transfer of Intraday trading in GB from Eurolight to M7 system in Nov. 2018
Capacity Display	COMING SOON	Show available Hub to Hub capacity between XBID markets
Order transfer	COMING SOON	Automatic order transfer functionality between XBID order book and local order book

Continuous intraday service improvement

✓ Following the successful launch of the XBID solution…

… we focus on the delivery of new products:

Products		
Blocks in the 15mn Intraday Auction DE	✓	Introduction of Blocks in the 15-min Intraday Auction in Germany
15mn Continuous NL+BE	✓	Introduction of local 15-min products in the Netherlands and Belgium
GB-IE Intraday Auctions	✓	Introduction of two new 30-min GB Intraday auctions coupled with Ireland
CH-IT Intraday Auctions	COMING SOON	Introduction of two new 30-min CH Intraday auctions coupled with Italy

Fee holiday for initiators !

4. Future of Swiss ID Market

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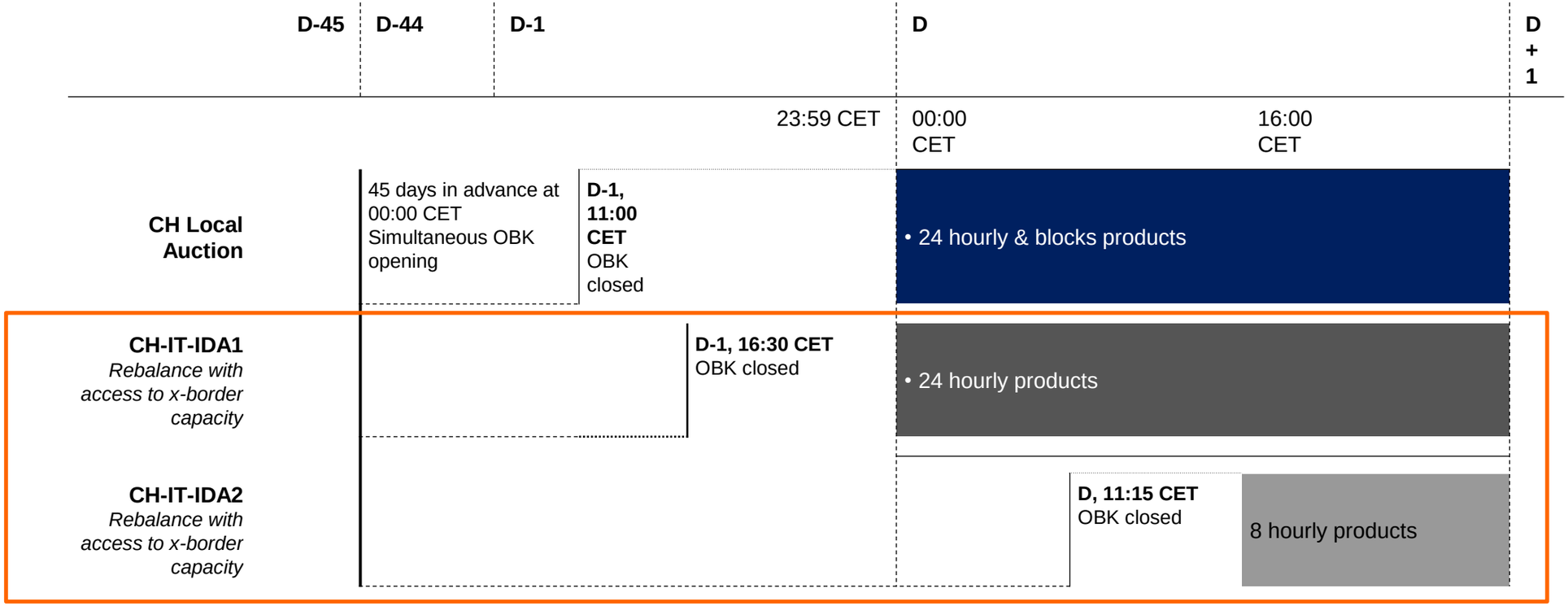
Future developments of the Swiss Intraday Market following XBID go-live

- The Swiss electricity market is highly interconnected due to its central position in Europe and hydroelectric production park
- The Swiss intraday market is isolated following the XBID go live. Volumes have dropped by up to 90% as implicit access to cross border capacity has been lost
- The objective is to restore liquidity via the **launch of two new coupled intraday auctions with Italy**, aligned with the existing coupling process between Italia and Slovenia
- **Expected go-live**: **end of Q1 2019** with market participants testing in Feb 2019
- **Regulatory background:** Project parties as well as National Regulatory authorities consider that this product is out of scope of the EU CACM Guideline
- Need for an additional local Swiss 15-min Intraday auction to be further assessed with market participants

Overview of Swiss Intraday Auctions



- **CH-IT IDA1** : D-1, 4:30pm ; **CH-IT IDA2** : D, 11:15am
- Hourly auctions, no blocks
- Coupled to Italy

Product specifications (preliminary - to be confirmed)

	Frequency	**Daily**
	Order book opening	**45 days**
	Delivery procedure	**Nomination by ECC to concerned TSO**
	Products	**Linear orders (no block orders)**
	Curve type	**Piecewise**
	Currency (order submission, auction and settlement)	**€**
	Price tick order submission	**0,1 €/MWh**
	Precision published price	**0,01 €/MWh**
	Price limits order entry/auction	**[-500 €/MWh; 3000 €/MWh]**
	Volume tick	**0,1 MW**

Q&A

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Thank you for your attention!

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Current status of planned changes in the scheduling process

Hermann Feldmann - Project Manager

Thomas Eckert - Senior Spec. Capacity Allocation & Scheduling

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1 Impact on balance group management

2 New processes

3 Transition phase

4 Project planning – Implementation phases

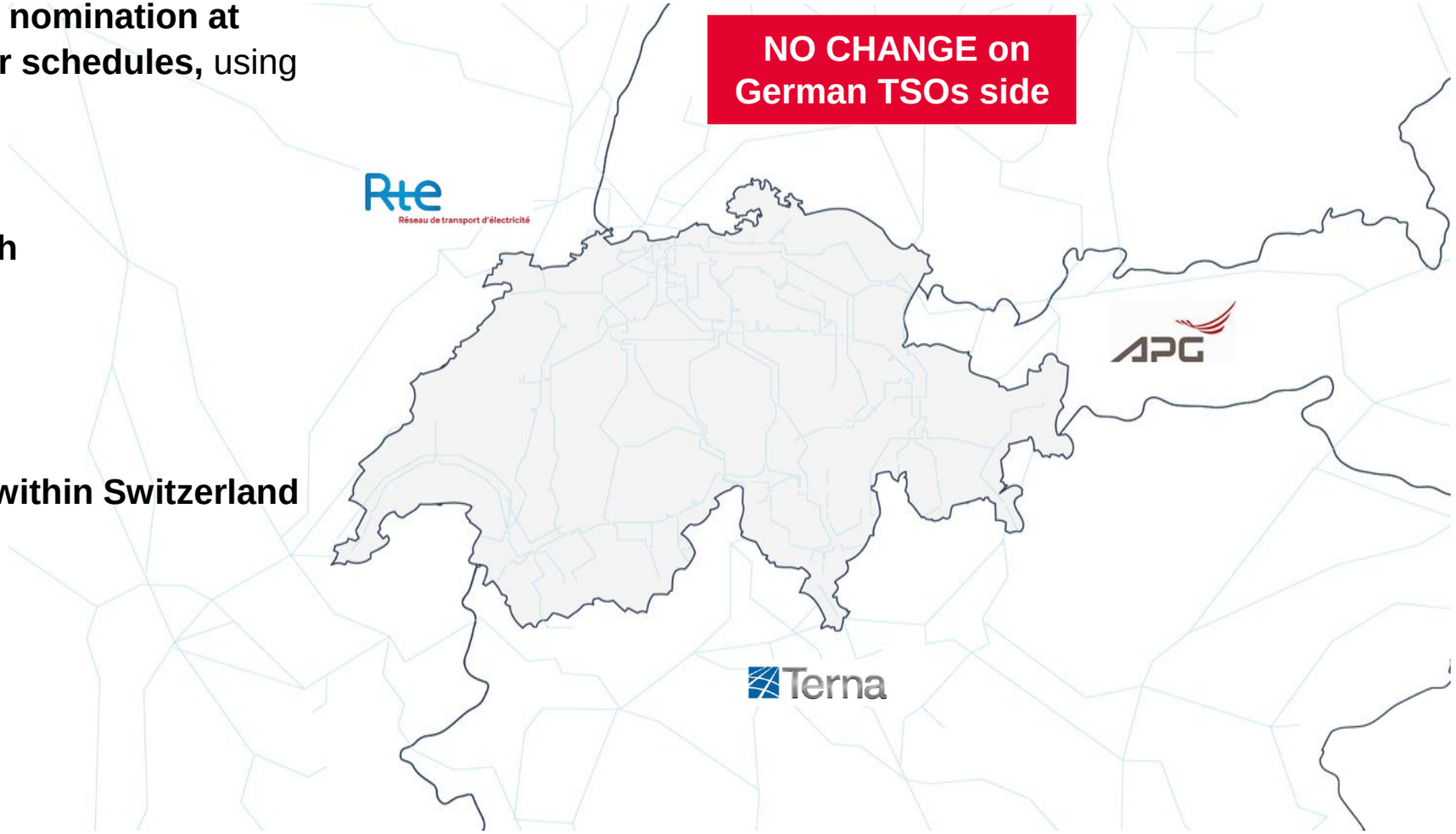
5 Reporting

6 Secure communication

7 Current state of BG acceptance tests

Impact on balance group management

- **Introduction of rights-based TPS nomination at Swissgrid for all CH cross-border schedules,** using
  - Capacity Contract Type
  - Capacity Agreement-ID
- **Long-term matching process with**
  - APG
  - RTE
  - Terna
- **No changes for BGs only active within Switzerland**



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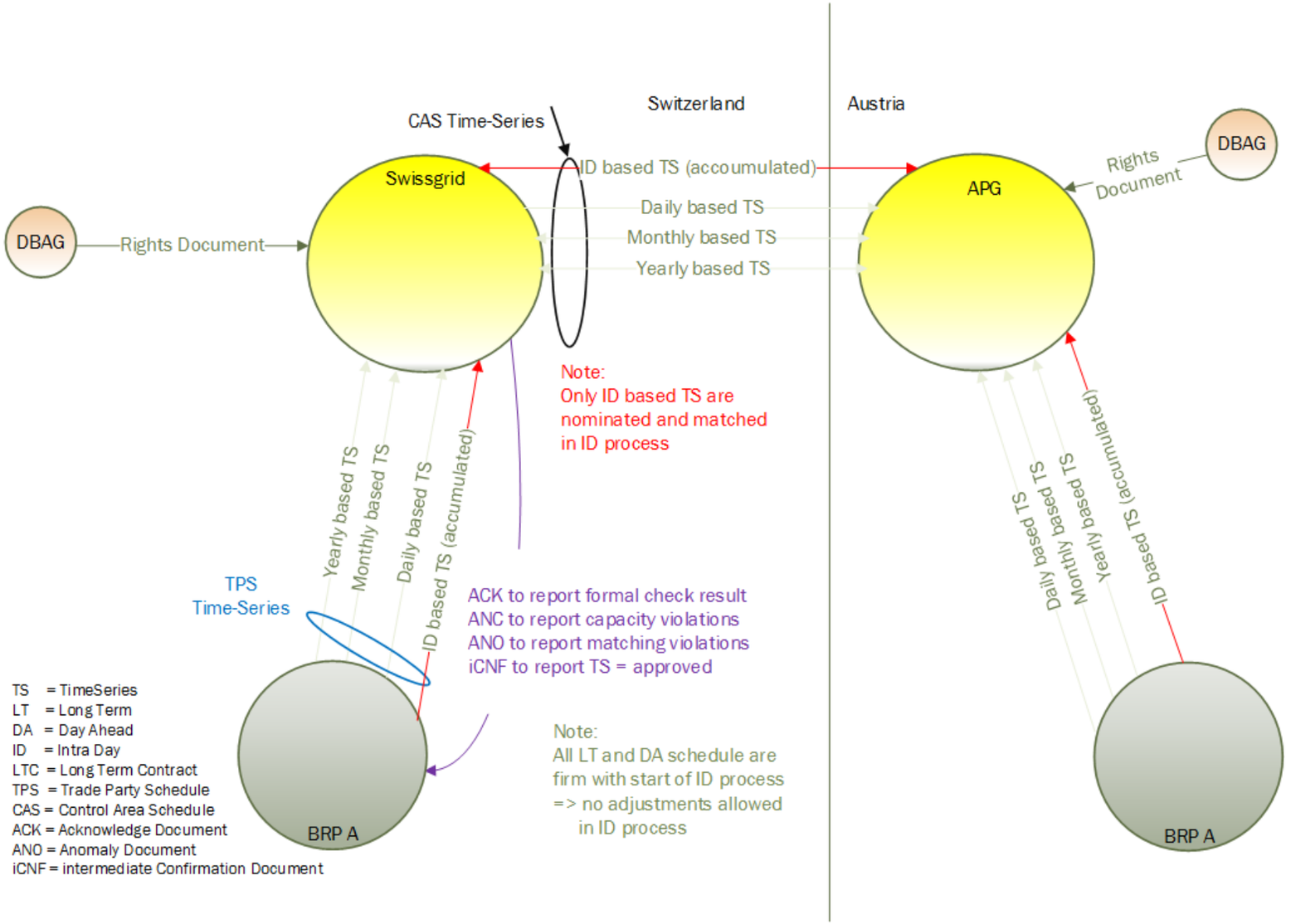
New processes –
Example rights-based scheduling process on the Austrian border



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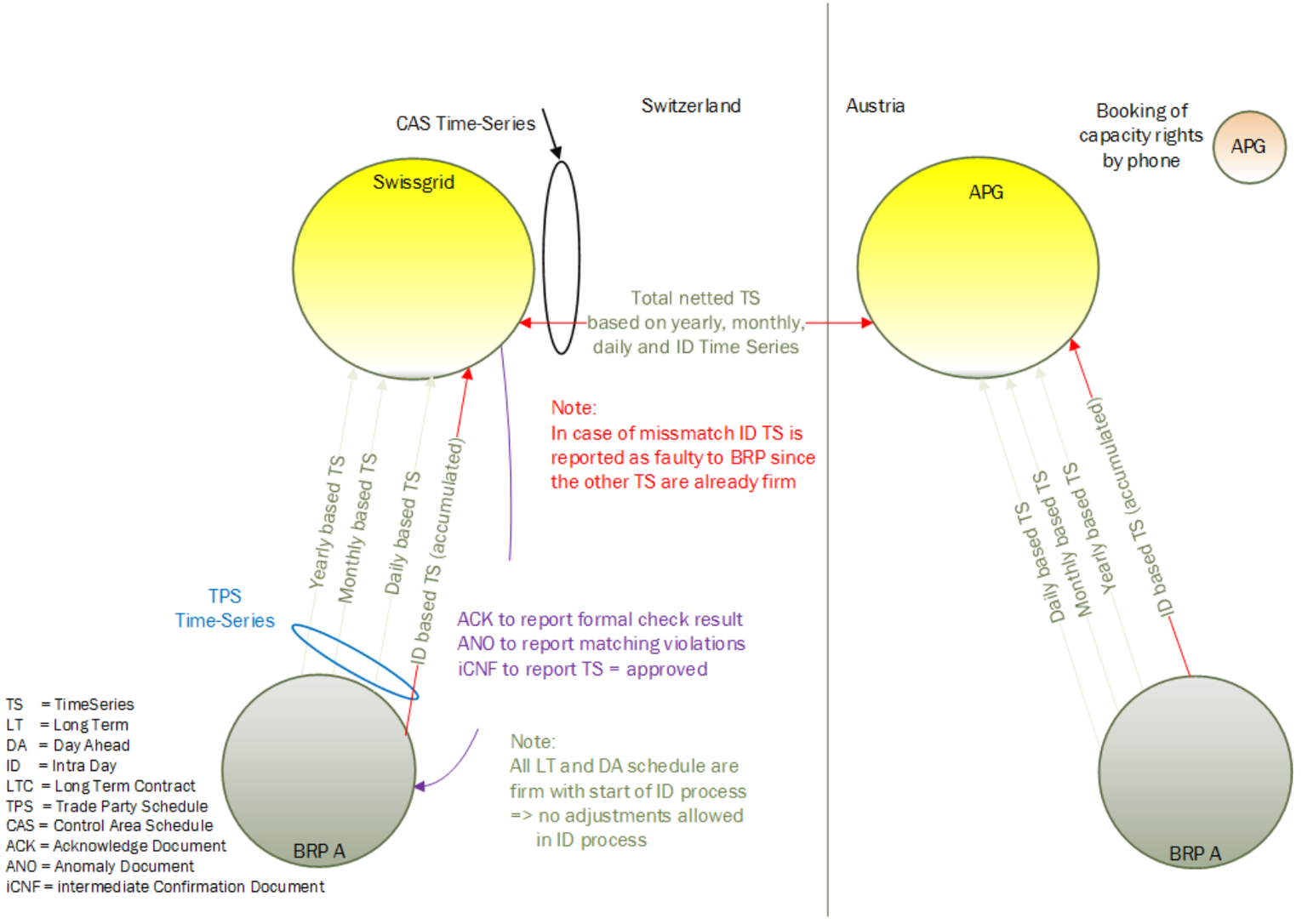
Transition phase –
Example for the Austrian border



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Transition phase – Characteristics

It is not possible to implement the changes on all CH borders at the same time

Step 1: Implementation of rights based scheduling processes with Terna

Step 2: Switch the processes with APG and RTE after a stabilisation phase

There is a transition phase for AT and FR border, this is equal to final scheduling process with DE-TSOs

- Rights-based TPS schedules have to be matched with total netted, neighbouring TSO schedules
- With the Go Live of rights based scheduling process in Switzerland there is no **long term** matching process for the borders
  - CH – FR
  - CH – AT
  - CH – DE

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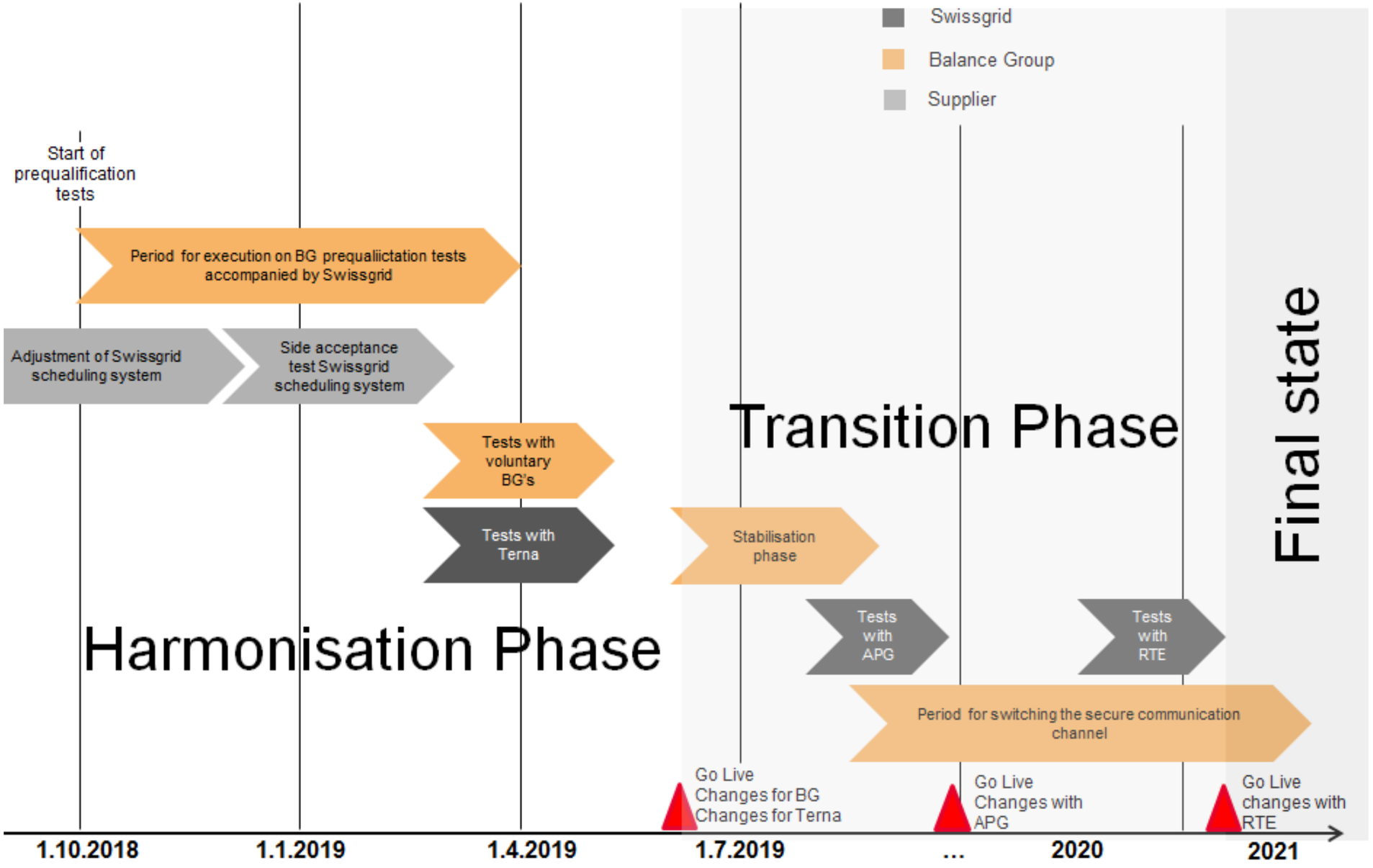
Project planning – Implementation phases



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Reporting
… about rights violations and mismatches

ANomaly Capacity document (ANC)

- A Balance Group (BG) is informed about any discrepancy to the actual rights document available at Swissgrid (violation of capacity limits, wrong CCT or CAI, wrong In/Out area or party) via an ANC directly after TPS was received by Swissgrid but just in case a valid rights document is available at Swissgrid
- The ANC will contain the nominated Time Series (TS) and the related Rights TS (but just in case capacity limits are violated)

ANOmaly document (ANO)

- During Long-Term and Day-Ahead process a BG is informed about a mismatch by an ANO document at Gate-Closure-Time the earliest
- In case of a mismatch in Intraday (ID) process no ANO is used since rights are an obligation.
  A mismatch during ID means always a violation of rights and a violated of rights was already reported by an ANC
- The ANO will contain the nominated TS and the related counterpart TS

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Reporting
… about matching and enforcement

Enforcement rules for LT and DA process

- At Cut Off Time (COT) not matching Time Series (TS) are enforced based on minimum value rule
- Matching or enforced TS which are violating the upper right are enforced to the upper right.

Specialities in case rights based TPS-TS do not match with «Total netted» neighbouring TSO-TS

- «Total netted» neighbouring TSO-TS is broken down according to the following rule:
  Exhaust first Yearly- then Monthly- and last Daily capacity.
  Note: This rule will also be applied in case Swissgrid is asked by BG to implement neighbouring TSO-TS values
- Exception for LT-process CH-FR: Values provided by RTE will be enforced

Enforcement rules for Intraday (ID) process

- At COT Swissgrid will enforce ID TS according to the ID-rights independent if nominated by BG or not.

