



European Network of  
Transmission System Operators  
for Electricity

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# COMPLIANCE AUDIT REPORT 50HERTZ TRANSMISSION GMBH

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29. – 30.11.2011

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COMPLIANCE AUDIT CONDUCTED IN NEUENHAGEN BY  
THE ENTSO-E RG CE SG COMPLIANCE MONITORING &  
ENFORCEMENT  
AT THE CONTROL CENTRE OF THE ENTSO-E MEMBER 50  
HERTZ

**DISCLAIMER**

The present Compliance Audit Report is based on the information as provided by the audited company. This report is in no way a guarantee that security and reliability on the system of the audited company and/or on the whole synchronously interconnected system of the Regional Group Continental Europe (RGCE) is ensured. This report cannot be considered as a certification of whatever form. Finally, this report does not as such have any impact on the compliance, by the audited company and/or by any other member of ENTSO-E, with the RGCE Operation Handbook and/or any other relevant applicable standard.

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# 1 EXECUTIVE SUMMARY

## 1.1 COMPLIANCE MONITORING IN ENTSO-E RGCE

The mission of the ENTSO-E System Operation Committee Regional Group Continental Europe (RGCE) is to improve the reliability and security of the interconnected power system in the Continental Europe through developing and enforcing RGCE Operation Handbook (OH) standards, monitoring the interconnected power system and assessing its future adequacy. The RGCE member TSOs are subject to compliance with all approved OH standards. The Compliance Monitoring Program (CMP) is the RGCE program that monitors and assesses compliance with these standards via:

- the annual process of self-assessment, which is applied to all TSOs, as well as
- the annual process of mandatory on-site compliance audits, which is applied to a certain number of TSOs chosen on a rotating base either directly (in case of doubts that a certain TSO complies with OH Standards) or by random.

SG Compliance Monitoring & Enforcement (CME) is in charge of performing above mentioned two processes. The 2011 is the second year of conducting mandatory compliance audits. In 2008 and 2009 CME performed four voluntary compliance audits and in 2010 six mandatory audits.

## 1.2 AUDITED TSO

The RGCE member TSO 50 Hertz was chosen for a Compliance Audit in 2011. CME conducted the audit on 29 – 30.11.2011 at the control centre of 50 Hertz in Neuenhagen, Germany.

## 1.3 AUDITED OH STANDARDS

The Compliance Audit encompassed 21 standards of Operation Handbook Policies 1-3 which are related to Load-Frequency Control and Performance, Scheduling and Accounting, and Operational Security. In 2010 TenneT made compliance declarations in the self-assessment process for standards which will be checked against their evidence during the audit:

1	P1-A-S1.1 PRIMARY CONTROL Organisation
2	P1-B-S4 SECONDARY CONTROL RESERVE
3	P2-A-S4 General Agreements between UCTE System Operators who are affected by cross border scheduling
4	P2-A-S5 General Agreements between neighbouring CONTROL AREAS
5	P2-A-S5.1 Identification Code used-either EIC or GS1 (former EAN)
6	P2-A-S5.2 Agreement on the contents and granularity of the exchanged CAS (e.g. MTFs, resolution) in order to allow a sufficient matching
7	P2-A-S5.3 Agreed timing for processes (e.g. exchange of programs, matching, day ahead and intraday process, Gate Closure, Cut-Off Time)
8	P2-A-S5.4 Rules to solve mismatches at Cut-Off Time
9	P2-A-S5.5 Responsibilities (e.g. matching, CAPACITY check)
10	P3-A1-S2 Coordination for exceptional type of contingency
11	P3-A2-S1 Determination of the external contingency list and observability area
12	P3-A2-S2 Implementation of observability area
13	P3-A2-S5.2 Abroad consequences of TSOs decisions in operational planning and in real time
14	P3-A2-S6 Data provision
15	P3-A3-S2 Overloads in N-1 situation (simulation)
16	P3-A3-S4.1 Tie-lines operating conditions
17	P3-A4-S3 Principle of "No cascading with impact outside my border"
18	P3-A4-S4.1 Regional agreement for the set of remedial actions
19	P3-B-S1.2.2 Other REACTIVE POWER generation/absorption resources
20	P3-B-S2.1.2 Coordination for voltage and reactive power management
21	P3-D-S2 Transient angle Stability calculation