CoNFirmation document (CNF)

- A BG is informed about matched and enforced Time Series (TS) via CNF
- The CNF will contain the TS implement by Swissgrid
- Enforced TS intervals are flagged accordingly in the CNF

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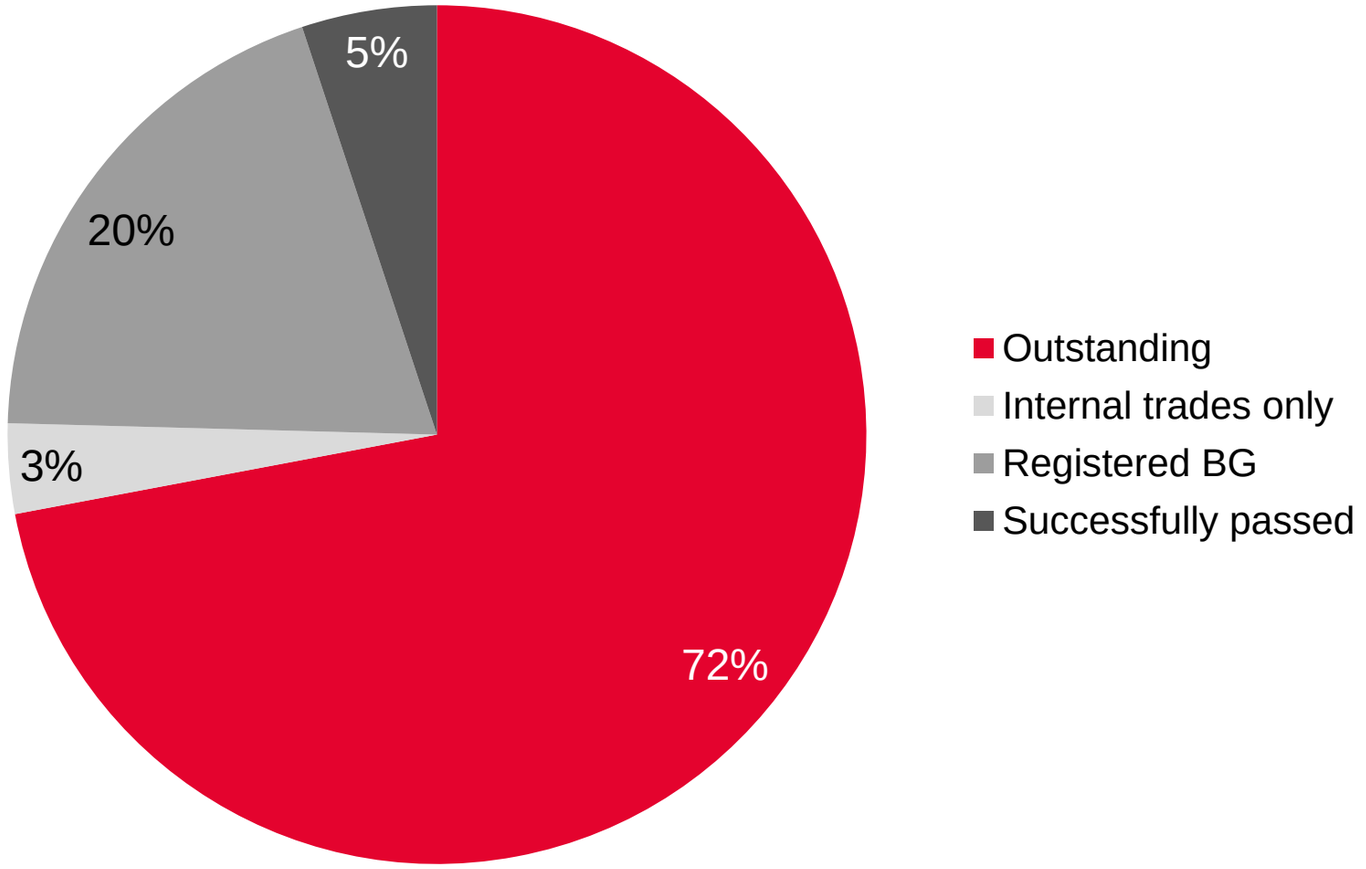
Status on secure communication

- Swissgrid is aiming for ECP as protocol for secure communication
- At the moment Swissgrid is evaluating the technical details
- Swissgrid also is evaluating the protocol for a fall-back communication channel
- Swissgrid will inform Balance Groups in Q1 2019 about the next steps

Current state of BG acceptance tests (1/7)

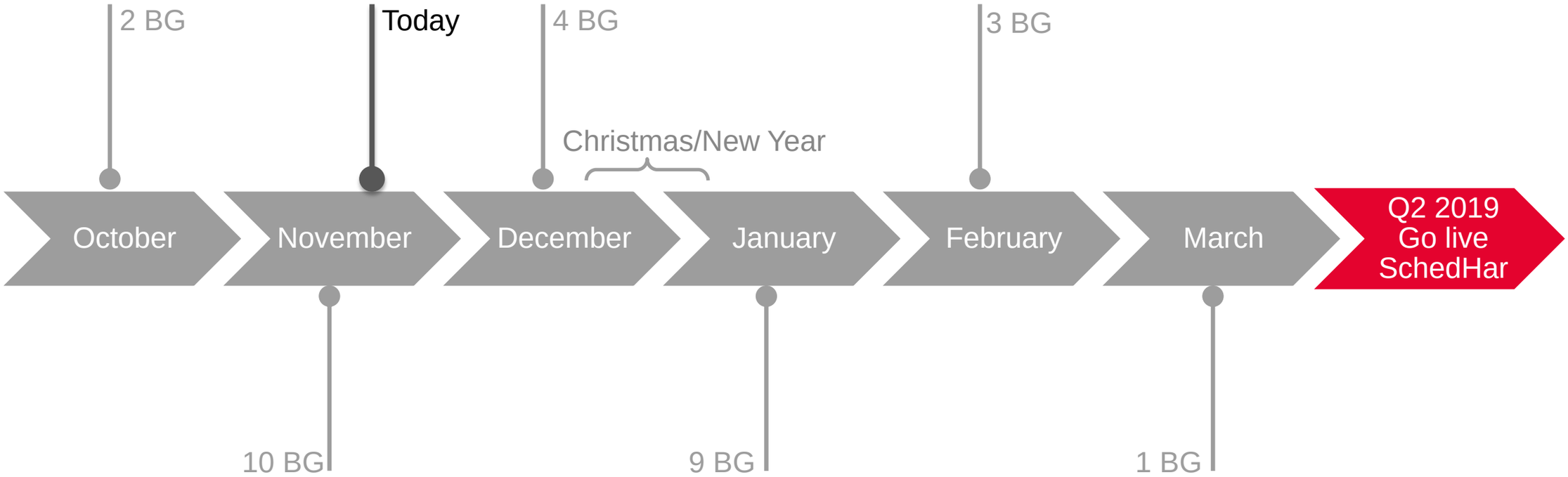
Status quo

- 29 BG registered
- 6 BG successfully passed the SchedHar tests
- 4 BG with internal trades only
- 85 BG outstanding
- 118 BG in total



Current state of BG acceptance tests (2/7)

Test periods chosen by BG



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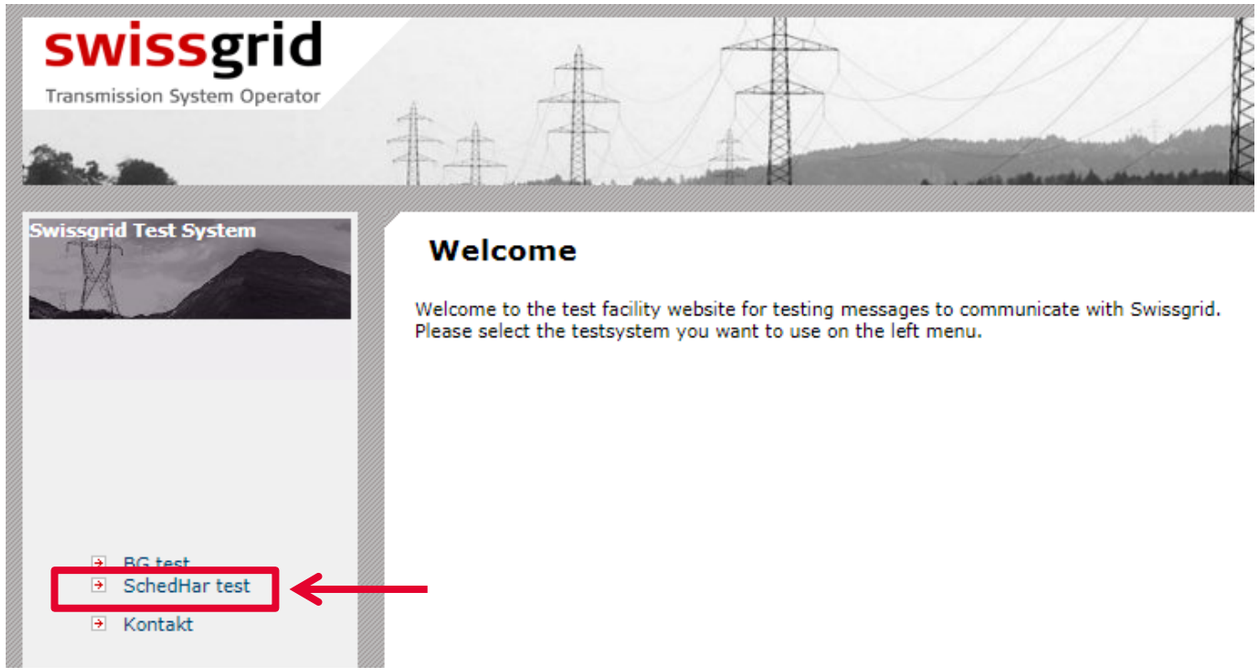
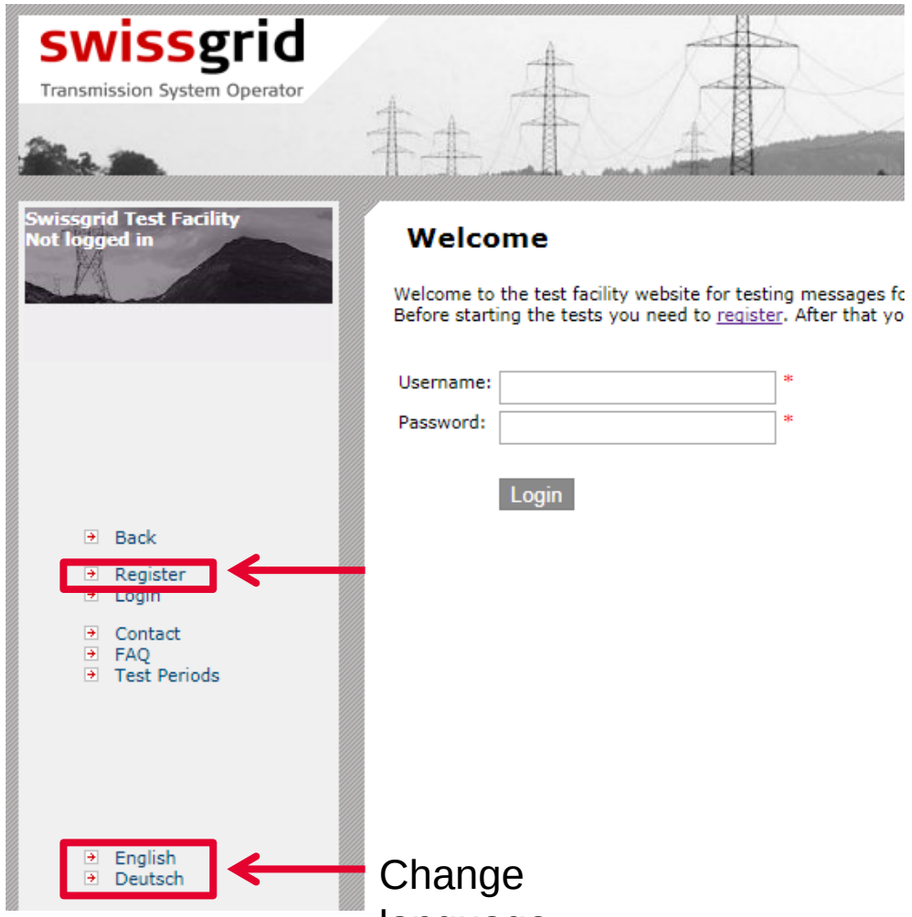
Current state of BG acceptance tests (3/7)

Registration (1/2)

- Navigate to https://dnvgl-test.com/ → «SchedHar test» → «Register»
- Change language if needed





Change language

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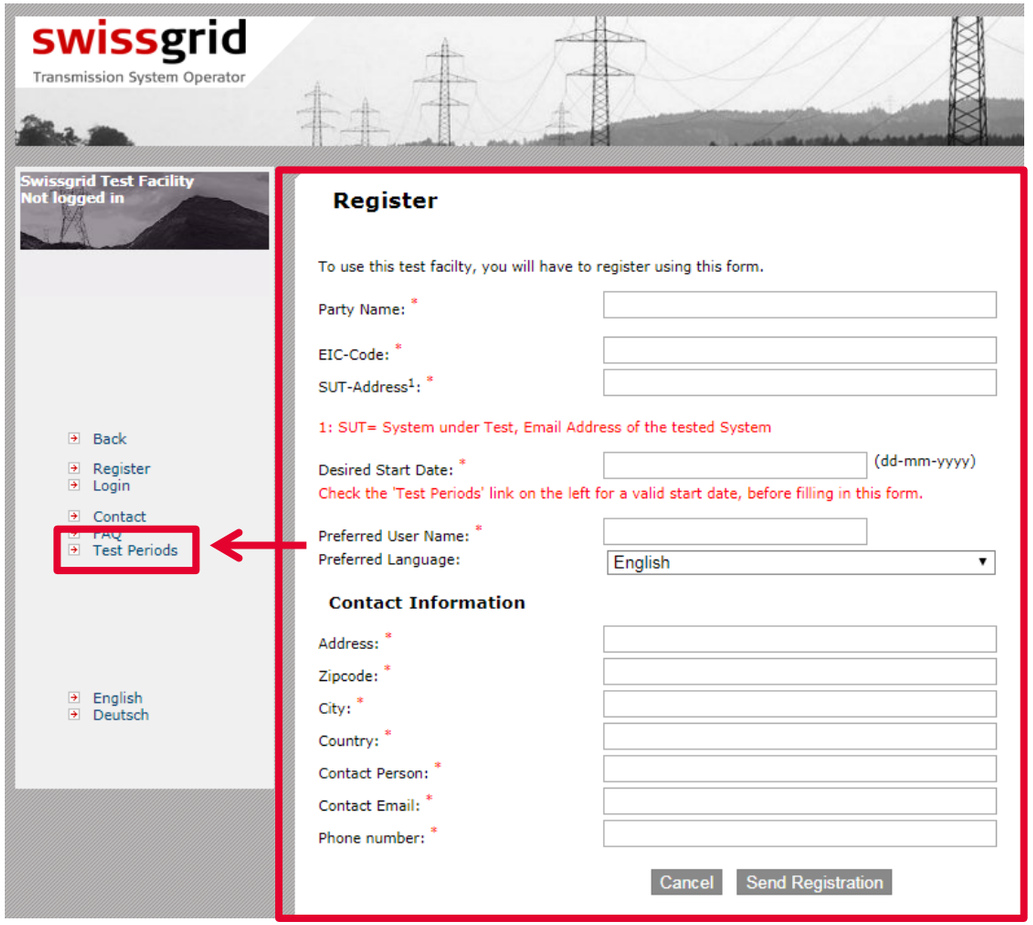
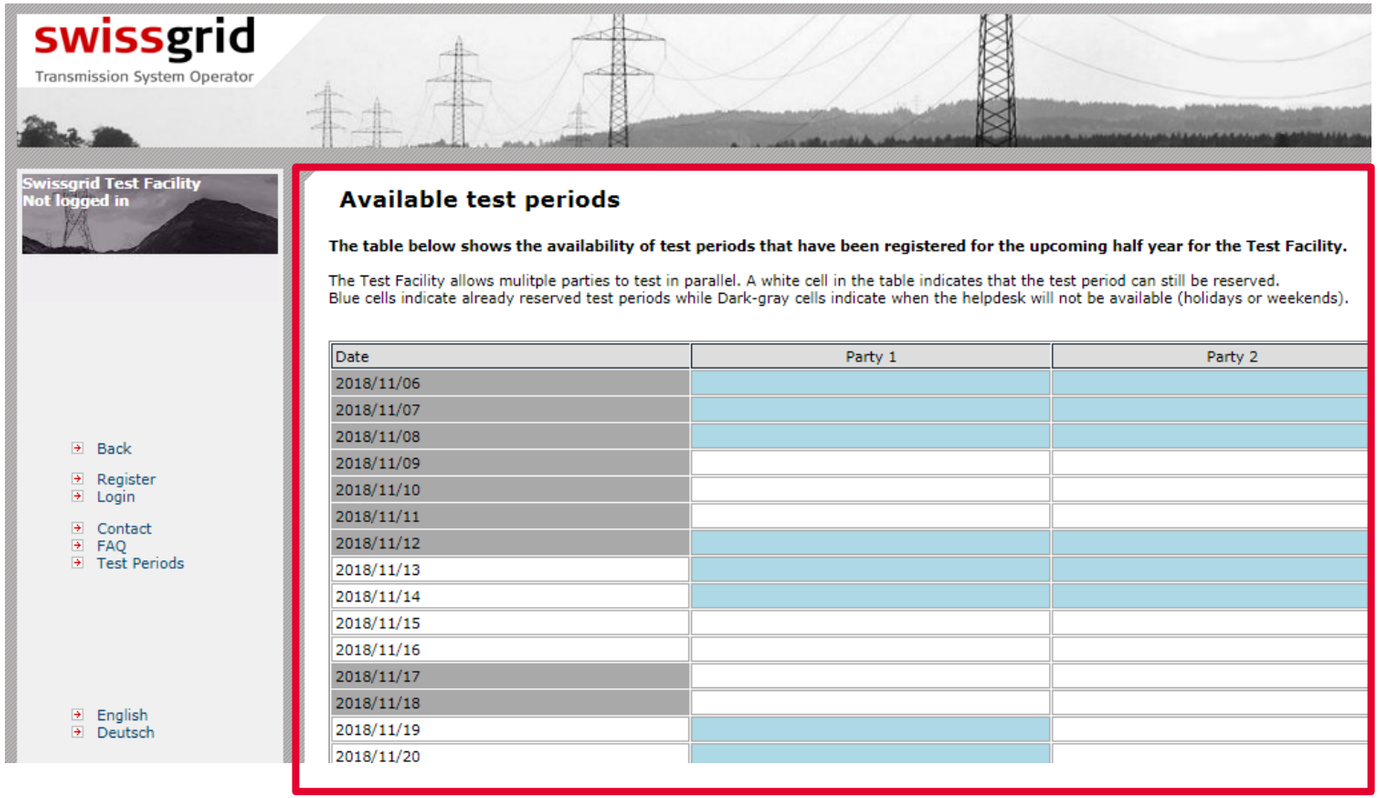
Current state of BG acceptance tests (4/7)

Registration (2/2)

- For available test periods please navigate to the menu «Test Periods»
- Fill in the form and select your desired test period respectively the first day of your three days testing period





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Current state of BG acceptance tests (5/7)

Discussion on test scenario CN1 resp. 5.3.1. Matching process Long-Term, wrong CAI & CCT

- **Test description**
  - Long-Term nomination of TPS with time series on yearly capacity with wrong CCT & CAI
  - After positive ACK and ANC the BG has to nominate a corrected TPS

- **How to deal with that?**
  - Correct the CCT and CAI of the existing time series and send a higher version

- **Why do we send a positive ACK?**
  - In Swissgrid system the two main processes “formal check” and “capacity check” are separated from each other. Since there might be no Rights Document available yet when TPS is received by Swissgrid.
    Therefore the TPS will be positive acknowledged even there is a faulty CCT / CAI within it because it is schematically correct.
  - A negative ACK would be sent if the CCT is not a code accredited by Swissgrid
  - The ANC will be sent first after reception of the Rights Document in Swissgrid system

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Current state of BG acceptance tests (6/7)

Common issues / first experiences

- Participation in SchedHar tests
  - All BG which are active in cross border scheduling
  - All BG which don’t have an active BG yet at Swissgrid even they intent not to participate in cross border scheduling

- No participation in SchedHar tests
  - All BG which are only active within the Swiss control area and have already an active BG at Swissgrid

- Response time of the DNV-GL test platform
  - Can take up to 10 min

- BG with metering points may not include CONS time series within the TPS
- Usage of integration system instead of manual adaptions
- Most BG need one day for testing

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Current state of BG acceptance tests (7/7)

Documents

- Frequently asked questions on the Swissgrid website via an FAQ
- FAQ for the test scenarios in the menu «FAQ» on the DNV-GL test platform
- More detailed information of the test scenarios can be found in the BG Acceptance Test document on the Swissgrid website

SPOC

- Please send any requests about the testing or the new processes in general to bg-registration@swissgrid.ch

Impact of separated secondary control net positions

Matthias Bucher
Specialist Economics & Market Design

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Procurement of secondary control power: Introduction of SRL+, SRL- instead of SRL

What?

- In order to guarantee the frequency stability, Swissgrid procures a power band for automatic upward and downward regulation (secondary control power) from ancillary service providers (SDV)
- Until June 2018, the power band had to be symmetric, i.e. every SDV had to provide/bid the same amount of upward as downward reserves
- Since June 2018: Provision of secondary control reserves is separated in upward and downward reserves

Why?

1. Requests from different (potential) market participants to design an asymmetric power product.
2. Lower entry barriers in the market allows SDV to optimize their offers without excluding existing market participants.
3. With respect to situations in winter (e.g. less offers in the ancillary service market), it is desirable for Swissgrid to tap into additional sources of flexibility.
4. Harmonisation with international ancillary service markets, which are attractive as they offer additional sales potential for SDV and additional liquidity for Swissgrid.

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New products SRL+, SRL- replace the product SRL

What has changed?

- The previous existing product SRL has been removed.
- Introduction of two new products:
- SRL+: positive control power
- SRL-: negative control power
- Settlement of activated secondary control energy (SRE+, SRE-) is done separately for both direction of delivery.

What has not changed?

- Weekly auctions
- Remuneration for capacity remains «pay-as-bid»
- Activation of energy is done «pro-rata», but separately for the two directions of delivery

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Impact on the balance energy price

The prices P_{sek} are only used if a use of secondary control occured in the relevant direction (request of energy SRE+, SRE-)

Balance group	short (deficit)	BGM pays $(A + P_1) * \alpha_1$
	long (surplus)	BGM receives $(B – P_2) * \alpha_2$

A = max. (P_{spot}; P_{sek+};P_{ter+})

B = min. (P_{spot}; P_{sek-}; P_{ter-})

Until now:

- Single net position of secondary control energy per quarter-hour.
- Only one price for secondary control energy takes effect per quarter-hour.

Since separation of SRL:

- Separate positions for positive respectively negative direction of delivery
- Per quarter of an hour, both prices (P_{sek+}, P_{sek-}) can take effect.

Consequence:

- For deviations (net positions of BG) in the same direction as the dominant deviation of the control area Switzerland (e.g. control area short, BG short or vice versa)
  → no change (still either P_{sek+} or P_{sek-} relevant)
- For deviations in the opposite direction as the dominant deviation of the control area Switzerland (e.g. control area short, BG long
  or vice versa)
  → P_{sek} of the not dominant direction can take effect more often (instead of P_{spot})

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Survey: Should the energy values of requested SRE in INS be sent out un-netted?