## 1.4 RESULTS

Main lesson learned is that 50HzT is fully compliant with almost all standards investigated during the Audit except those related with Primary and Secondary Regulation for which the Audit Team assessed the level as non compliant. This problem is not strictly limited to 50 Hz but involves all the German ENTSO-E Members and, strictly to Secondary Regulation, other non German ENTSO-E Members as well (

The Audit bears witness to the fact that a part of Continental Europe synchronous zone has a conflict between current regulations of different levels (ENTSO-E Operation Handbook Policies and national regulation).

Another profitable discovery is related with the current use of the term “neighbour” within the standard statements of the Operation Handbook. It might mislead to a conclusion that the neighbours of a Control Area are only other Control Areas physically connected by tie lines. In fact for the purpose of adequate interoperability every Control Area with reciprocal influence should be accounted among the neighbours of each Control Area. This broad vision is implemented by 50 Hz and can be seen as best practise. This approach shall enlighten the next revision of the OH Policies.

The table 1 describes 50 HzT compliance declarations in self assessment questionnaire 2010 and compliance audit questionnaire 2011 with compliance level suggestion by CME audit team after reviewing the evidence for the audited standards. Upgrades are highlighted with green and downgrades with red colour. Standards which kept their declaration level are not highlighted.

TABLE 1. COMPLIANCE LEVEL CHANGES FOR THE AUDITED OH STANDARDS

OH Standard	Self assessment questionnaire 2010	Compliance audit questionnaire 2011	On site compliance audit 2011
P1-A-S1.1	FC	FC	NC
P1-B-S4	FC	FC	NC
P2-A-S4	FC	FC	FC
P2-A-S5	Not asked	FC	FC
P2-A-S5.1	FC	FC	FC
P2-A-S5.2	FC	FC	FC
P2-A-S5.3	FC	FC	FC
P2-A-S5.4	FC	FC	FC
P2-A-S5.5	SC	FC	FC
P3-A1-S2	NC	SC	FC
P3-A2-S1	FC	FC	FC
P3-A2-S2	FC	FC	FC
P3-A2-S5.2	FC	FC	FC
P3-A2-S6	FC	FC	FC
P3-A3-S2	FC	FC	FC
P3-A3-S4.1	FC	FC	FC
P3-A4-S3	FC	FC	FC
P3-A4-S4.1	FC	FC	FC
P3-B-S1.2.2	FC	FC	FC
P3-B-S2.1.2	FC	FC	FC
P3-D-S2	FC	FC	FC

## 2 AUDIT REPRESENTATIVES

The Audit Team has the task to prepare and perform the Compliance Audit as well as to develop the corresponding audit report. The audit team composition is given on table 2. The TSO subject to a compliance audit may object any member of the Audit Team on the basis of a conflict of interests or the existence of other circumstances that could interfere with the impartial performance of his or her duties. The audited TSO is obligated to express its concerns with the proposed team member four weeks prior to the team's arrival on-site. The 50 Hertz didn't make any such objection. The 50 Hertz staff present during the compliance audit is given on table 3.

TABLE 2. CME AUDIT TEAM FOR 50 HERTZ

Audit team role	Company or association	Name
Audit team leader	REE	Jaime Sanchiz Garrote
Audit team member	RTE	Olivier Beck
Audit team member	Terna	Silvia Moroni
Compliance Monitoring Advisor	ENTSO-E Secretariat	Lasse Konttinen

TABLE 3. 50 HERTZ AUDIT STAFF

Function in the company	Title	Name
CAM	Head of System Operations	Hans-Peter Erbring
Control Centre Support Department	Head of Process Preparation	Bernd Krietzsch
Control Centre Support Department	Congestion Management/ Grid Coordination and Outage Planning	Andrej Roscher
System Operation Methodologies Department	Head of System Operation Methodologies	Uwe Zimmerman
System Operation Methodologies Department	Cooperation & System Security	Matthias Kuring
System Operation Methodologies Department	Cooperation & System Security	Ana Cigarán Romero
Customer Care / Network Access Department	Customer Care / Network Access	Ulf Hoffmann

## 3 AUDIT PLAN

### 3.1 GENERAL PROCEDURES

The purpose of this chapter is to help and provide guidance to your organization regarding the oncoming Compliance Audit. The audit will cover a chosen set of Operation Handbook (OH) standards equivalent to those monitored within the Compliance Monitoring Program 2010 self-assessment process.