Information schedule (INS) to SDV is provided un-netted since mid October

Key points of a potential change:

- Format of INS file per-se remains unchanged
- Concerns only activated secondary control energy (Business type A12)
- Information on delivered activated secondary control energy per 15min interval would be displayed un-netted, i.e. potentially non-zero values for both directions
- If netted values are needed, BGV can easily calculate them
- Schedule-relevant data from the BGV to the scheduling system has to be delivered as today (netted)

→ Link to survey will be communicated soon. Participation is very welcome!

Message Identification	TPS12XSDL[redacted]	**Message Type**	Balance Responsible Schedule
Message Version	1	**Process Type**	Schedule day
Send Date and Time	2018-06-08T06:34:37Z	**Schedule Classification Type**	Exchange Type

	Id	**Coding Scheme**	**Role**
Sender	12X-0000001861-Q	ETSO	TRP
Receiver	12XSDL[redacted]	ETSO	TRP

Schedule Start and End Date	2018-06-06T22:00Z/2018-06-07T22:00Z

Seq. No.	**1**	**2**
TS Id.	38219	38217
Version	1	1
BusinessType	Secondary control	Secondary control
Product	Active Power	Active Power
Aggregation	AREA	AREA
Unit	MW	MW
Out Area	10YCH-SWISSGRIDZ	10YCH-SWISSGRIDZ
In Area	10YCH-SWISSGRIDZ	10YCH-SWISSGRIDZ
Out Party	12X-0000001861-Q	12XSDL[redacted]
In Party	12XSDL[redacted]	12X-0000001861-Q
Period	2018-06-06T22:00Z/ 2018-06-07T22:00Z	2018-06-06T22:00Z/ 2018-06-07T22:00Z
Resolution	PT15M	PT15M
Sum	**46.100**	**45.500**
Pos	**Qty**	**Qty**
1 00:00 - 00:15 m	0.000	9.200
2 00:15 - 00:30 m	0.000	7.600
3 00:30 - 00:45 m	0.000	0.000
4 00:45 - 01:00 m	0.000	0.000
5 01:00 - 01:15 m	0.000	3.600
6 01:15 - 01:30 m	0.000	3.200
7 01:30 - 01:45 m	0.000	0.400
8 01:45 - 02:00 m	3.600	0.000
9 02:00 - 02:15 m	0.000	2.400
10 02:15 - 02:30 n	0.000	3.600
11 02:30 - 02:45 n	0.000	0.800
12 02:45 - 03:00 n	2.000	0.000

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Example

Balance group	short (deficit)	BGM pays $(A + P_1) * \alpha_1$
	long (surplus)	BGM receives $(B – P_2) * \alpha_2$

$A = \max. (P_{spot}; P_{sek+}; P_{ter+})$

$B = \min. (P_{spot}; P_{sek-}; P_{ter-})$

	Deviation	With old product	With new product and P_{sek} of both directions	With new product and P_{sek} only of dominant direction
BG 1	+ 10 MWh (long)	$B = P_{sek-}$	$B = P_{sek-}$	$B = P_{sek-}$
BG 2	- 5 MWh (short)	$A = P_{spot}$	$A = P_{sek+}$	$A = P_{spot}$
SG	- 5 MWh			

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Balance Group Management and operational occurrences

Marc Rüede - Head of Capacity Allocation & Scheduling
Nicolas Schledermann - Specialist Capacity Allocation & Scheduling

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1 Balance Group Management

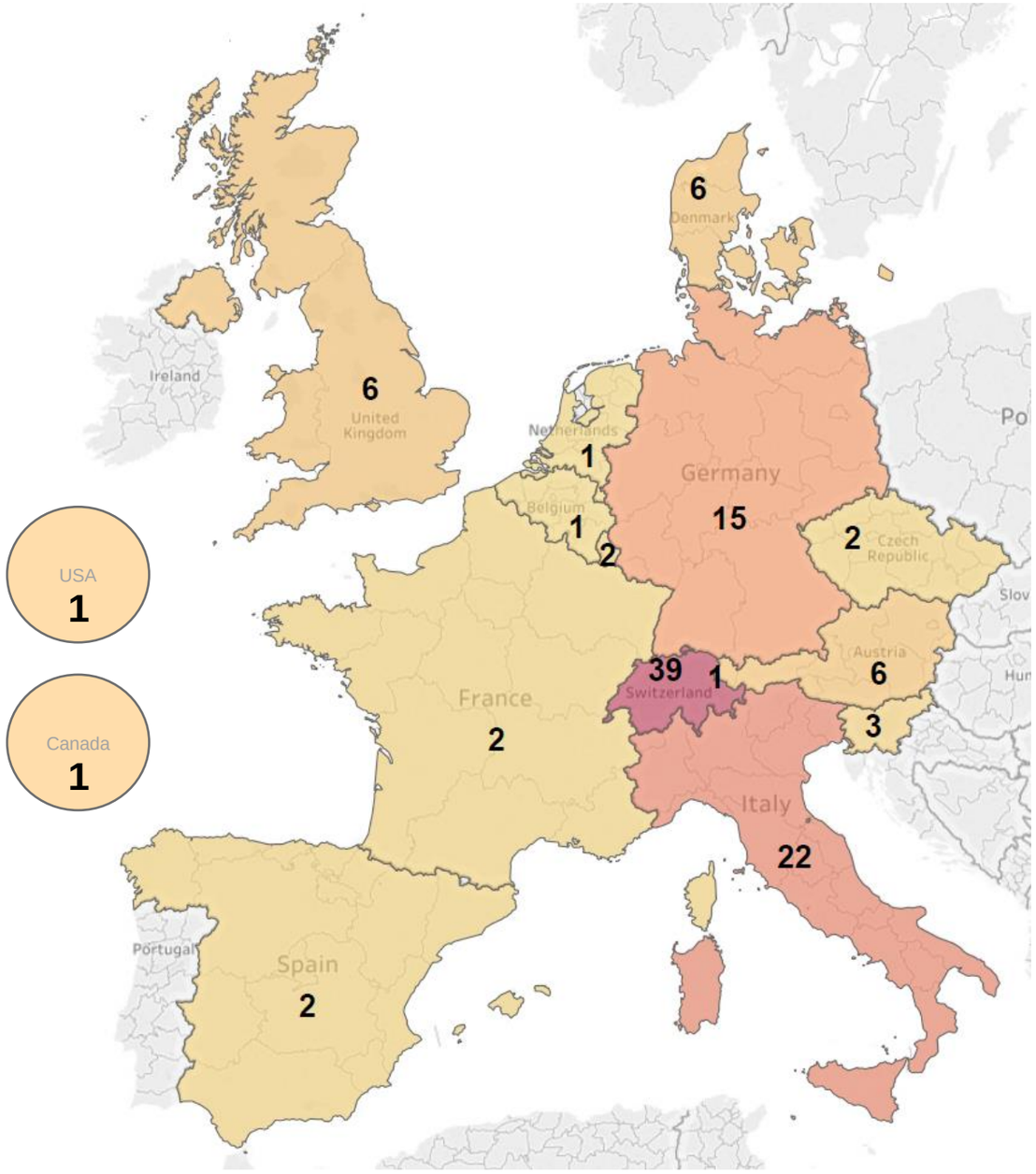
2 Operational occurrences

3 Schedule management system outage

4 Nomination of cross border schedules

Balance Group Management
BG statistics

	# BGs	↓	↑	Mutations
2016	101			163
2017	102	3	4	191
2018	97	10	5 (8 pending)	143



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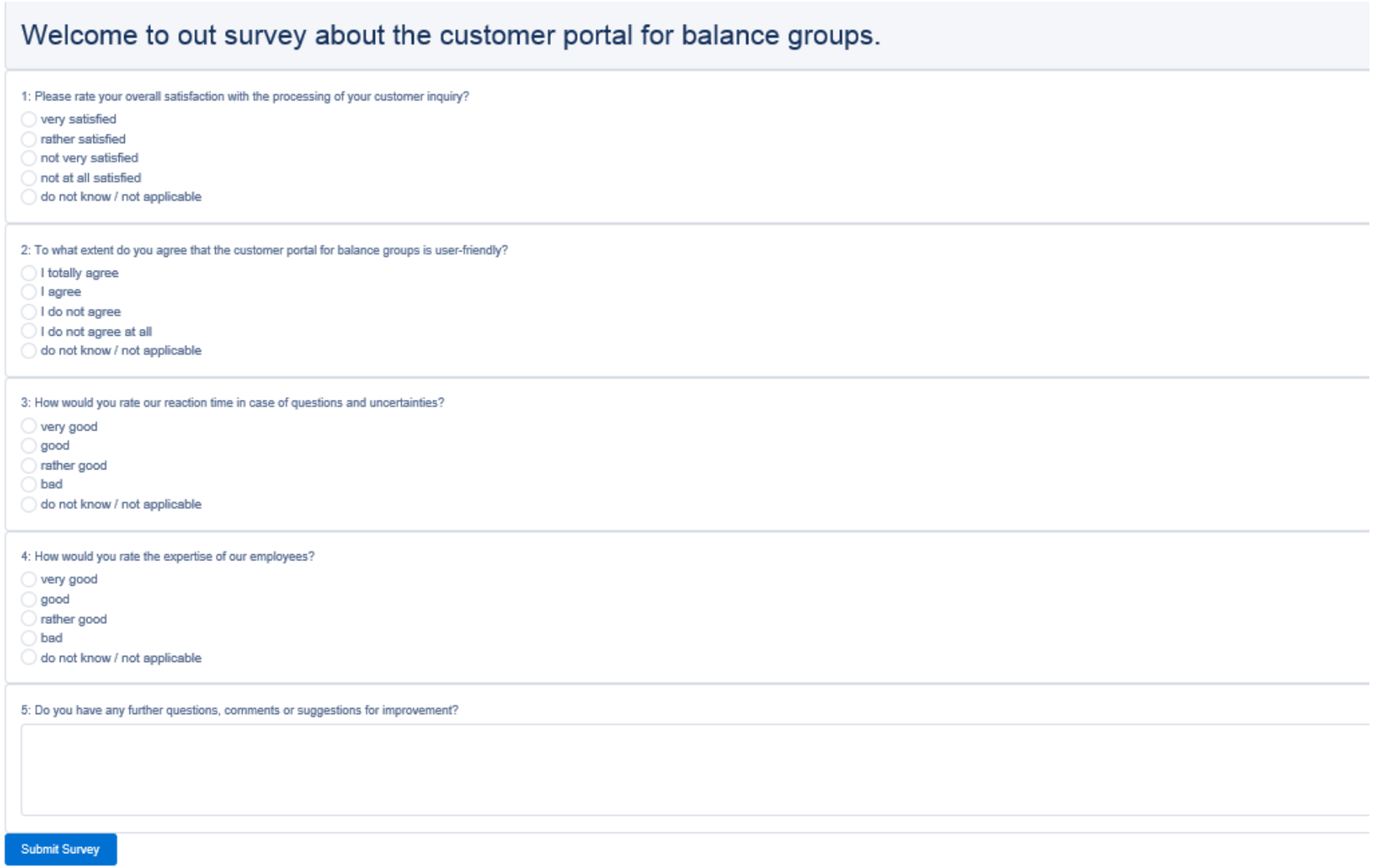
Balance Group Management
BG mutations – Feedback



Welcome to out survey about the customer portal for balance groups.

1: Please rate your overall satisfaction with the processing of your customer inquiry?

- very satisfied
- rather satisfied
- not very satisfied
- not at all satisfied
- do not know / not applicable

2: To what extent do you agree that the customer portal for balance groups is user-friendly?

- I totally agree
- I agree
- I do not agree
- I do not agree at all
- do not know / not applicable

3: How would you rate our reaction time in case of questions and uncertainties?

- very good
- good
- rather good
- bad
- do not know / not applicable

4: How would you rate the expertise of our employees?

- very good
- good
- rather good
- bad
- do not know / not applicable

5: Do you have any further questions, comments or suggestions for improvement?

Submit Survey

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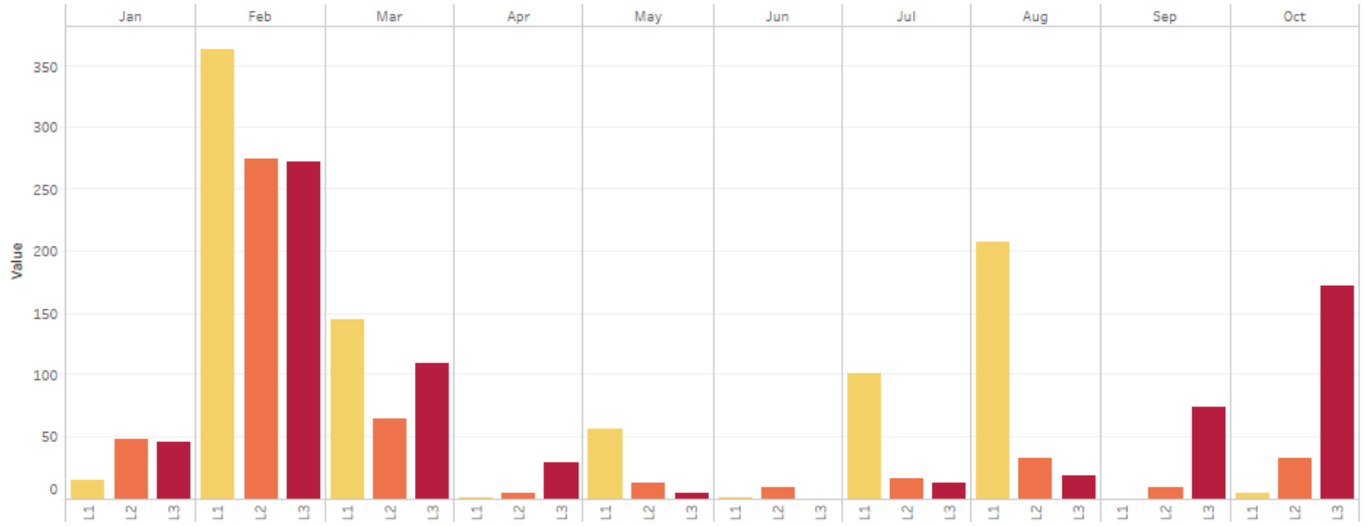
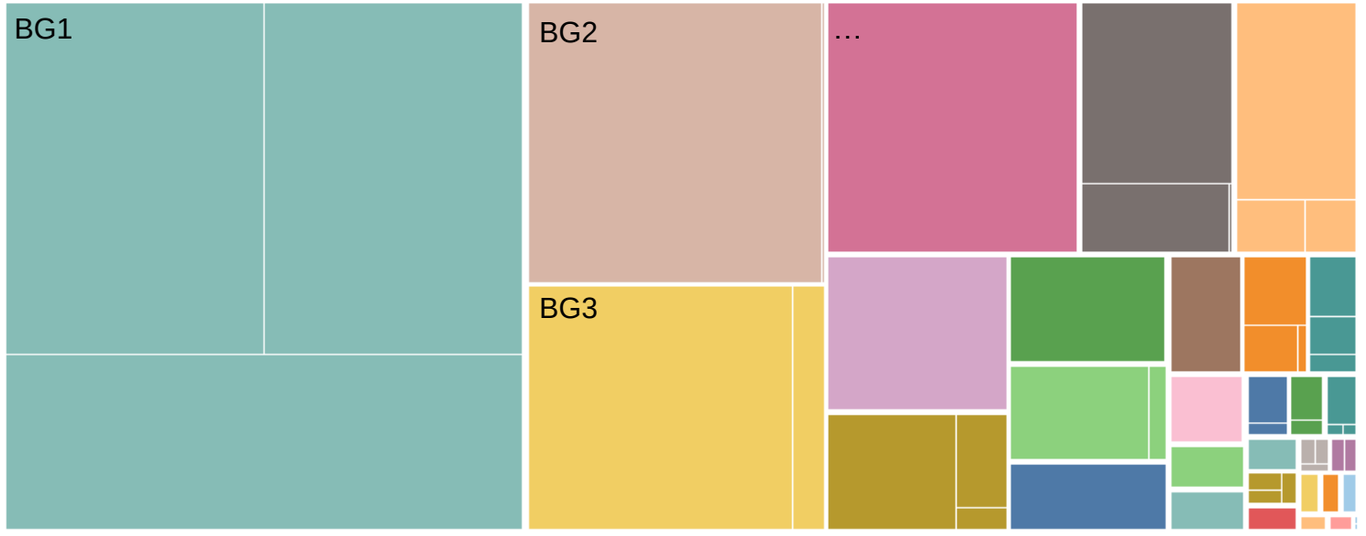
Balance Group Management
Limit Violations

Number of Limit Violations



Amount of Limit Violations in MWh



Measures	
Written explanation	8 BGs
Meeting at Swissgrid	3 BGs
Warning of Intraday suspension	1 BG
Penalties – in case of repeated L3 violations	10 BGs EUR 73`678

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Operational occurrences
Facts event 1

31st March 2018 – Control Area Short

- From 00:00 until almost the end of the day
- Short Position 400 - 600 MW

Deployed Control Energy

- Positive 10’504 MWh
- Negative 493 MWh

Changes of TRE bids during the day increased balancing energy price

→ Reason: Short Position of one BG because of IT malfunction, connection to CONS forecast

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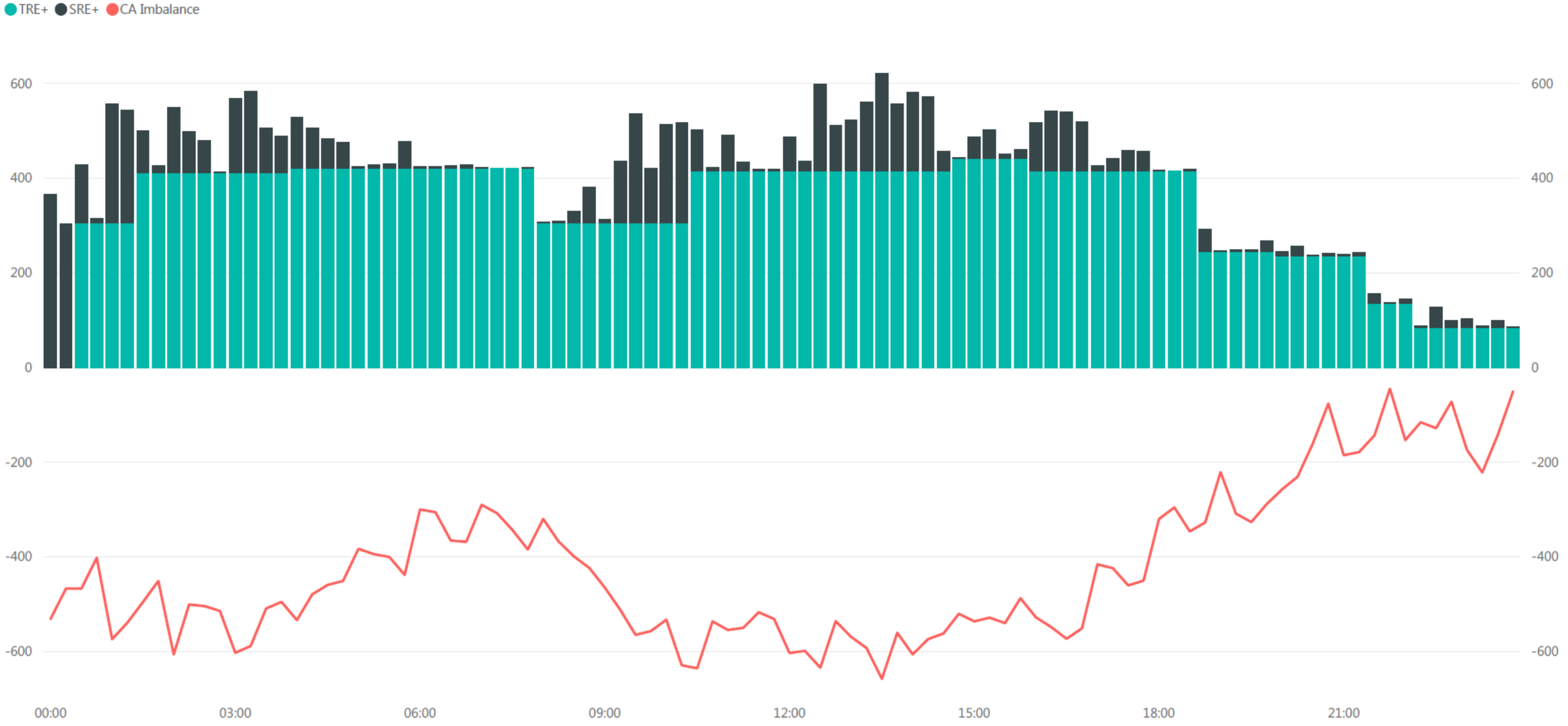
Operational occurrences
Activated control energy event 1



Operational occurrences
Facts event 2

22nd August 2018 – Intervention in power plant production

- Congestion warning for different regions
- N-1 violations
- National redispatch resources were exhausted
- Critical grid situation followed by an intervention in power plant production (220 MW reduction)
- Short position of responsible Balance Group
- Balancing with SRE+ and TRE+

→ Result: High balance energy prices due to deployment of high TRE+ bids

Operational occurrences
Challenges

- Swissgrid has no exact picture of imbalances caused by Balance Groups with metering points (only validation)
- TRE bids can led to very high balance energy prices
- Unsatisfying congestion warning process

- Balance Groups are fully liable to balance their positions – and in consequence for the eventual balance energy even in rare cases of power plant production intervention

Operational occurrences
Measures to avoid high balance energy prices

Two events caused significant high balance energy prices:

31.03.2018 – 3’183 €/MWh

22.08.2018 – 5’637 €/MWh

The reason are calls/requests of TRE bids on high levels of the merit order list

Possible measures from Swissgrid to reduce the volatility of balance energy prices:

- Adjustment of price cap for TRE Bids to +3’000 EUR/MWh for TRE+, starting in mid 2019
- Working group congestion warning (AG Engpasswarnung) will be started in Q1 2019 ➔ Target: make the process more efficient
- Implementation of the integrated market (earliest June 2019)