Please submit the completed Audit Worksheet by email to the ENTSO-E Secretariat and send carbon copies to all Audit Team members three weeks before the first audit day. On table 4. you may find the complete schedule of the audit process for your company.

All documentation (evidence) required for the onsite audit of each standard must be available as a hard copy or in electronic format at the audit location. The Control Area Manager and/or other responsible expert personnel must be available during the audit to provide guidance to the Audit Team on where to look in the documentation for compliance to the OH standard and, if requested, to give further explanation on criteria and procedures implemented.

In preparation for the audit, please organise your supporting compliance documentation which is the evidence for your compliance for audited standards. If possible, please try to provide English versions of the documents. Otherwise please translate the main title, index and last update of the document for the Audit Team. Previously mentioned preparations must be completed prior to the start of the audit. The ENTSO-E RGCE SG CME would like to emphasize the importance of preparation for the audit. All documentation will be considered as confidential audit records and treated as such. The Audit Team will prepare a public report of its audit findings.

**TABLE 4. SCHEDULE FOR THE COMPLIANCE AUDIT**

Submittal of the audit material on behalf of the Audit Team	<b>7 weeks prior to audit</b>
Submittal of the completed Audit Worksheet to the Secretariat by 50 HERTZ	<b>3 weeks prior to audit</b>
Initial draft of the audit report based on the Audit Worksheet sent to 50 HERTZ by the Audit Team	<b>2 working days prior to audit</b>
Opening meeting of the Audit Team and CAM of 50 HERTZ (1) Introduction of the Audit Team members, (2) Description of how the on-site audit will be conducted, (3) Discussion on how confidential information will be handled, (4) Discussion on data access required by the Audit Team, (5) Announcement that the 50 HERTZ will be asked to provide feedback on the audit process and results, (6) Presentation of the TSO and TSO's organization (7) Visit at the control room	<b>First audit day,</b> 29.11.2011 09:00 – 09:30
Start of the OH standards' review	<b>First audit day,</b> 29.11.2011 09:30 – 17:30
Continuation of the OH standards' review	<b>Second audit day,</b> 30.11.2011 09:00 – 10:30

Internal Audit Team meeting	<b>Second audit day,</b> 30.11.2011 10:30 – 12:00
Closing meeting with CAM of 50 HERTZ (1) Presentation of preliminary audit findings and recommendations to be included on the draft audit report, with a strong emphasis on the evidences for each compliance level or non compliance identified by the Audit Team, (2) Discussion and feedback by the 50 HERTZ with a possibility to object the findings, (3) In case of any non-compliance or lack of evidence of compliance, first draft proposal of the TSO on an adequate mitigation plan, including deadline. Should such an immediate proposal not be possible, the TSO must submit it afterwards in written copy within seven days.	<b>Second audit day,</b> 30.11.2011 12:00 – 13:30
Delivery of the draft audit report to 50 HERTZ for review	<b>2 weeks after the audit</b>
Remarks by 50 HERTZ	<b>4 weeks after the audit</b>
Delivery of the final audit report to 50 HERTZ	<b>6 weeks after the audit</b>
Acknowledgement of the final Audit Report by ENTSO-E RGCE Plenary and decision on its possible internal or external publishing.	<b>RGCE Plenary in 2012</b>

### 3.2 OBJECTIVES

In 2011 the objective of Compliance Audits is to check chosen set of standards from OH Policies 1-3. These standards were also monitored in the 2010 regular compliance process via the self-assessment questionnaire. Furthermore, before performing the Compliance Audit, the Audit Team makes recommendations to the audited TSO to prepare the evidence or documentation on compliance with the audited OH standards.