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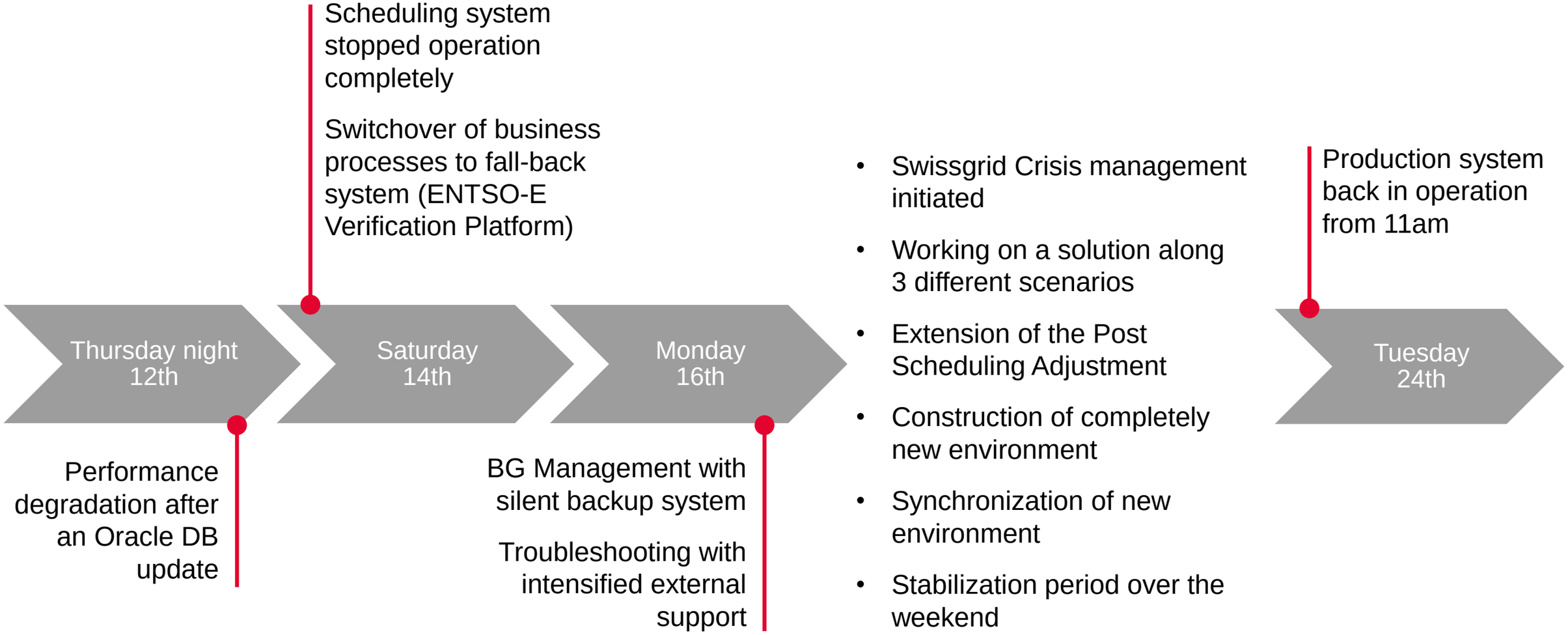
Schedule management system outage
Timeline of outage – April 2018



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Schedule management system outage
Lessons learnt & measures

+ Supportive cooperation of balance groups
+ Limited impact on market trading, except lacking system replies (ACK, ANO)
+ Quick setup of the BCM solution (use of test system as production system)
+ Stable alternate solution by setting up total new system in a dedicated ICT zone
+ Practical proof of concept establishing and coordination of the «Swissgrid Crisis Management»

− Faster identification of root cause

Nomination of cross border schedules
Intraday on Swiss borders

Scenarios:

- Capacity is booked at DB AG Platform but not nominated at Swissgrid by TPS
- TPS is sent to Swissgrid but capacity is not booked yet at DB AG Platform (open position)

Result:

- Swissgrid has mismatching schedules between Balance Groups and Neighbouring-TSOs
- Challenges to close position near delivery

Solution:

- Booked Intraday capacity at DB AG Platform has always immediately be nominated to Swissgrid with TPS

Imbalance pricing

Roger Wiget
Specialist Market Development

swissgrid

Price reform – Basic idea

Current system

Concept of new system

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Price reform – Fundamentals

Current market

Dual imbalance energy price system
(one price per direction)

Imbalance energy prices depend on:

- Spot prices
- Balancing energy prices
- Surcharge

Balancing energy prices depend on:

- Spot price
- Auctions (pay-as-bid)

Surplus is achieved and transferred to reduce tariffs

Provision of balancing capacity

Concept of new market

Single imbalance energy price system
(one price for both directions)

Imbalance energy price depends on:

- Balancing energy price(s)

Balancing energy prices depend on:

- Auctions (pay-as-bid)

Income from and costs of energy are equal from TSO perspective

Provision of balancing capacity (same as today)

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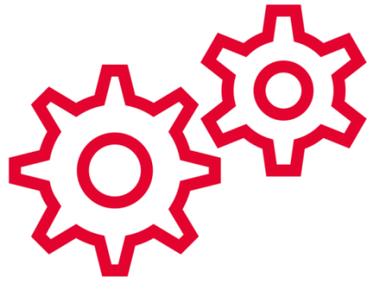
Price reform – Benefits

- More efficient balancing mechanism leading to higher market liquidity
- Clearer price signals due to marginal cost structure
- Closer to real time market pricing
- Financial neutrality of TSO
- Integration in the EU balancing market



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Price reform – Status

Synchronize with the integration of Switzerland into the European balancing platforms and market

↓

Subject to a decision of the European Commission

↓

No principle change before 2021

Swissgrid will invite BSP and BRP for consultancy as soon as it is reasonable

Introduction of the replacement reserves market (TERRE)

Alina Zigkiri
Specialist Market Development

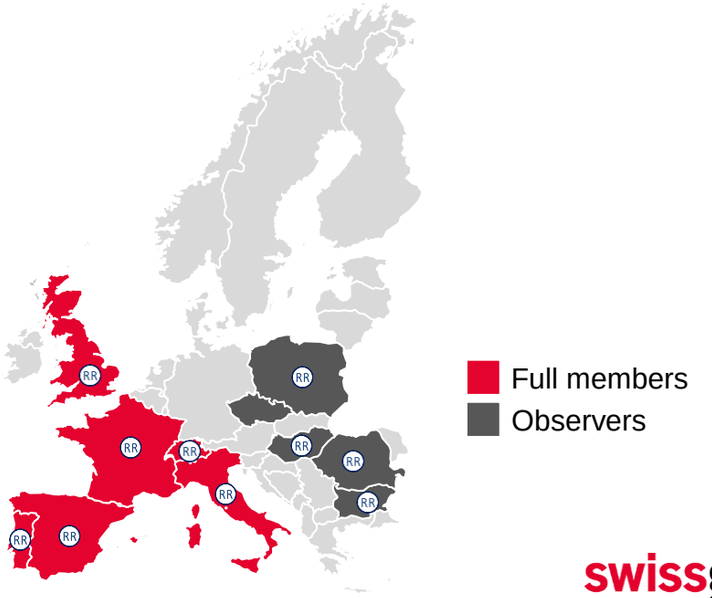
swissgrid

Standard products for balancing energy

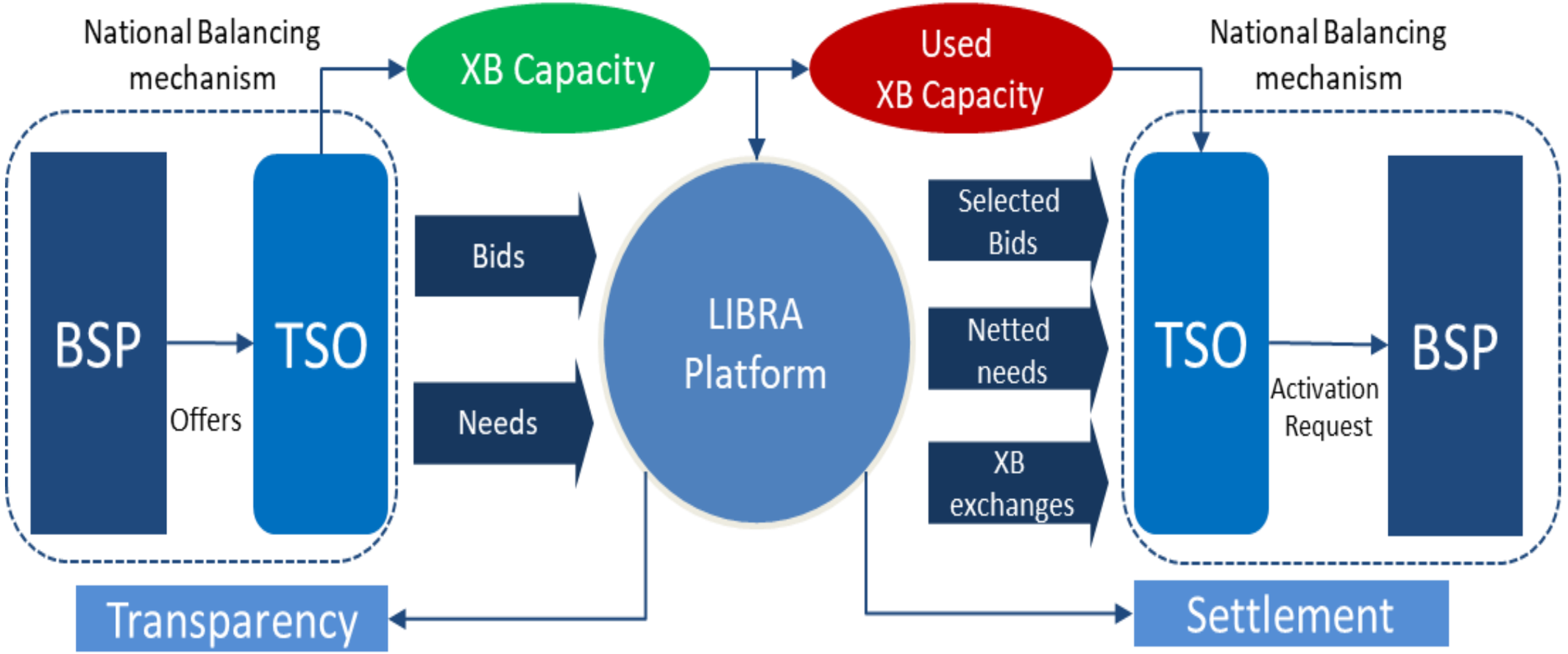
Swissgrid products for ancillary services	Standard products for balancing energy
• Secondary control energy	• Automatic frequency restoration reserves
• Fast tertiary control energy	• Manual frequency restoration reserves
• Slow tertiary control energy	• Replacement services

Trans-European Replacement Reserves Exchange

Cooperation of European TSOs in order to exchange balancing energy



TERRE process



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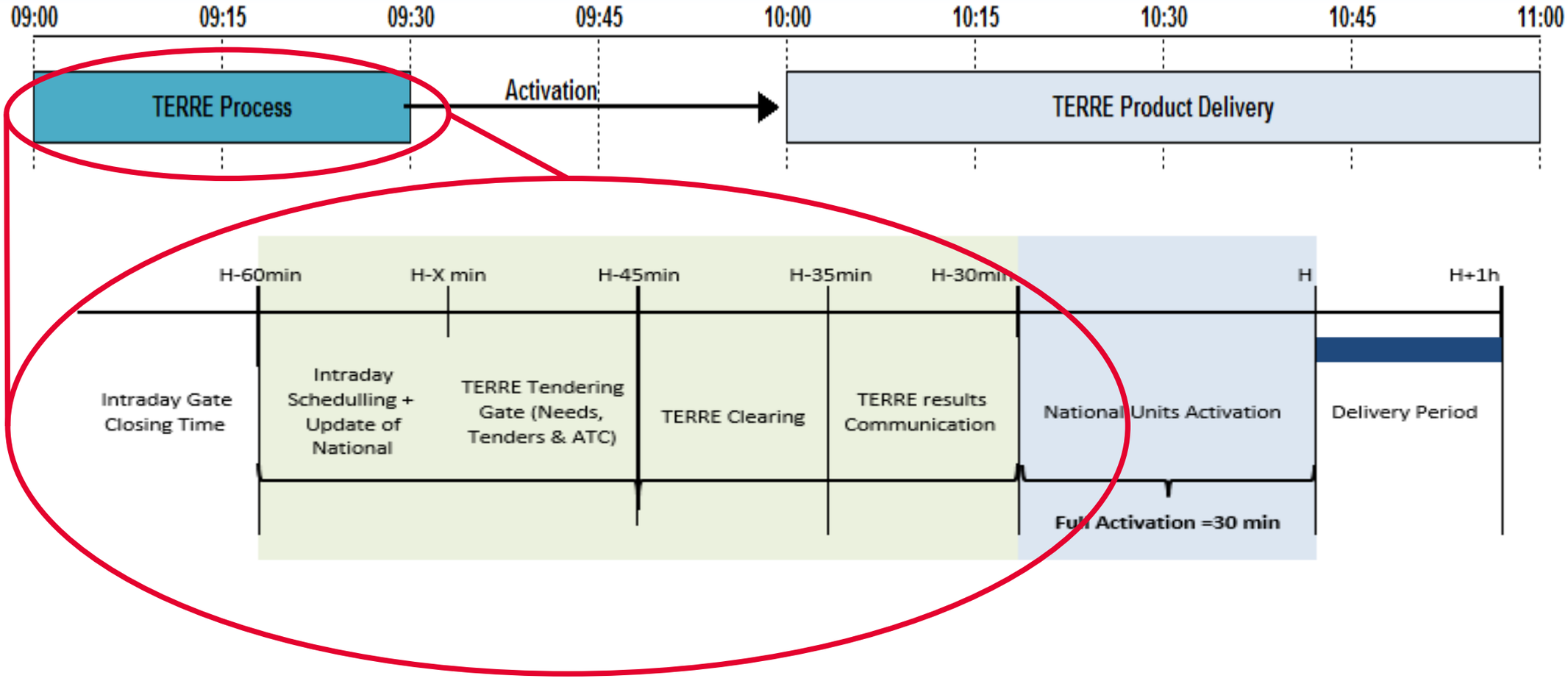
TERRE timings



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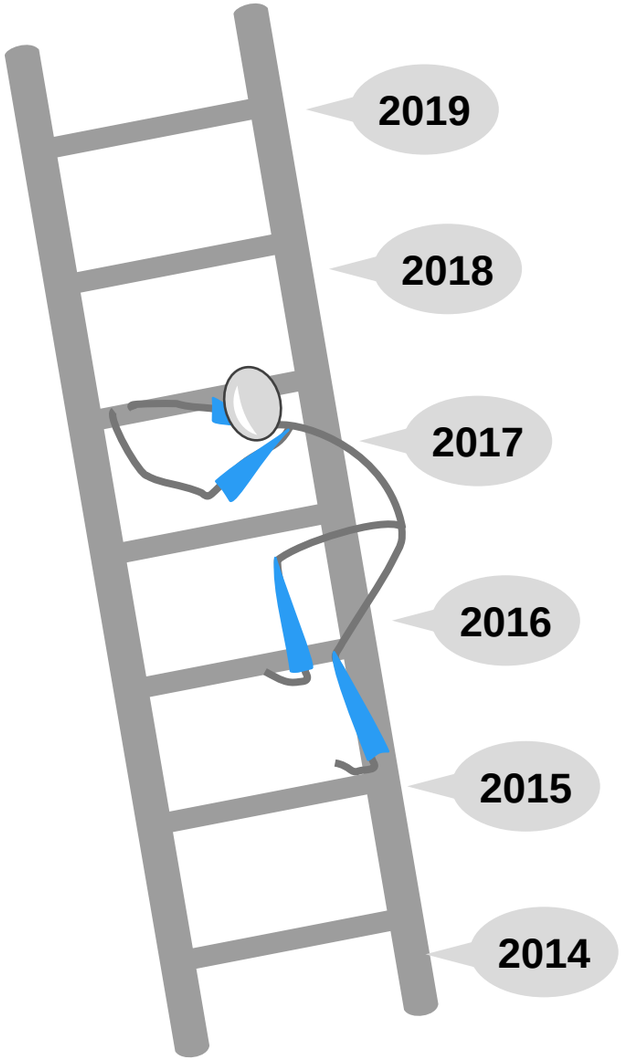
TERRE Status



2019	Development of LIBRA platform Local implementation **Go live December 2019 (first wave)**
2018	Development of LIBRA platform Local implementation Replacement Reserves Implementation Framework
2017	Harmonization of local markets 2nd Consultation
2016	End of design phase 1st Consultation
2015	Design phase
2014	Project start

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Impact on Balance Groups

- **TERRE will replace a part of the French Balancing Market (Mécanisme d'ajustement)**
  - Participation of Swiss market participants to MDA is not foreseen after the Go-Live of TERRE

- **New business code in the schedules due to TERRE activations**

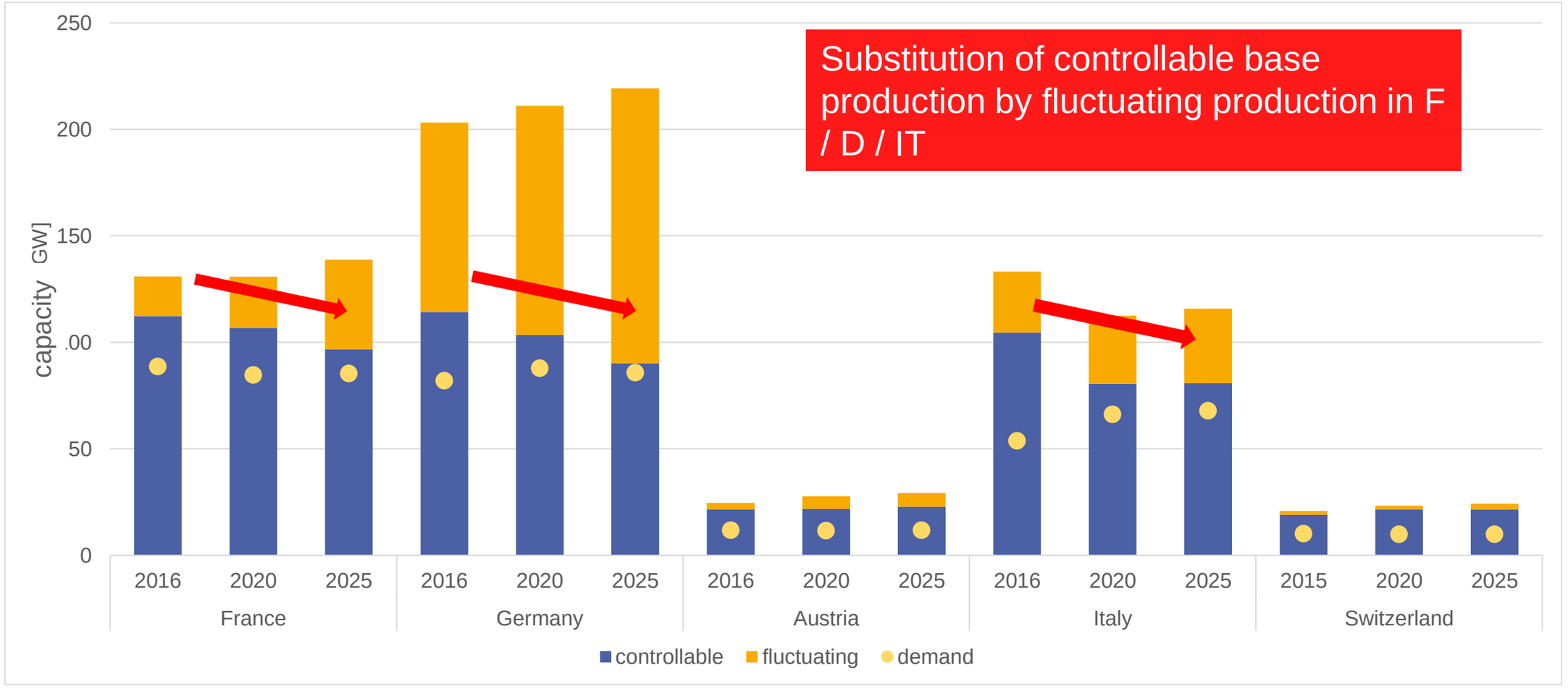
- **Change in the Balance Group Contract Annex 1 in order to include TERRE**
  - Imbalance price settlement:

    New definition of $Pter_{+/-}$: weighted average price of all activations for tertiary control energy in Switzerland

swissgrid

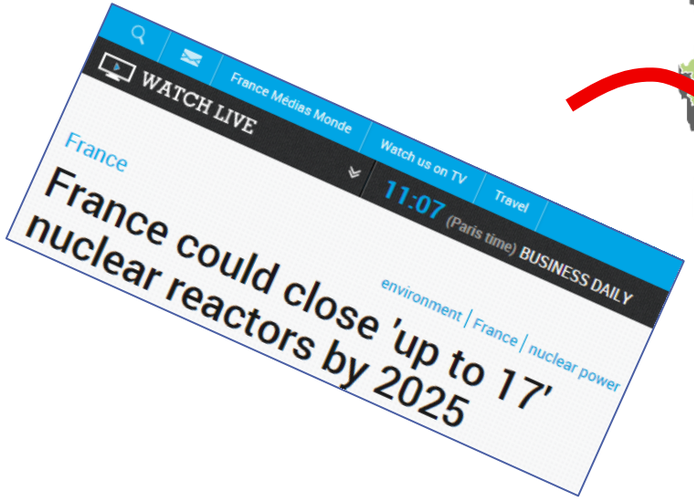
Security of supply Switzerland

Planned developments at the European electricity production



Source: ENTSO-E 2016

Ability of our neighbours to export



Quelle: france24.com, bmu.de, Zeit.de

Belgium: November 2018

Bloomberg

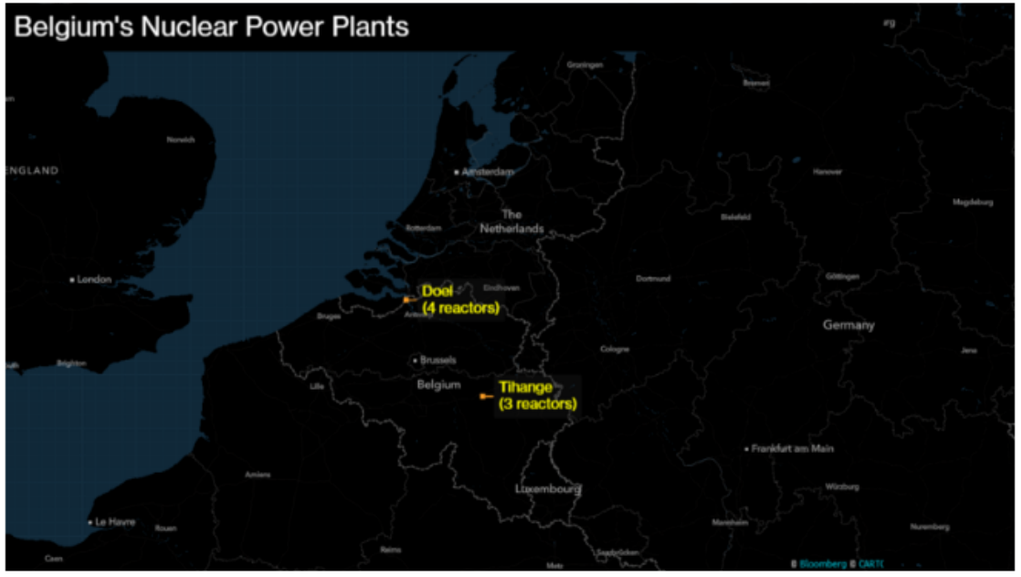
Markets

Belgium Faces Winter Blackouts as Aging Reactors Falter

By Rachel Morison

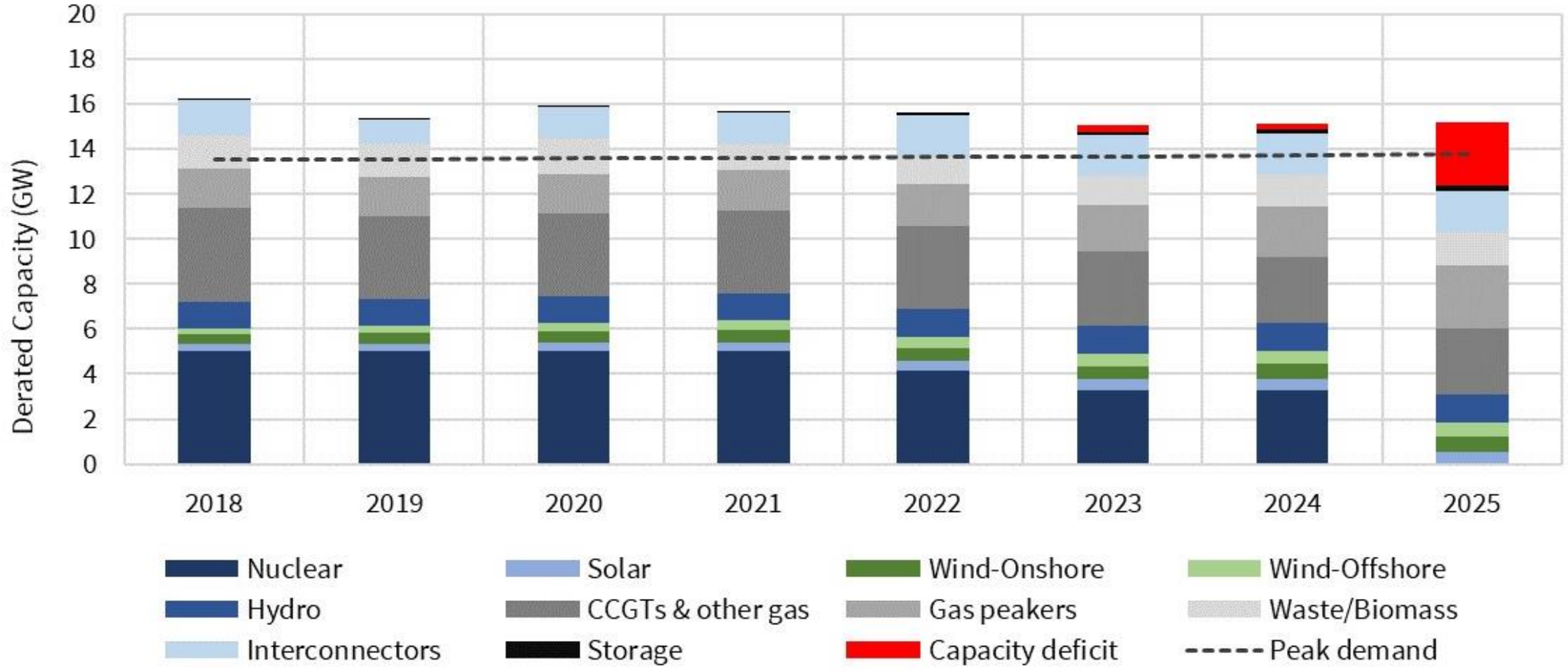
26. September 2018 06:00 *Updated on 26. September 2018 11:06*

- Only 1 of 7 reactors will be operational at start of November
- Energy minister hopes power imports will help meet shortfall



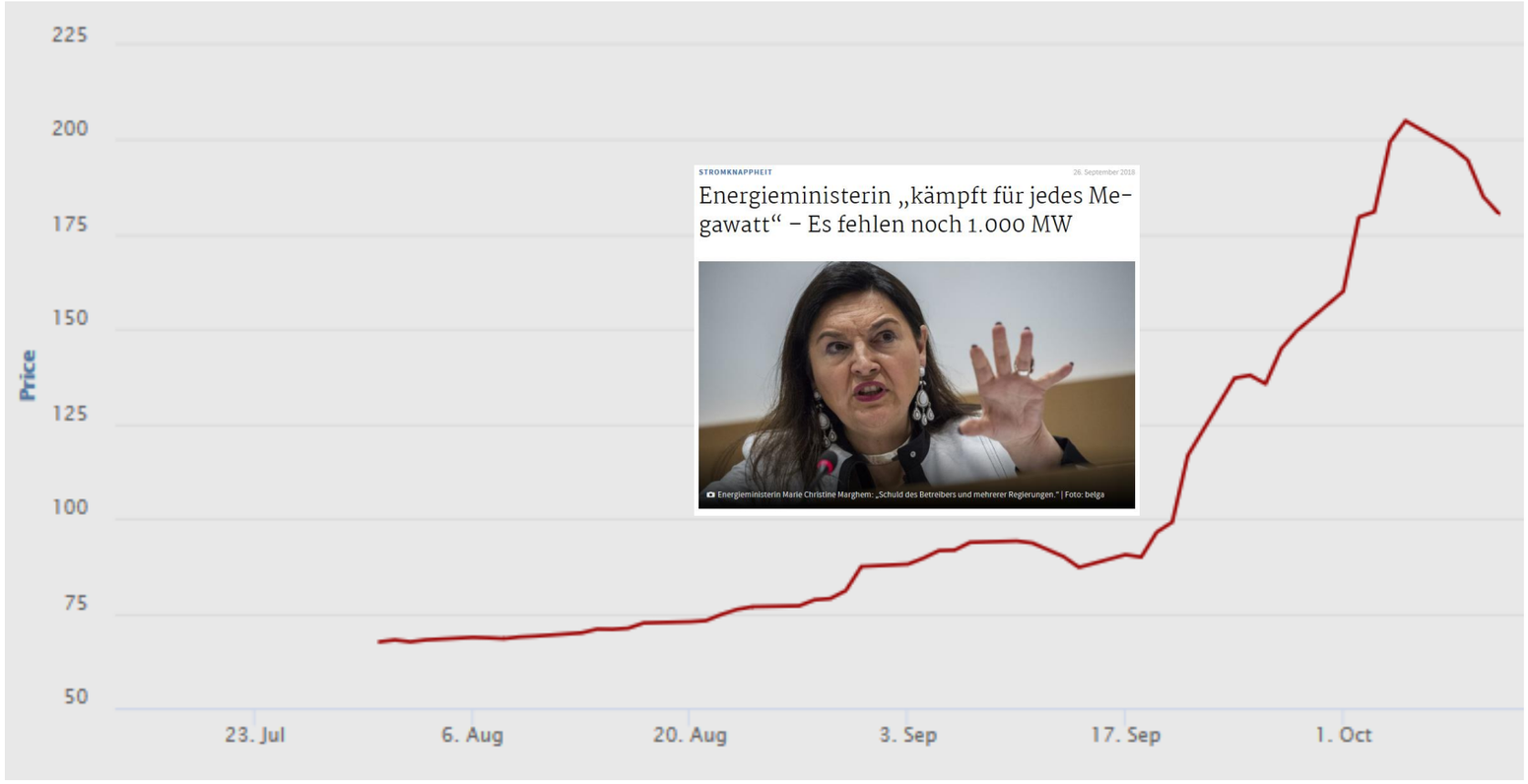
Source: Bloomberg.com

Belgium: evolution of de-rated capacity



Source: timera-energy.com

Belgium: market price November 2018

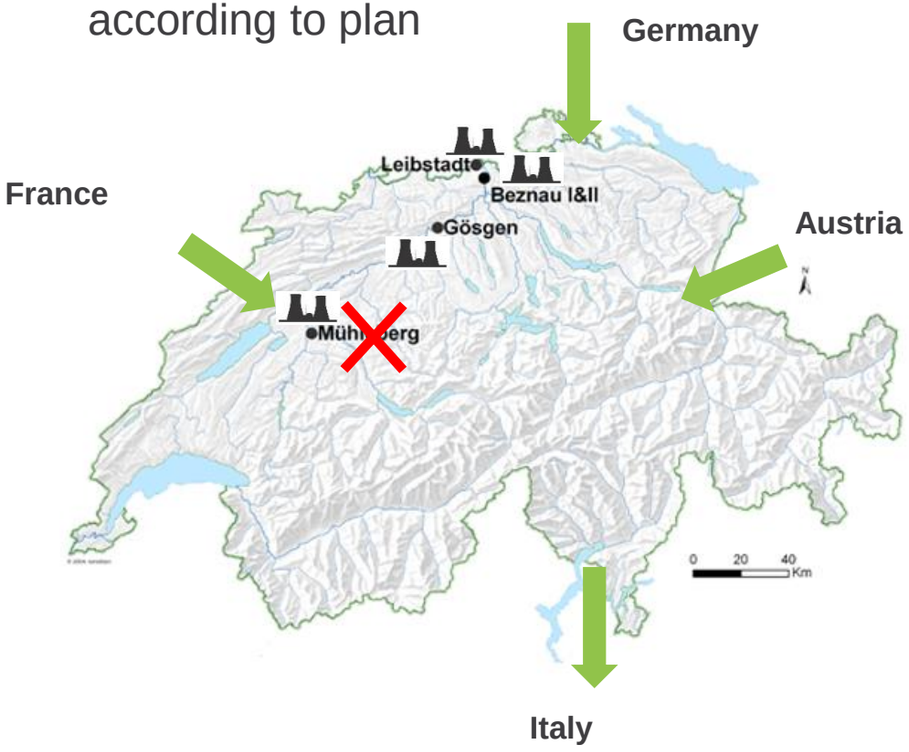


Source: EEX, grenzecho.net, belga

Adequacy study 2025: Scenarios

Base Case 2025

- w/o bilateral electr. treaty NTC reduced
- Development HVDC North-South Germany according to plan



Stress scenarios 2025:

Scenario 1-2025:
- As base case, but with
- Dev. HVDC delayed hence import D/AT->CH wind-depended reduced modelled*
- Unavailability KKB in winter
- reduced Import France / Italy

Scenario 2-2025:
- As scenario 1, but with
- Unavailability KKL/KKG/KKB in winter

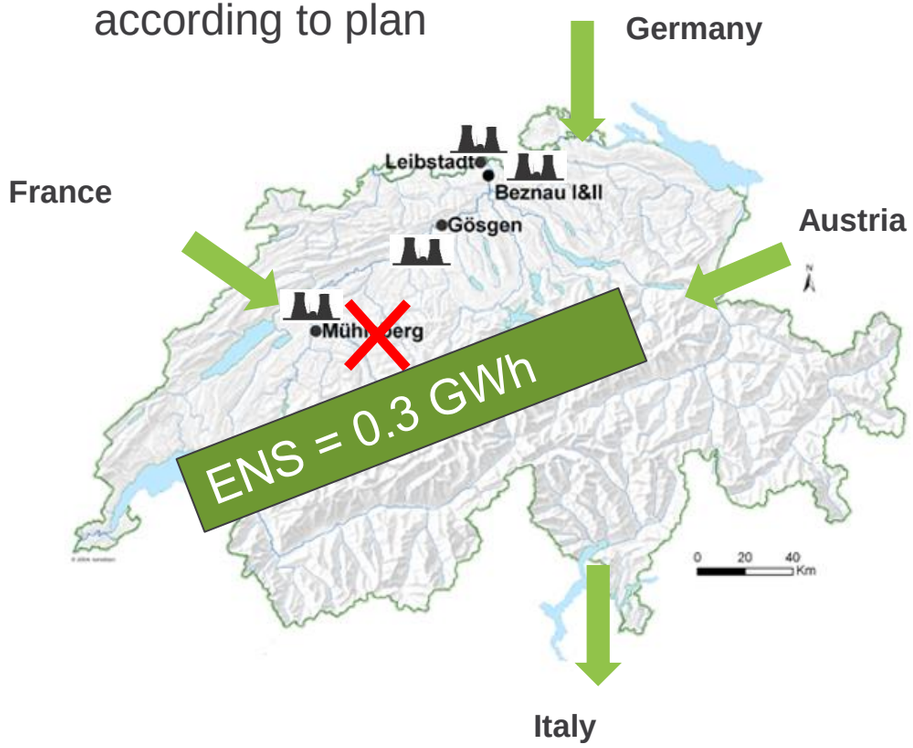
Scenario 3-2025
- As scenario 2, but with
- Carbon reduction D&I (-8.5 GW)
- Unavailability Grand Dixence

* As today

Adequacy study 2025: Results

Base Case 2025

- w/o bilateral electr. treaty NTC reduced
- Development HVDC North-South Germany according to plan



ENS = energy not supplied

Stress scenarios 2025:

Scenario 1-2025:
- As base case, but with
- Dev. HVDC delayed hence import D/AT->CH wind-dependend reduced modelled*
- Unavailability KKB in winter
- reduced Import France / Italy

ENS = 17 GWh

Scenario 2-2025:
- As scenario 1, but with
- Unavailability KKL/MVL/KKB in winter

ENS = 320 GWh

Scenario 3-2025
- As scenario 2, but with
- Carbon reduction D&I (-8.5 GW)
- Unavailability Grand Dixence

ENS = 383 GWh

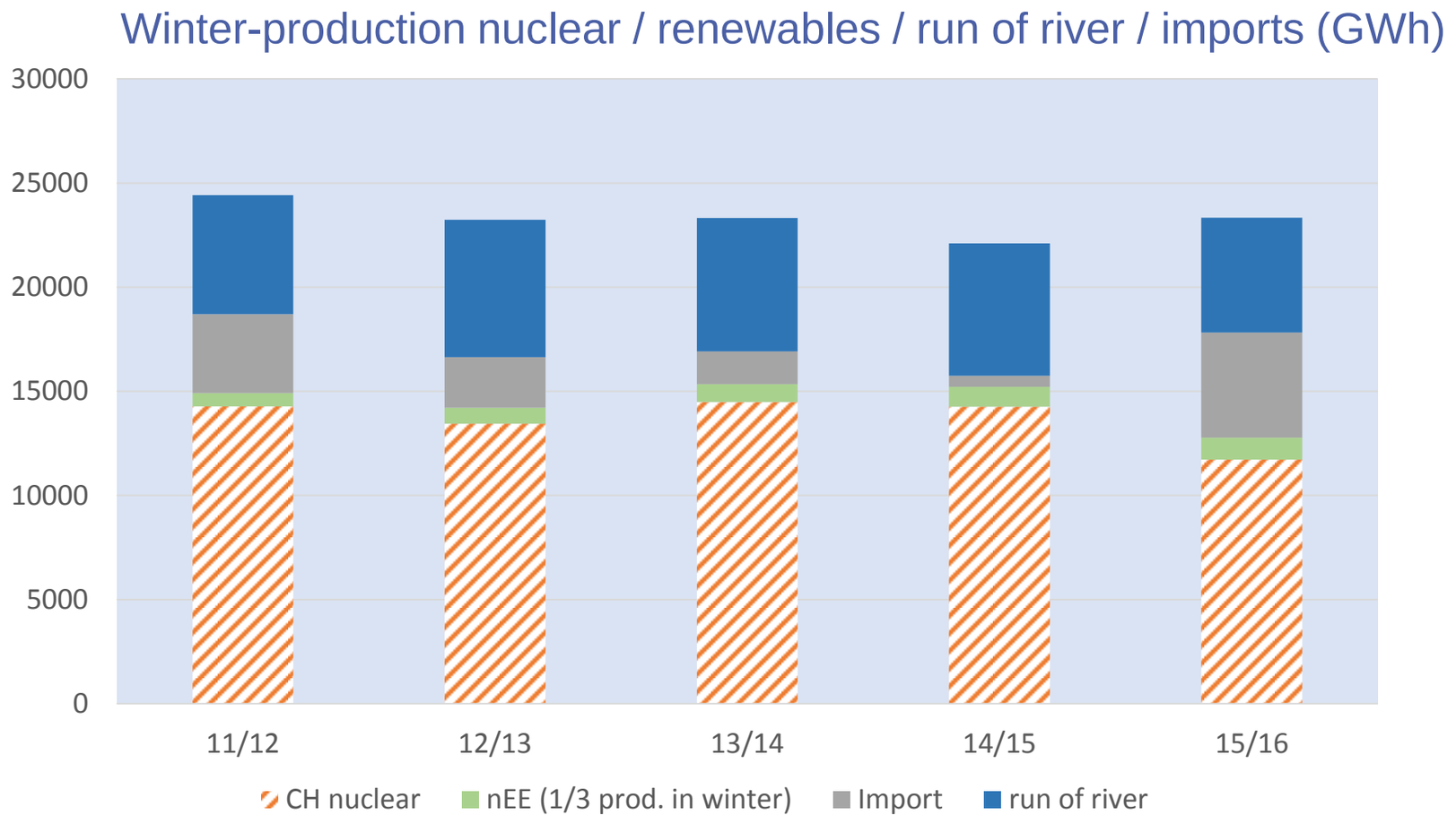
Adequacy study 2025: Findings ElCom

- Currently no need for action for immediate measures according to article 9 StromVG

- Provisions for immediate measures to cover the remaining risks of the stress scenarios should be taken to ensure a rapid and effective implementation if need be

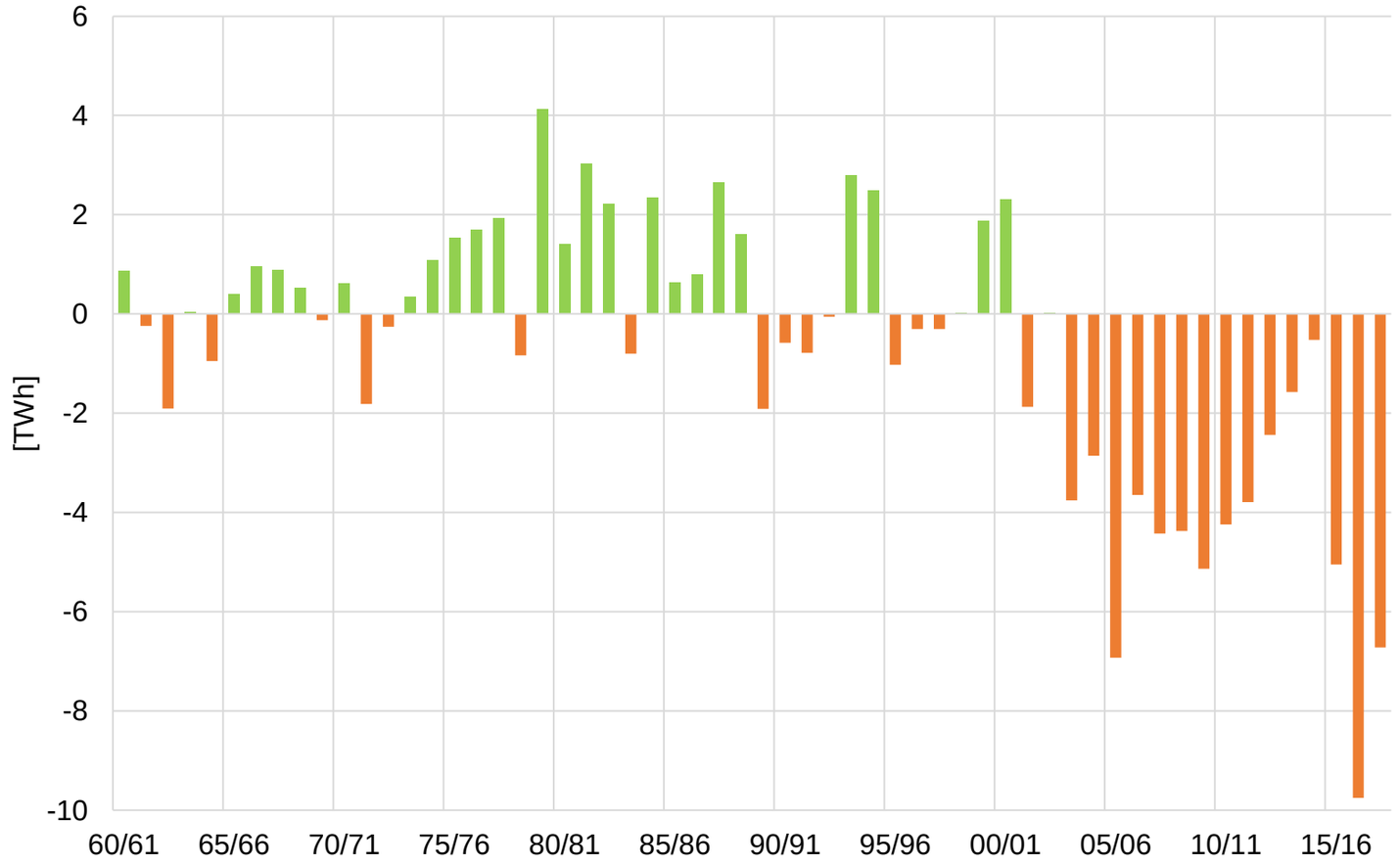
- Long term perspective: to secure the long term system stability after decommissioning of the Swiss nuclear power plants care is needed in order to ensure that a substantial part of the omitted capacity for winter production will still be available nationally

Challenge 1: production in winter



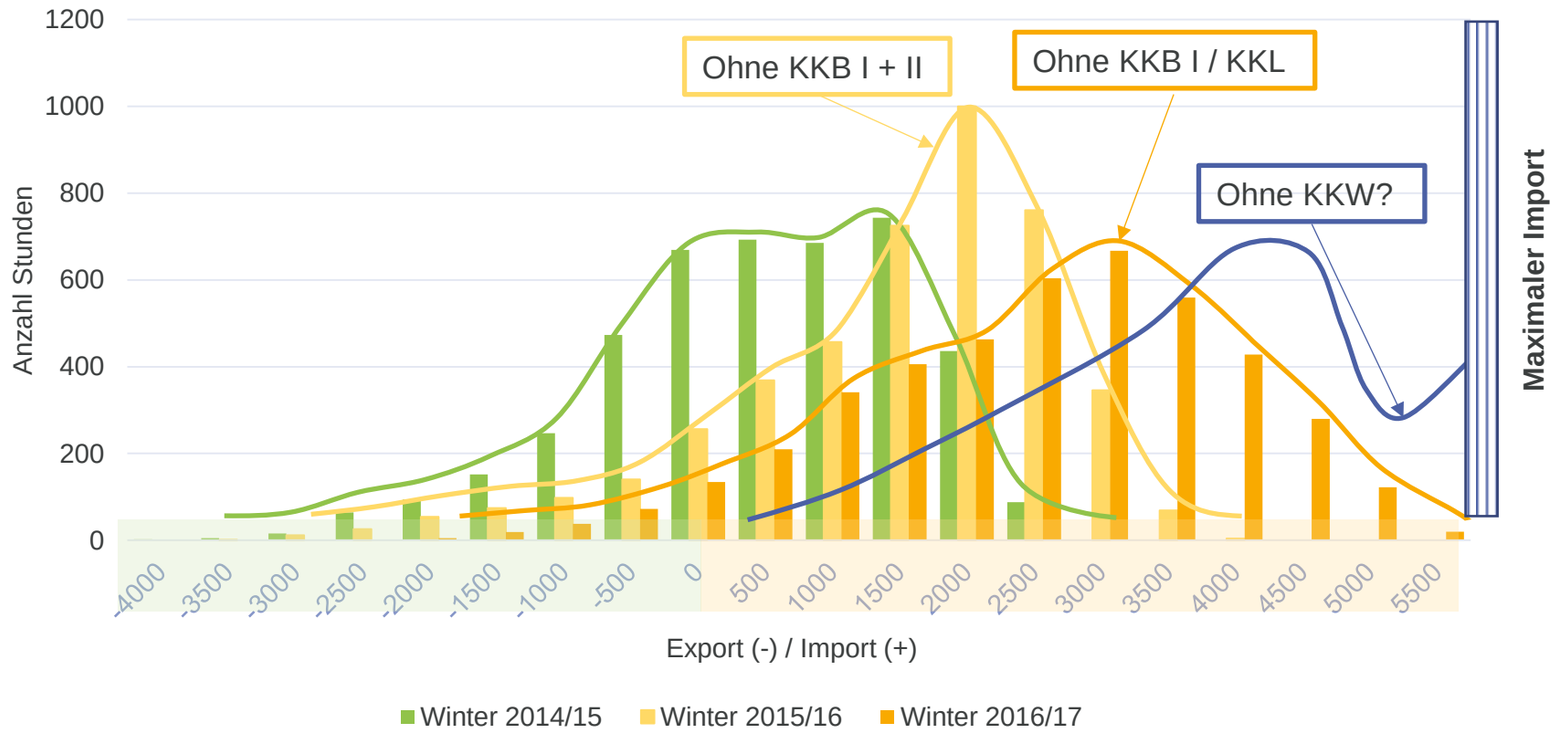
Source: Schweizer Elektrizitätsstatistik 2017