### 3.3 SCOPE

The scope of a compliance audit encompasses issues which are directly related to the compliance of the audited TSO with the investigated RGCE OH standards and issues which make a general background for the implementation of the OH at the audited TSO.

#### Directly related issues

Issues directly related to the audited RGCE OH standards:

- Existence of TSO's addenda and/or non-compliance declarations/non-compliance self-reports
- Follow-up of the TSO's mitigation plans to remove the declared non-compliances
- Self-assessment questionnaires of 2010 stored at the ENTSO-E Secretariat related to audited TSO concerning the audited OH standards
- Audit Worksheet 2011
- Information and explanations which the Audit Team receives on site

#### General background

The compliance audit also encompasses issues of general nature listed below:



- General policies of the audited TSO rules and procedures for the control centre(s) related to the audited standards
- Procedures to control the application of the audited OH standards and their follow-up
- Procedures to improve the compliance with the audited OH standards
- TSO's internal report related to the implementation of the audited OH standards
- TSO's internal audits and/or documentation concerning implementation of OH standards
- TSO's internal bodies (forums, panels) for the implementation of the OH standards

### 3.4 METHODOLOGY

The CME group prepared an audit schedule defining the chronological order of the compliance audit, which the audited TSO accepted without comment. The audit team reviewed the existing material on the audited TSO and its neighbouring TSOs already collected through the self-assessment process in the 2010 self-assessment questionnaires. It also processed (assessed) the answers in the 2011 Audit Worksheet filled in by the audited TSO.

The methodology includes audit criteria and expectations based on best practices. The adopted criteria are objective, measurable (if possible), complete and relevant to the objectives. At defining the audit methodology, the auditors identify the potential sources of audit evidence and estimate the amount and type of evidence needed.

The audit team uses an Audit Worksheet (AW) (see chapter 4) for reviewing the audited OH standards. The purpose of the AW is to ensure consistency and fairness. By using the AW the Audit Team documented the material reviewed and the observations made. One of the main reasons for an on-site visit is to review the existing documentation and to interview the staff. Thus, the auditors obtain "objective evidence" which support the self-assessed declarations of the audited TSO. The audit team determine whether the evidence presented by the TSO is sufficient. They do this by assessing the relevance, validity and reliability of the information and documentation presented.

It is the responsibility of the audited TSO to provide evidence of compliance with all audited OH standards. In most cases the evidence is in written form like documents, plans, programs or records. In some cases the evidence is a review of computerized records or additional supporting material provided at interviews with the staff of the audited TSO.

### 3.5 EVALUATION PRINCIPLES

#### Preparatory phase – activities in charge of Audited TSO

- Inspection of the exact wording of each audited OH standard and of additional questions formulated by the CME
- The TSO must fill in the audit questionnaire and submit to the audit team before the audit
- Identification of documents and other material the TSO has to present to the auditors in order to demonstrate its compliance level with each OH standard

#### Preparatory phase – activities in charge of CME Audit team

- Identification of compliance level declaration inconsistency with neighbouring TSOs (Self-assessment questionnaire 2010 cross-border check regarding compliance level declarations)
- Analysis of the explanations and comments which the audited TSO made in the self-assessment 2010 and audit questionnaires 2011 in written form in order to evaluate the quality of explanations and comments.
- Identification of the missing explanations in the self-assessment 2010 and audit questionnaires 2011
- Analysis of the improvements achieved during the implementation of mitigation and improvement plans declared in the MLA Addendum/Addenda, in the self-assessment

questionnaire 2010 and in the Audit Worksheet 2011 in case of non compliance and sufficient compliance

**Audit phase**

- Request to the audited TSO to give additional explanations, especially related to standards which were not or not fully addressed by documents and other material mentioned in the self-assessment questionnaire 2010 and audit questionnaire 2011.
  - The goal is to improve the quality of the explanations
- Request to the audited TSO to present that evidence and, if necessary, additional evidence, in printed or electronic form
  - The goal is to improve the quality of the presented evidence
  - The presented material must be relevant to the audited OH standard at all,
- Request to the audited TSO to remark the titles of all presented documents, their relevant chapters and even relevant passages
- Request to the audited TSO to provide further written explanations related to the presented material

**3.6 CONFIDENTIALITY**

By signing this report the audit team members assure that they will maintain the confidentiality of information obtained during the compliance audit and drafting of the audit report. Moreover, they express their readiness to sign a supplementary confidentiality agreement, if the audited TSO assert such a claim.