Challenge 2: Swiss trade balance of electricity imports during winter



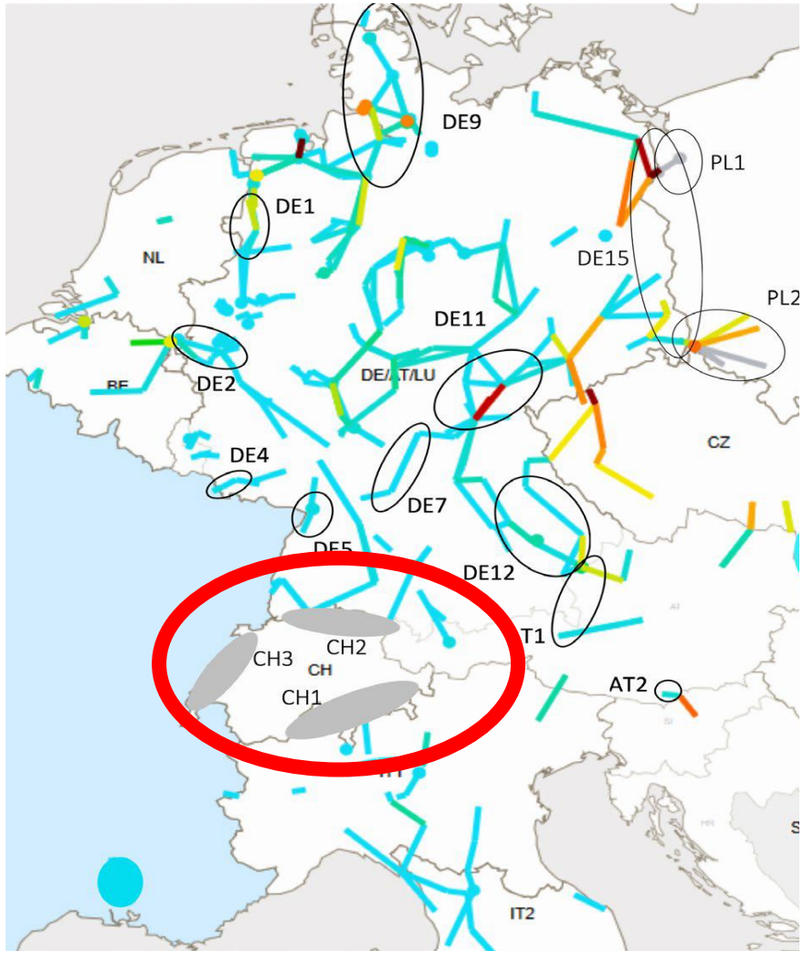
Source: Schweizer Elektrizitätsstatistik 2017

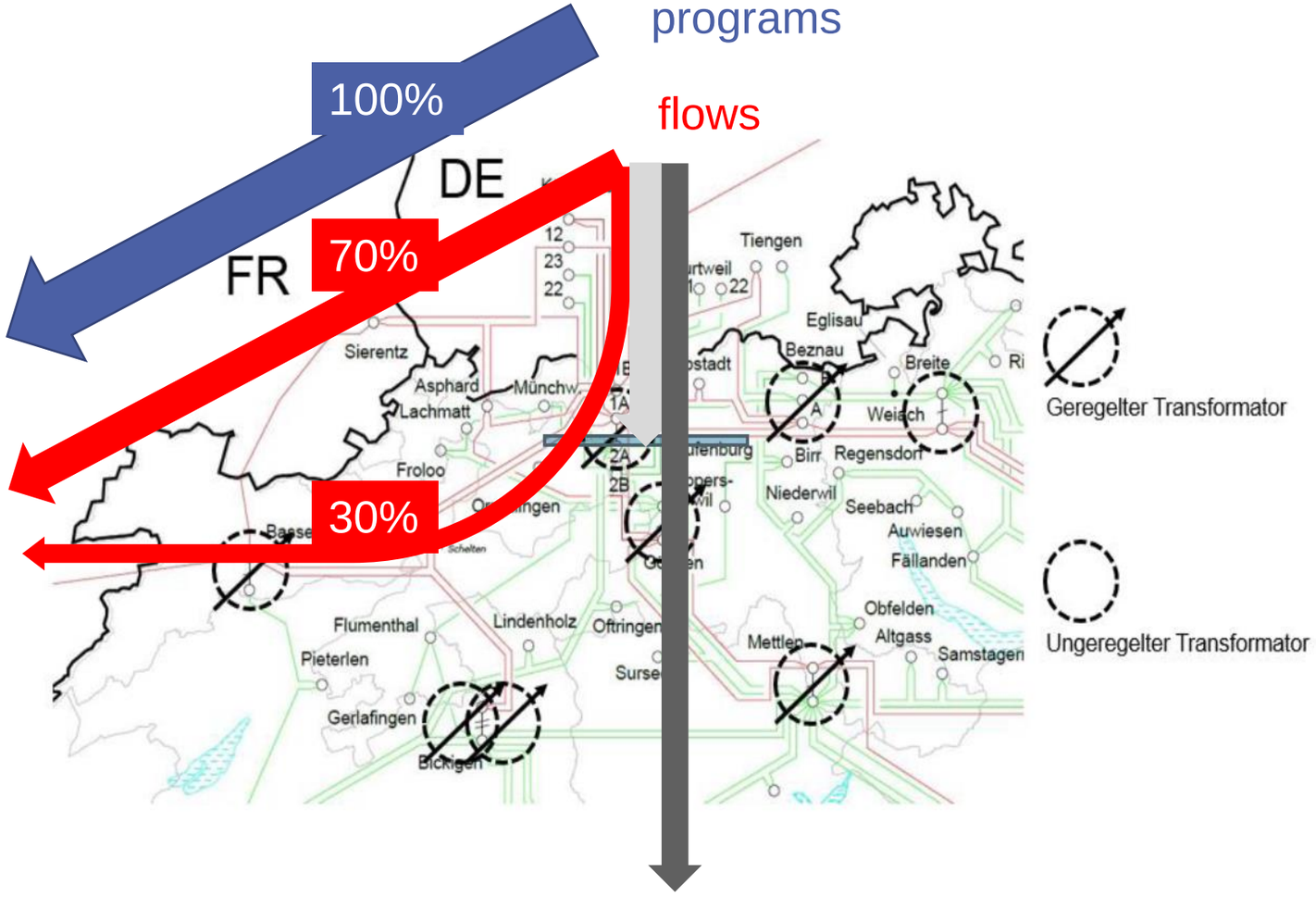
Challenge 2: growing imports / technical limits



Source: Schweizer Elektrizitätsstatistik 2017

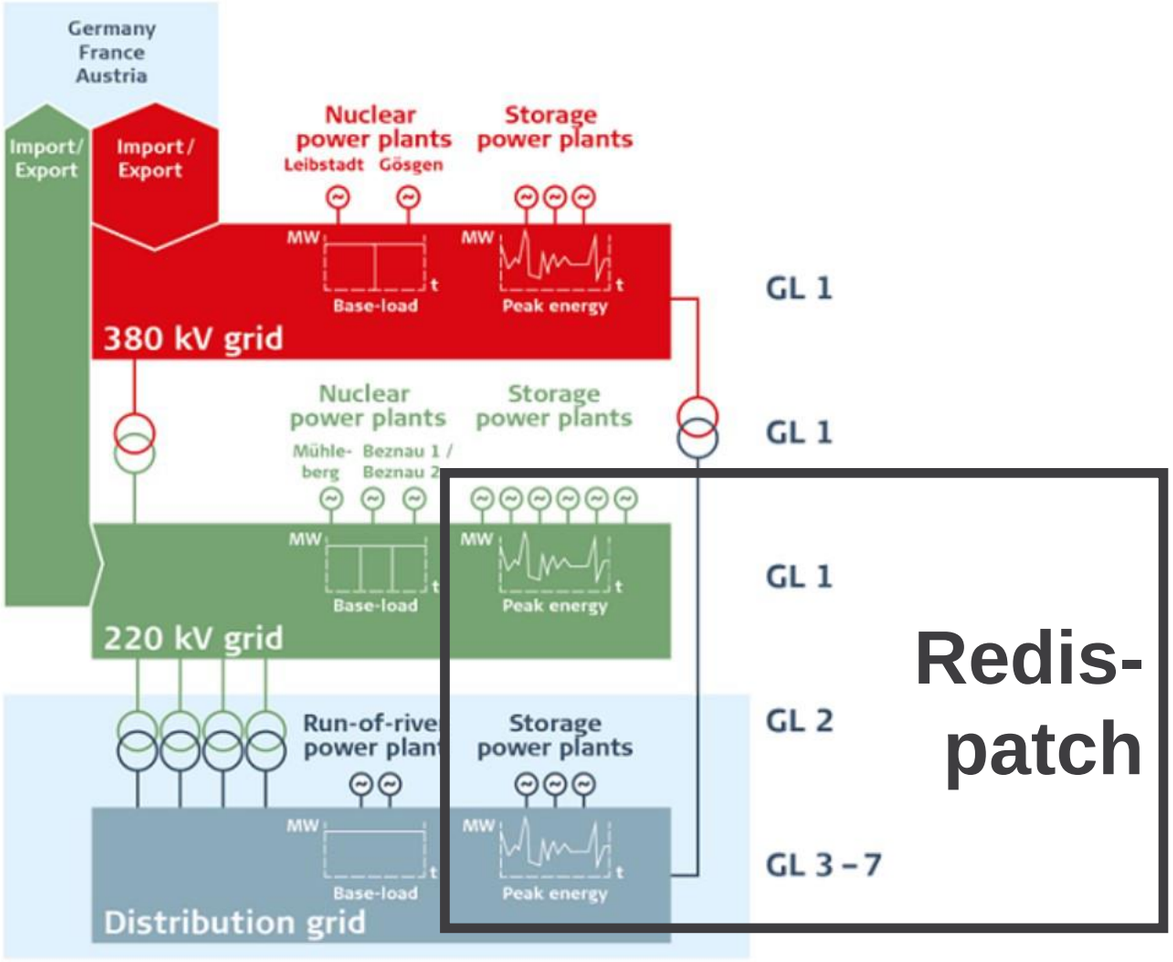
Challenge 3: Swiss (non)integration in EU / unscheduled flows

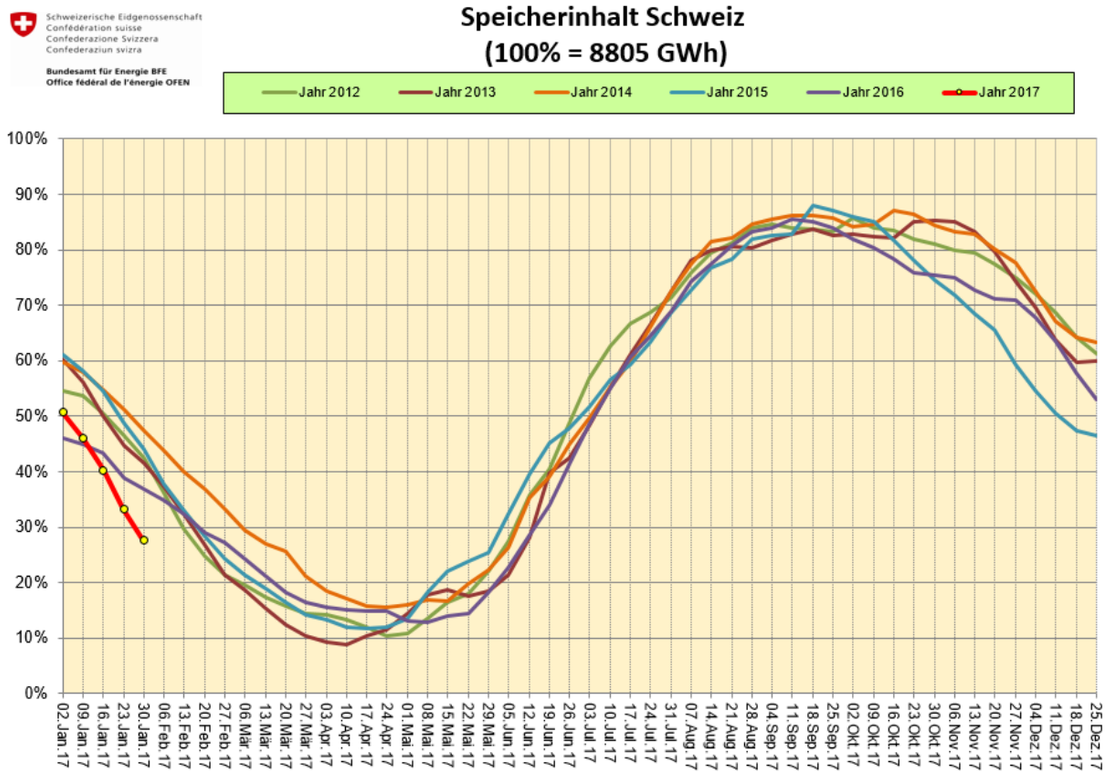




Source: entso-e, Swissgrid

Challenge 3: solution via redispatch ?

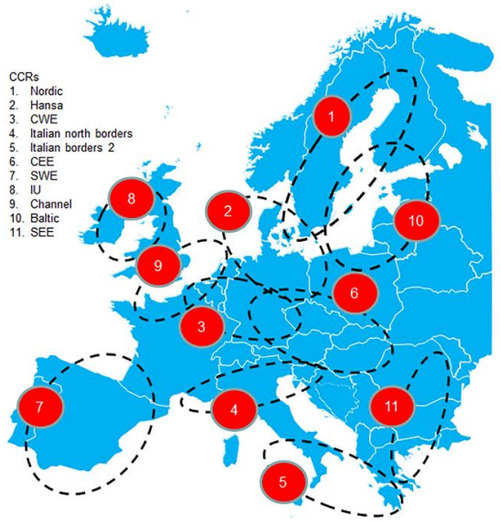




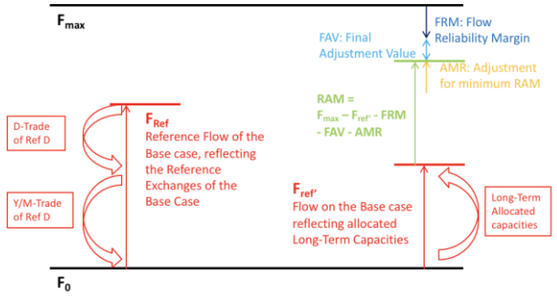
Source: Swissgrid, sfoe

Challenge 4…n : Swiss (non)integration in EU / section

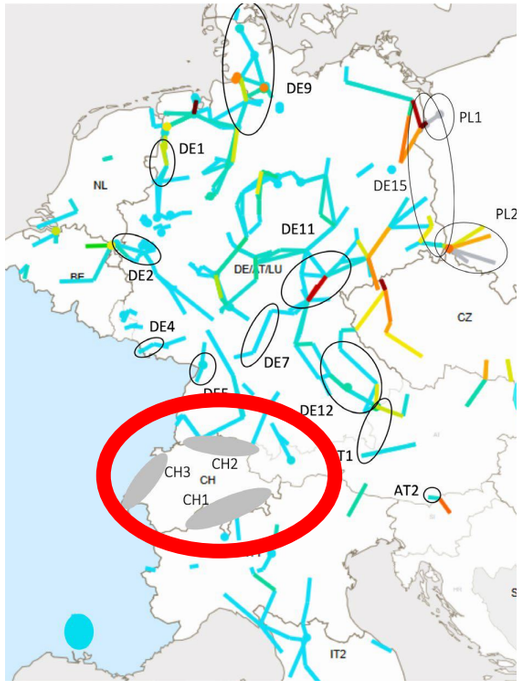
Capacity calculation



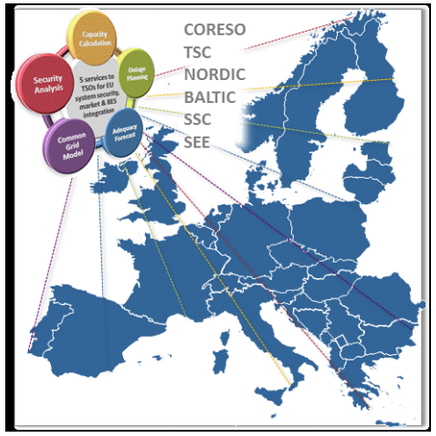
MinRam



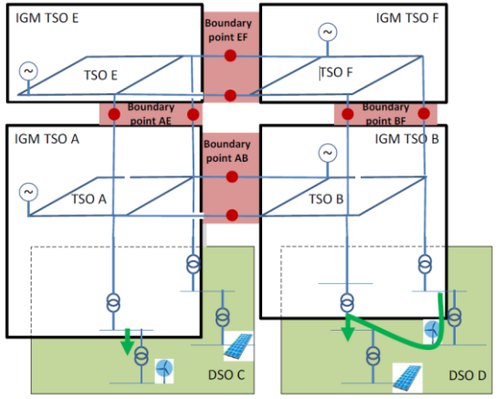
Bidding zone review



Regional security centers



Common Grid Model



Source: Entso-e, CWE TSO

Questions ?

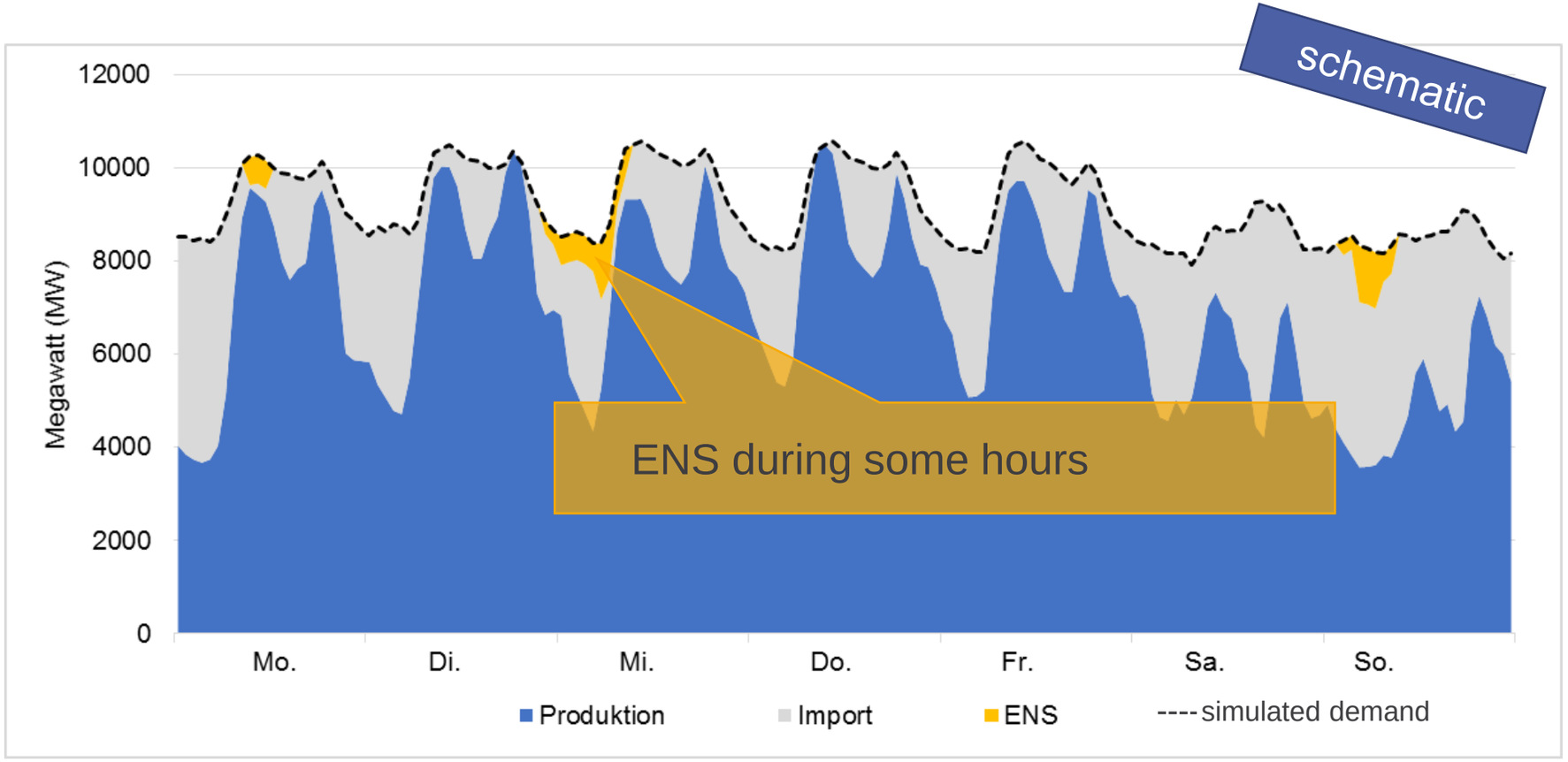
info@elcom.admin.ch
www.elcom.admin.ch

Upcoming event:

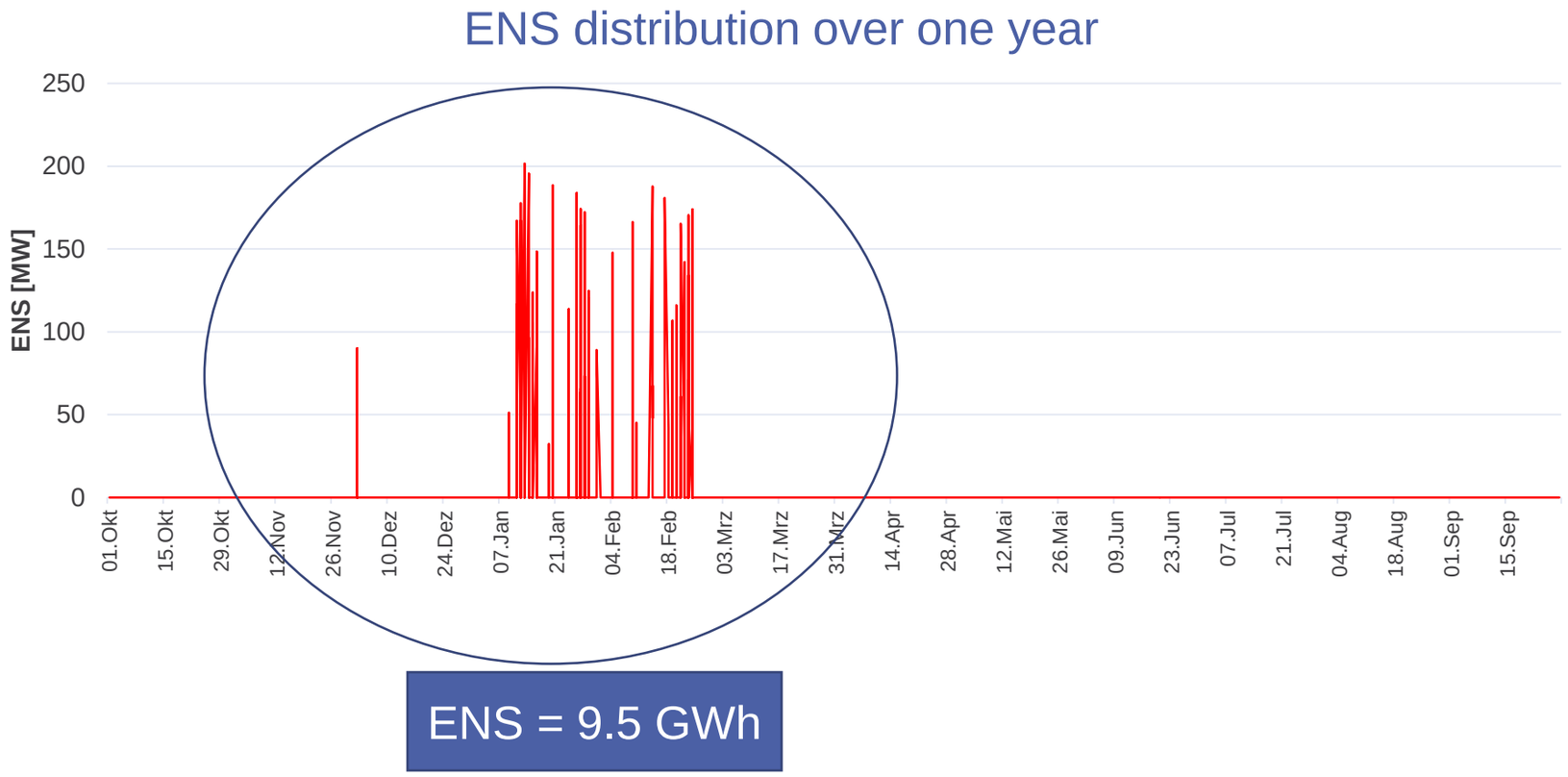
ElCom-Forum Thursday, 29.11.2018 at the «Kursaal Bern»
Subject: « Security of supply in international focus »

Registration: www.elcomevents.ch

Interpretation of adequacy results: what is ENS



Example ENS distribution for 2025



ENS = 9.5 GWh

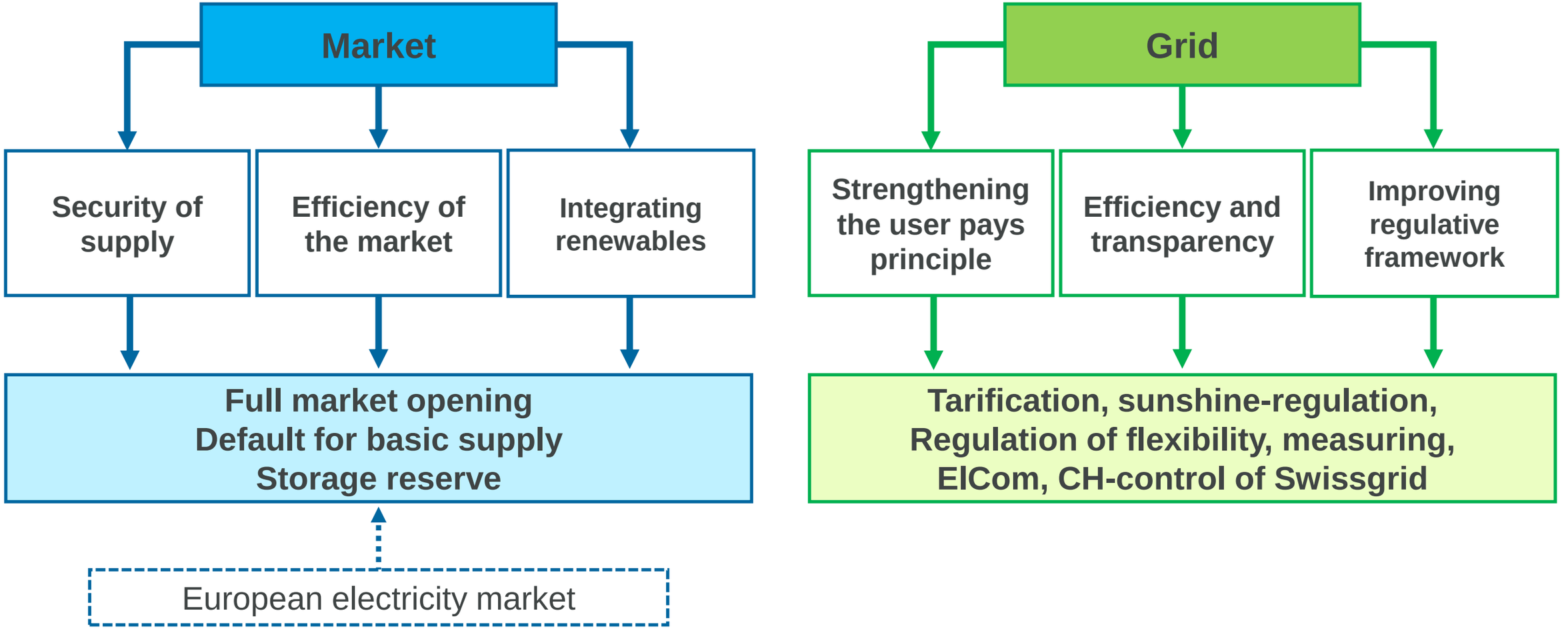
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Bundesamt für Energie BFE
Office fédéral de l'énergie OFEN
Ufficio federale dell'energia UFE
Swiss Federal Office of Energy SFOE

REVISION ELECTRICITY SUPPLY ACT
MAIN ELEMENTS OF THE CONSULTATION

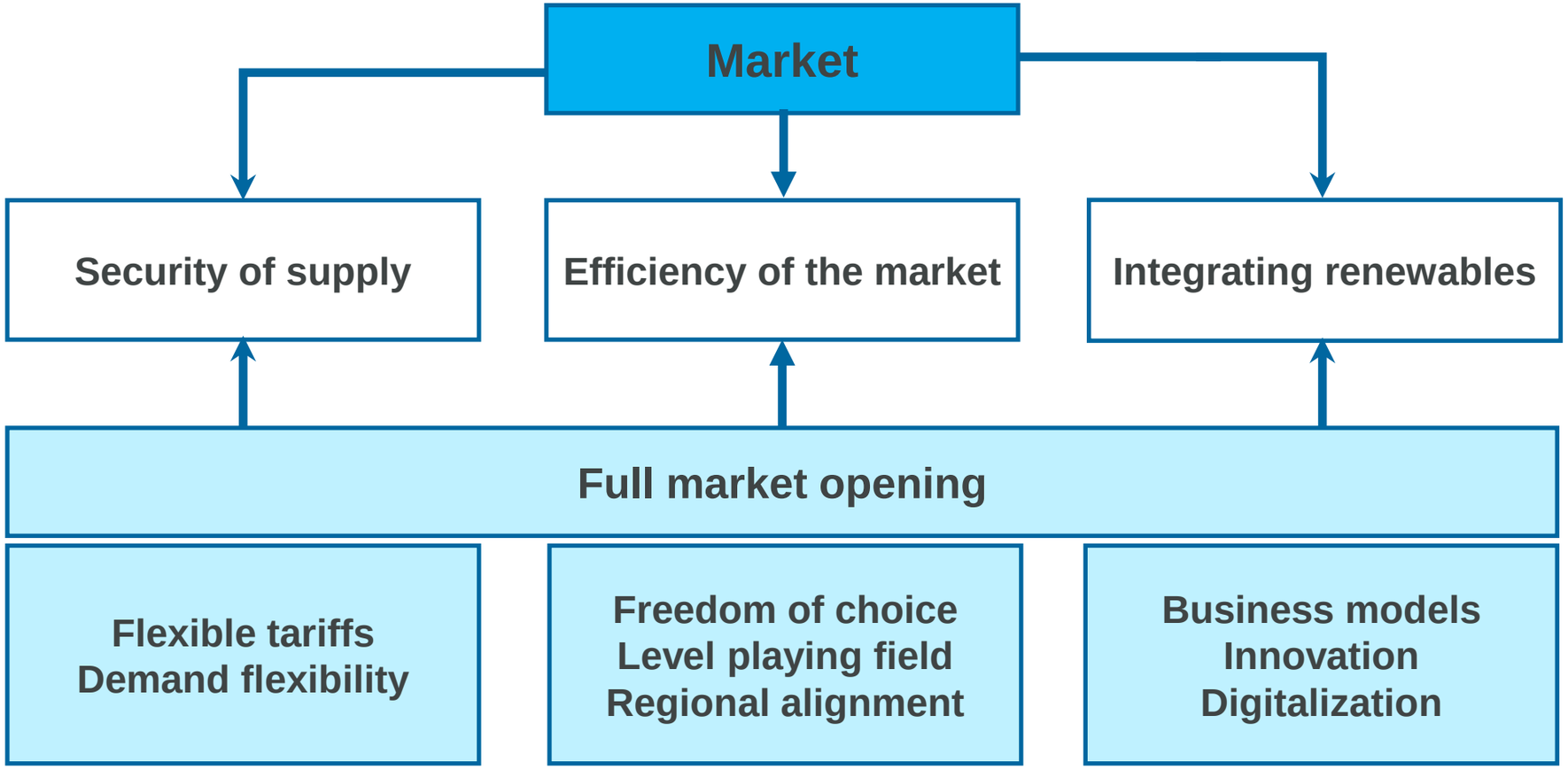
CONTENT

REVISION OF ELECTRICITY SUPPLY ACT
MAIN OBJECTIVES AND GOALS



FULL MARKET OPENING
HOW DOES IT FIT TO THE GOALS?

Full market opening is related to the three goals of market regulation

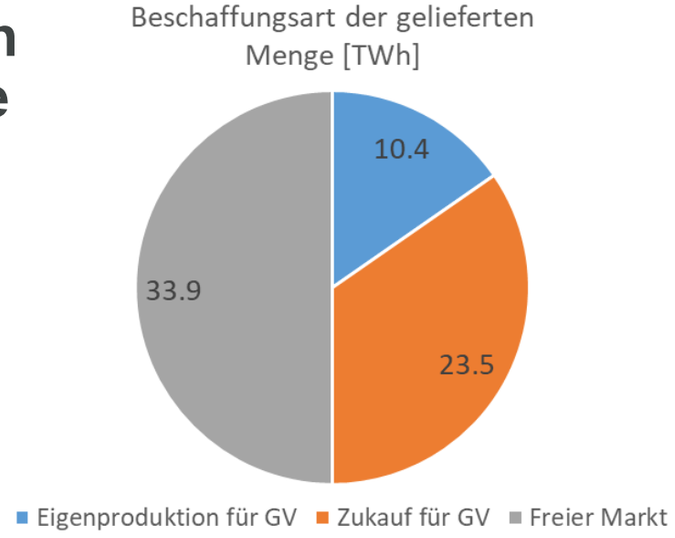


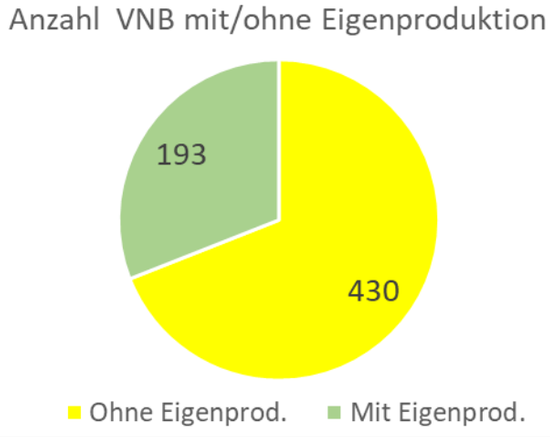
FULL MARKET OPENING
UNDERSTANDING THE PRESENT SITUATION

5 / 6 of electricity delivered to endconsumers is purchased on the market, 99% of endconsumers have no freedom of choice

- Today, only 10 TWh are delivered at production cost to basic supply. The rest of basic supply is purchased by distribution system operators (DSO) at the market.

- 70% of DSO do not have own production
- 91% of DSO do not have own production or it accounts for less than 20% of their sales





Market

FULL MARKET OPENING
DEFAULT IN BASIC SUPPLY

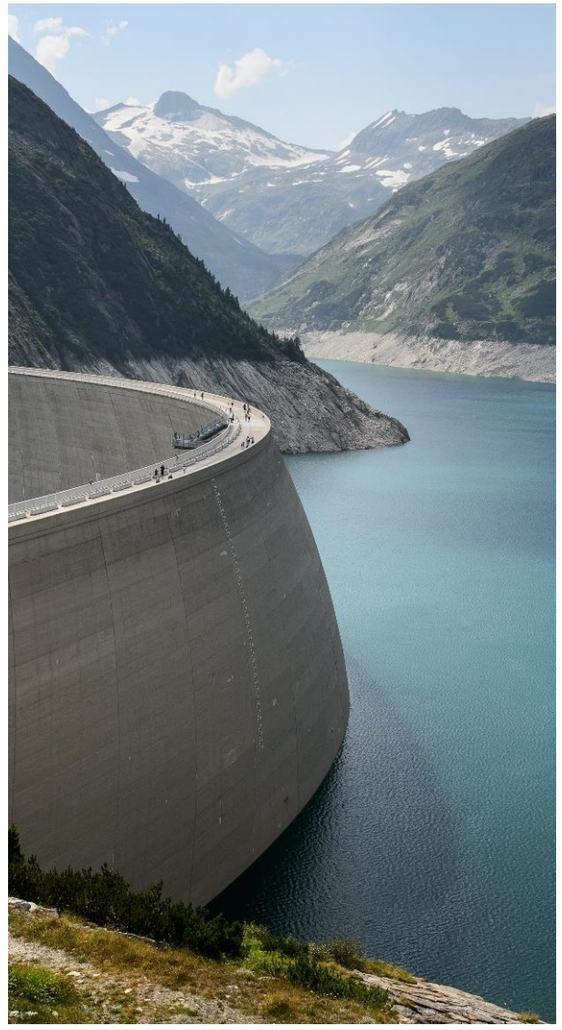
Basic supply remains, grid operators still important

Art. 5 Grid areas and connection requirement

- Grid operators are not only responsible for grid operation, but also for basic supply

Art. 6 Basic Supply

- Basic supply for consumers < 100 MWh still in place
- Default electricity product of Swiss origin and mainly or completely renewable (proof: guarantees of origin).
- Close-to-market support of renewables, including hydro
- End-consumers are free to choose another electricity product.



SECURITY OF SUPPLY AND MARKET MODEL
RESULTS AND CONCLUSIONS

Swiss security of supply is ensured in medium and long terms, energy only market is the appropriate model for Swiss market

- Study of ETHZ and University of Basel investigates Swiss security of supply (sos) up to the year 2035
- Thanks to domestic production and exchange possibilities with neighbouring markets: characteristic numbers for sos unproblematic
- ElCom and SFOE: in the future a system adequacy analysis will be performed every other year to capture the prospective development of sos.
- EOM is the appropriate market model, which can provide the required capacities – also in the context of hydro production

Market

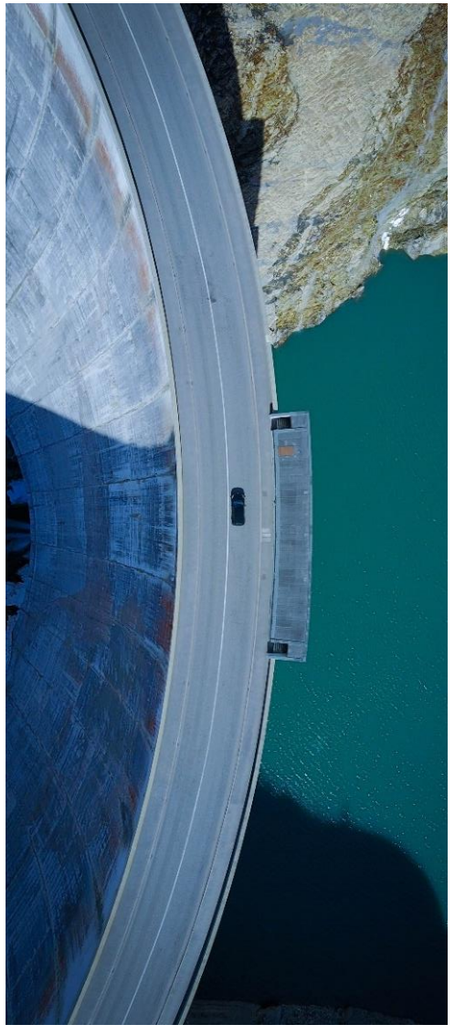
COMPLEMENTING THE EOM
STORAGE RESERVE

Complementing the EOM with a storage reserve as an insurance

- A storage reserve is created annually as an insurance in times of critical supply shortage.
- Participating operators receive remuneration for retaining generation capacity over a given time.
- Technology-neutral, open to all operators of suitable storage power stations and storages that are connected to the Swiss power grid.
- Participating operators are determined yearly through call for tenders.

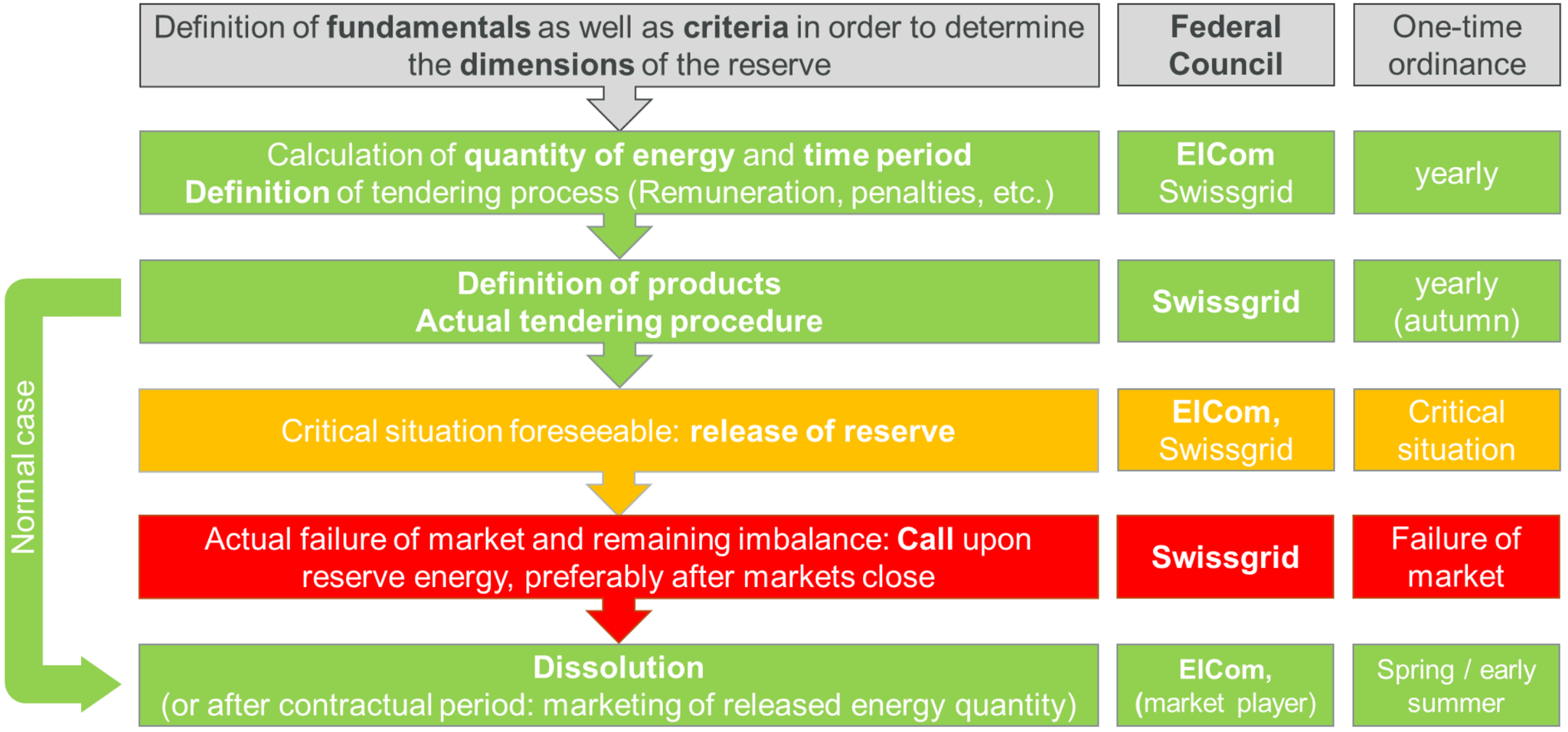
Clear role model – clear separation of market and reserve

- No dilution of responsibilities concerning security of supply
- Minimizing negative feedback on market mechanism



Market

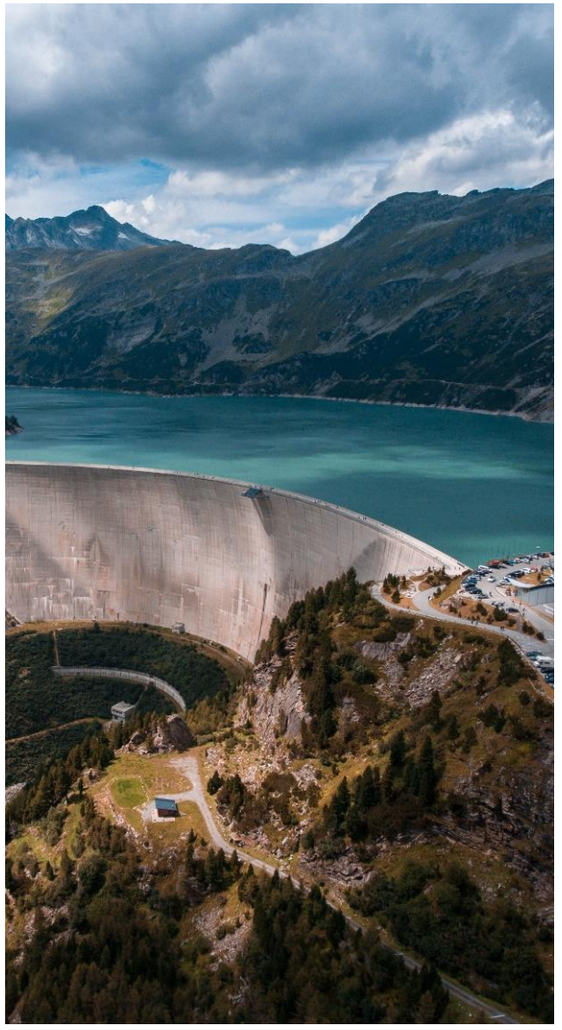
COMPLEMENTING THE EOM
STORAGE RESERVE – ROLES AND PROCESSES



COMPLEMENTING THE EOM
STORAGE RESERVE – WHO PAYS?

Costs of premium borne by all end-users, at the same time there are strong incentives to keep balancing groups balanced

- The reserve represents kind of an insurance from which everyone profits equally, it is therefore a type of system service from Swissgrid
- Costs for contracting of energy can be financed through the system usage charge of the transmission network
- Estimation of yearly costs: in the range of 15 – 30 Mio. Fr.
- If the reserve is called upon: as "causers" of the shortage the non-covered balance groups should contribute to financing the reserve by paying for imbalance energy
- Strong financial incentives for balancing groups to cover their energy need from the market and not from the storage reserve



REGULATION OF FLEXIBILITY

Grid

Establishing the framework of the future market for flexibility

Art. 17 bis Use of flexibility

- End consumers, storage operators and producers are owners of flexibility of consumption, storage and feed-in. Use by third parties based on contracts.
- Grid-assistive use: standardized contracts, individual contracts possible
- Use of flexibility as a mandatory part of grid planning
- Adequate remuneration for derating of feed-in and use in an interim time (until grid expansion is realized). In case of immediate risks in grid operation, use is free.
- Federal Council defines for each production technology the part that can be derated or controlled. ElCom supervises misuse.

ELECTRICITY SUPPLY ACT: CONSULTATION
MAIN OBJECTIVES AND MEASURES

Market

Grid

- **Full market opening** treats all end consumers equally and guarantees freedom of choice. This creates a more flexible pricing process and product innovation.
- Swiss electricity as **default for basic supply**, each provider can offer other products in addition (proof by guarantees of origin).
- **Storage reserve** (focus on energy) in addition to the energy-only-market: ensures availability of electricity in unforeseeable situations.
- **Sunshine-regulation** improves transparency and serves as a possible starting point for incentive regulation.
- **Power component** in grid tariffs will get more weight, according to the user pays principle.
- **Flexibility**: use of rights for owner of installations, condition for developing a new market.
- Free choice of the provider for **measuring electricity consumption and feed-in** in order to improve competition and quality of the service.

CONTENT

ELECTRICITY AGREEMENT
WHAT IS IT ALL ABOUT?

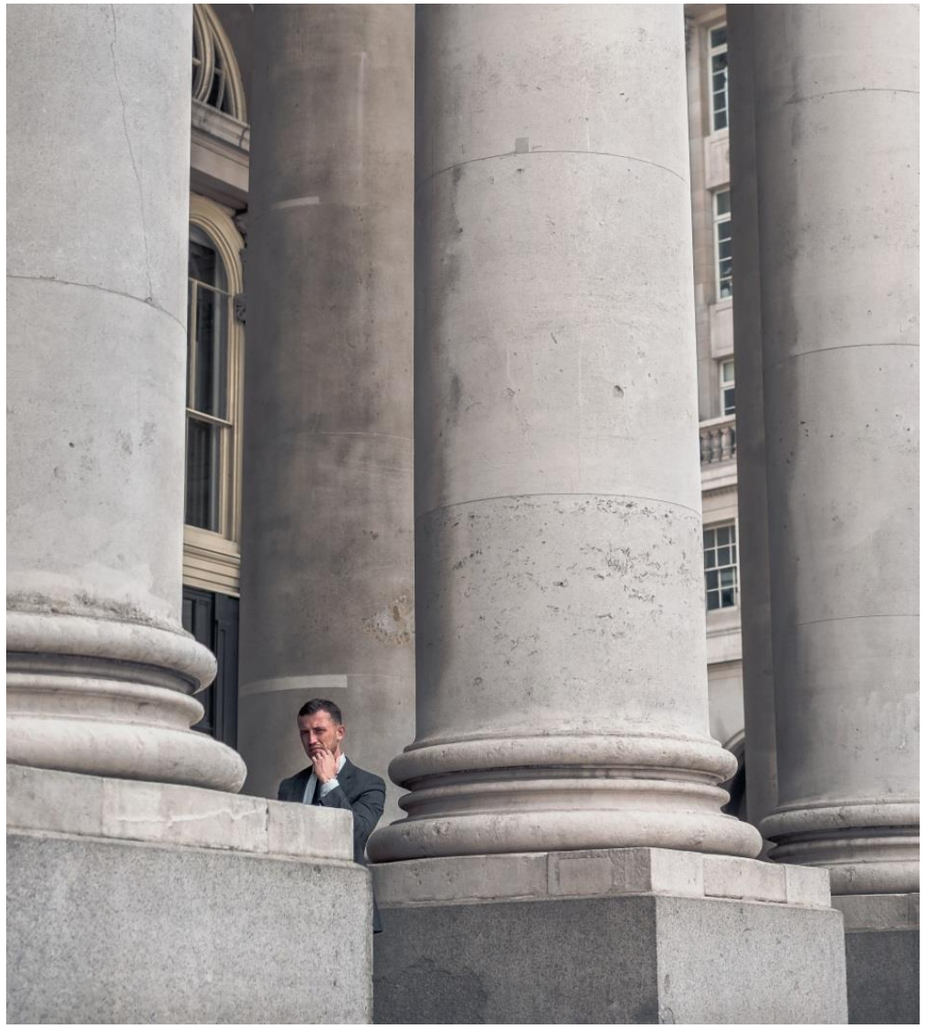
Relation to institutional question CH - EU

Conclusion of Electricity Agreement depends on progress in negotiations on institutional questions – wait and see!

What does it cover?

Mutual market access

Scope of application: generation, transmission, distribution, and trading of electricity



Clem Onojeghuo. https://unsplash.com/photos/08TuLyWmgMo

ELECTRICITY AGREEMENT
TOPICS

Electricity market legislation

- So far: third internal market package (electricity part)
- Soon: Clean Energy Package

Renewable Energies

REMIT

Energy Infrastructure

Electricity institutional aspects

Competition law, state aid

Environmental law

ELECTRICITY AGREEMENT
POSSIBLE NEXT STEPS

Possible next steps

Conclusion: Spring 2019 (time slot before European elections)

Followed by political approval process in Switzerland

Implementing act: if needed coordination with revision of electricity supply law.

Put into force: at earliest 2022

Thanks a lot for your attention!

Florian Kämpfer

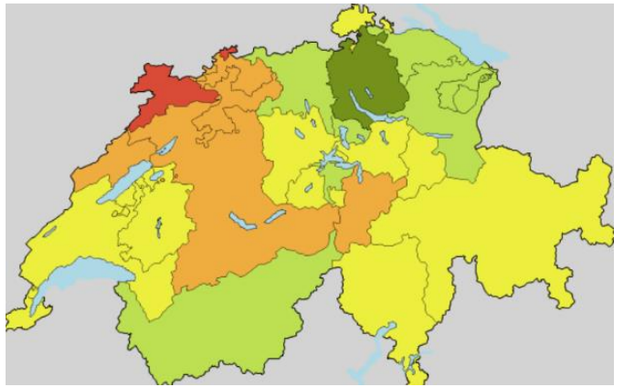
Swiss Federal Office of Energy SFOE

florian.kaempfer@bfe.admin.ch

SUNSHINE REGULATION

Grid

Sunshine regulation: creates transparency and «soft» incentives for improving efficiency



Art. 22a Publication of comparisons of Quality and Efficiency

- ElCom compares in particular:

  Tariffs for grid utilisation and attributable costs of grids, tariffs in basic supply, quality of electricity supply, quality of basic supply and grids, investment in smart grids, measurement for billing (monopoly), implementation of publication and information duties

- SFOE evaluates sunshine regulation every four years. If the efficiency hasn't improved (including effects on grid costs), the Federal Council draws a decree for incentive regulation

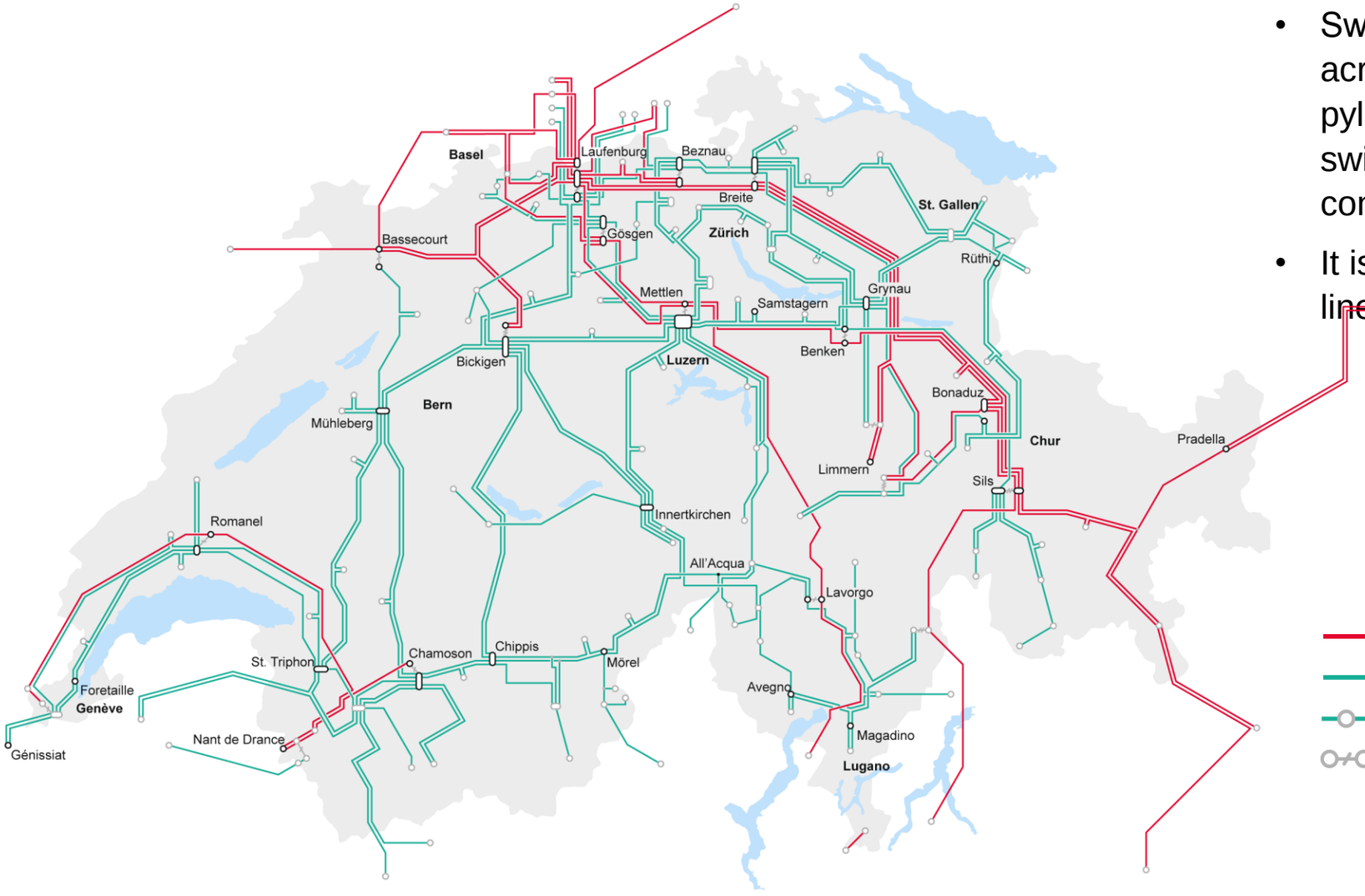
Current grid projects of Swissgrid

Susanne Landt
Head of Stakeholder Affairs

swissgrid

Not a grid project, but a great project: New headquarters Aarau

Switzerland’s transmission grid

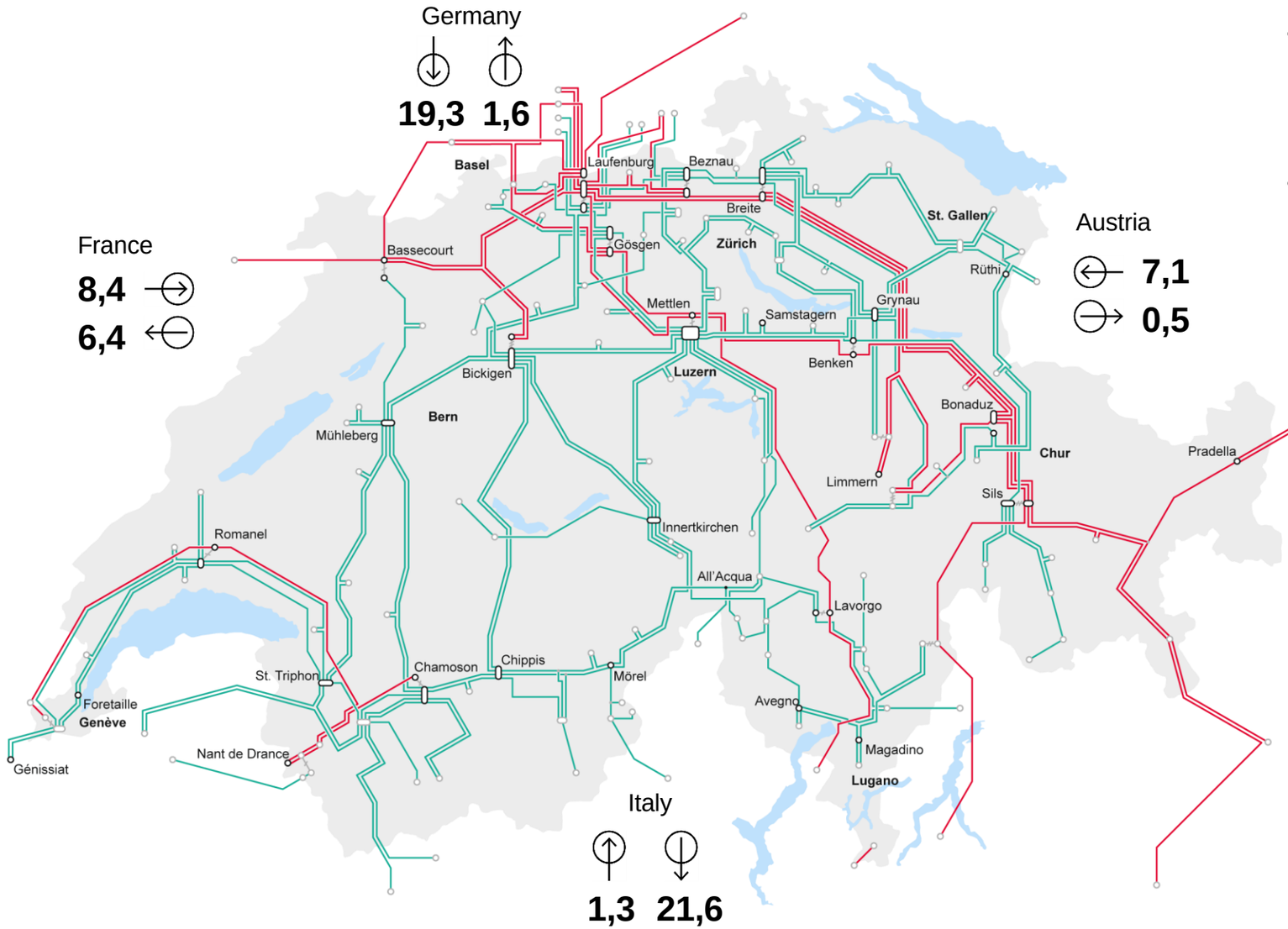


- Switzerland’s transmission grid extends across 6,700 kilometres of lines, 12,000 pylons and 125 substations with 145 switching substations, as well as 41 connections abroad
- It is comprised of both 380 kV and 220 kV lines

380 kV
220 kV
Switching substations
Switching substations with transformers

swissgrid

Closely linked with Europe



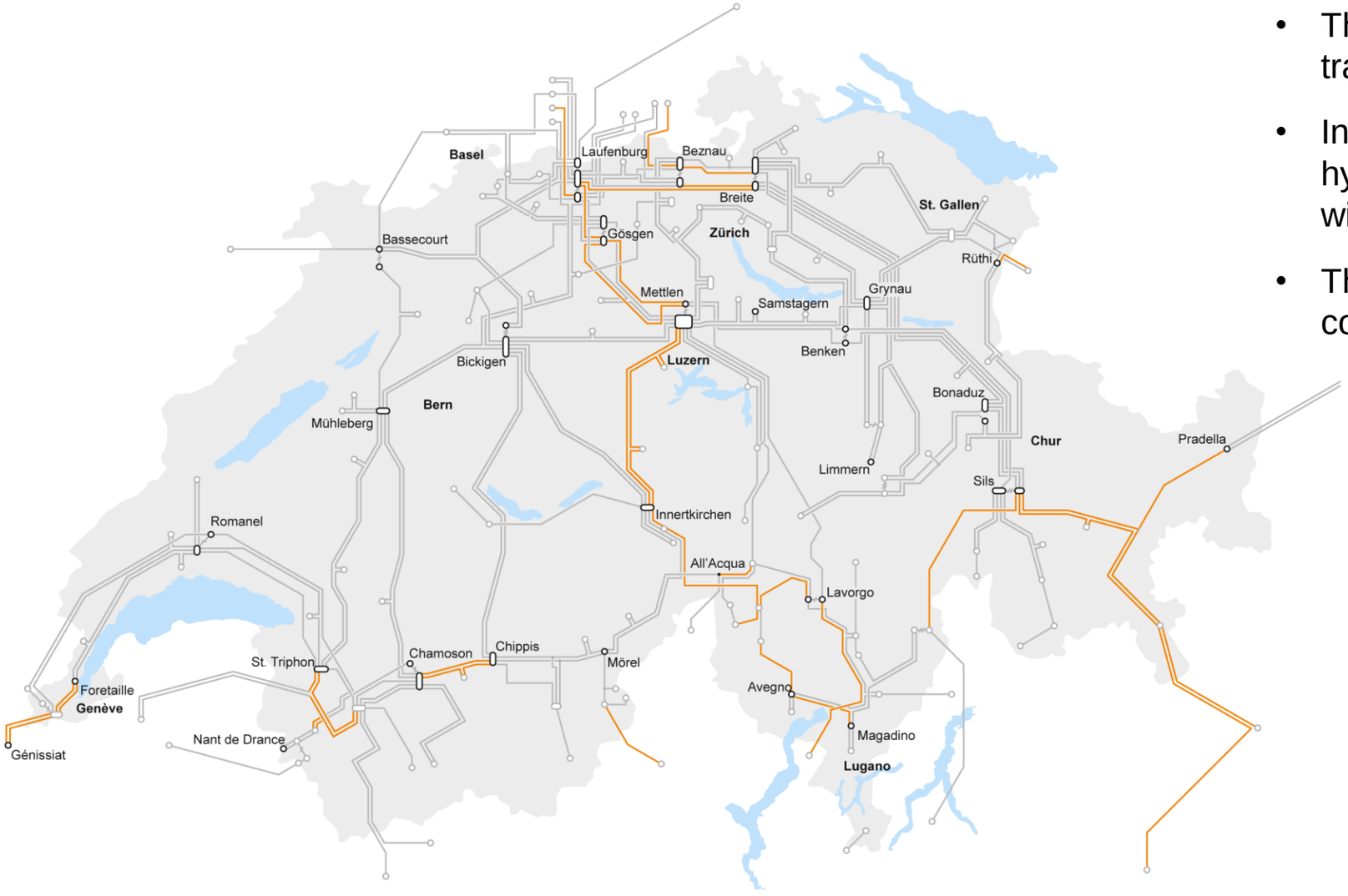
- Switzerland is part of the European interconnected grid and is connected to neighbouring countries via 41 lines
- Swissgrid works closely with the European transmission system operators

Power imports and exports
in terawatt-hours (TWh), 2017

- Electricity imports
- Electricity exports
- 380 kV
- 220 kV
- Switching substations
- Switching substations with transformers

swissgrid

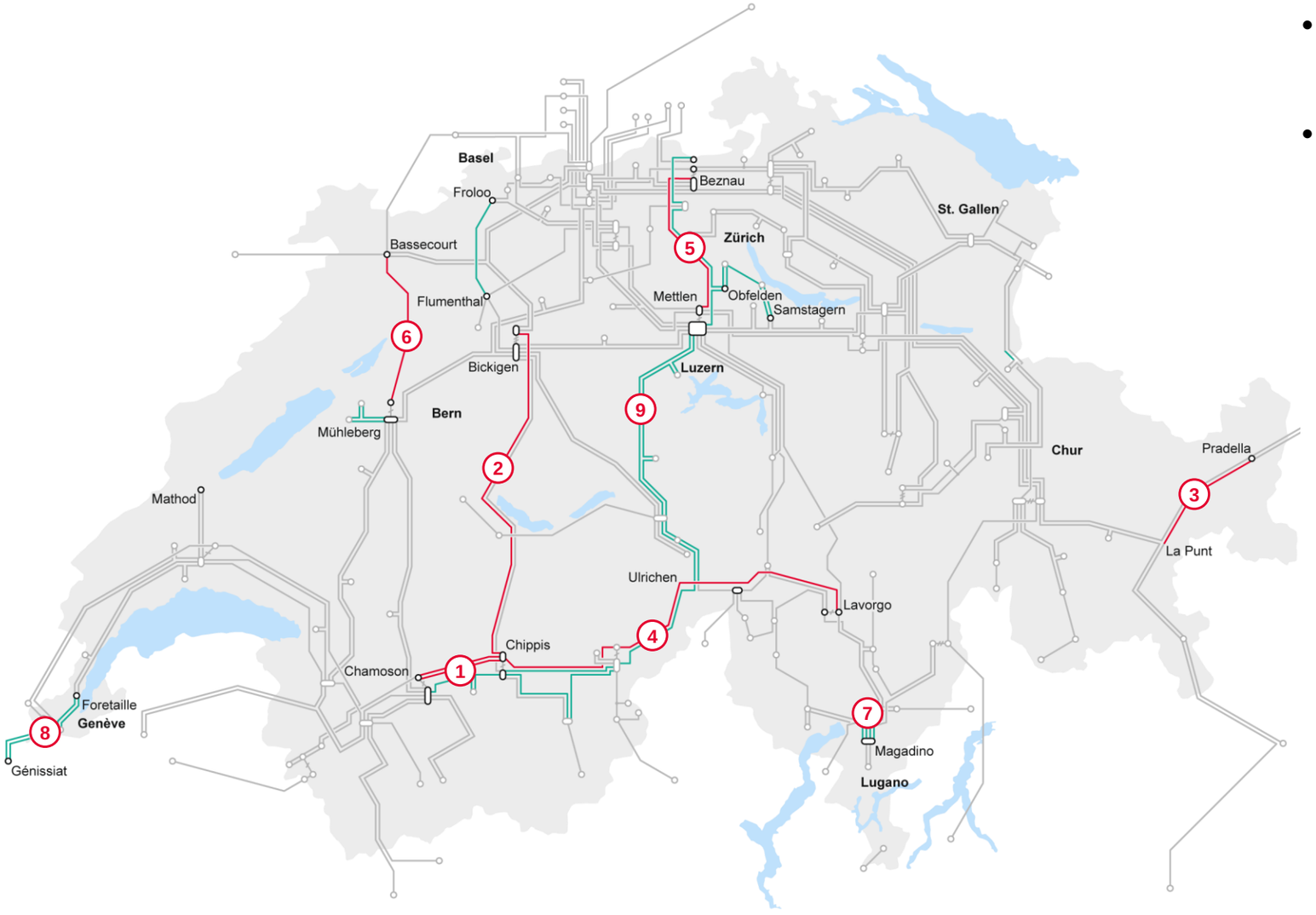
Existing bottlenecks in the transmission grid



- There are already bottlenecks in the transmission grid
- In some cases, the electricity generated by hydropower and the exchange of energy with other countries has to be restricted
- The bottlenecks are exacerbated by the construction of new power plants

swissgrid

Swissgrid is responsible for developing the grid in line with demand



- Swissgrid is responsible for replacing and modernising the entire infrastructure
- By 2025, around CHF 2.5 billion will be invested in expanding and maintaining the grid

1. Chamoson – Chippis
2. Chippis – Bickigen
3. Pradella – La Punt
4. Chippis – Lavorgo
5. Beznau – Mettlen
6. Bassecourt – Mühleberg
7. Magadino
8. Génissiat – Foretaille
9. Mettlen – Ulrichen

- existing
- 380 kV
- 220 kV
- Switching substations
- Switching substations with transformers

swissgrid

Thank you for your participation

Presentations are available on Swissgrid website:
https://www.swissgrid.ch/en/home/customers/topics/bgm.html#operational-documents

Please participate in our online survey until 1st December 2018.
https://de.surveymonkey.com/r/BGM2018
Password: meeting2018

swissgrid