**4 AUDIT WORK SHEET**

**4.1 P1-A-S1.1 PRIMARY CONTROL ORGANISATION**

**PREPARATORY PHASE**

<b>SELF-ASSESSMENT QUESTIONNAIRE 2010</b>	
<b>P1-A-S1.1</b>	
PRIMARY CONTROL Organisation. An organisational procedure to cover requirements and obligations for PRIMARY CONTROL actions and reserves performed by third parties in the CONTROL AREA including a monitoring procedure must be in place (e.g. GridCode, regulation, association agreement or contract).	
<b>Compliance Level:</b> FC	
<b>Explanation for the full compliance declaration:</b>	
<b>Additional Questions</b>	
Do you have a formal procedure in place to ensure compliance with this standard?	yes
What level of legal support does the procedure entitle? (i.e. law, grid code, agreement, other)	
Master agreements with all participating producer; German GridCode; decisions of the German regulator	
How do you monitor the primary control response of your Control area? (i.e. as a whole, for each single generation unit, etc. Timeframe: realtime/retrospective)	
Online monitoring of active power generation and activation status of primary control for each participating generation unit (Transmission Code Annex D1)	

## AUDIT QUESTIONNAIRE 2011

**P1-A-S1.1 PRIMARY CONTROL Organisation.** An organisational procedure to cover requirements and obligations for PRIMARY CONTROL actions and reserves performed by third parties in the CONTROL AREA including a monitoring procedure must be in place (e.g. Grid Code, regulation, association agreement or contract).

**Compliance level**    FC             SC             NC

Concise explanation for declared compliance level:

Requirements and obligations for Primary Control are ensured by:

general requirements defined in the German Transmission Code,  
decisions of the German regulator  
the pre-qualification of units,  
master contracts with all provider,  
an allocation procedure (at [www.regelleistung.net](http://www.regelleistung.net)) to ensure the availability of PCR,  
the exchange of information regarding the generation units to be used for Primary Control,  
the availability of online values of the feed-in of generation units,  
the possibility to request protocols proving the delivery of Primary Control and  
the accounting of contracted PCR.

Additionally there is the German working group “PG Regelenergie” which coordinated operational tasks, the development of Reserves as well as the development of rules and contracts within Germany.

**Do you have an addendum to the standard?**    Yes             No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

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*Do you have a formal procedure in place to ensure compliance with this standard?*

Yes             No

List of evidences, comments:

The procedure is contractually agreed with all provider and accepted by the German regulator (BNetzA).

All provider have to demonstrate, that their units are able to deliver Primary Control reserve  
Master agreements with all provider ensure an availability of 100% (standby generation / consumption units). Additionally the requirements for the provision of Primary Control are contractually agreed.

The finally used generation units are known and monitored online.

Provider have to deliver protocols to verify the delivery of Primary Control.

The German working group “PG Regelenergie” and related subgroups has been established to develop the process of Control Reserve within Germany (observation of legal, regulatory and contractual developments, coordination of operational tasks)

*What level of legal support does the procedure entitle? (i.e. law, grid code, agreement,*

other)

The applied process is entitled by the German Grid Code (Transmission Code), decisions of the German regulator: BK6-10-097 of 12. April 2011 (former BK6-06-065 of 31. August 2007) and master agreements with all reserve provider.

List of evidences, comments:

Transmission Code  
Decisions BK6-10-097 and BK6-06-065 of the German regulator  
Agreements with provider

*How do you monitor the primary control response of your Control area? (i.e. as a whole, for each single generation unit, etc. timeframe: realtime/retrospective)*

The monitoring is realized online for each generation / consumption unit. More detailed analyses can be done retrospective. On request provider have to deliver detailed protocols to verify the delivery of Primary Control.

List of evidences, comments:

Information on the used units as well as on the schedule of relevant units (at D-1) (Excel-file, Control System).  
The measured feed-in is known online (Control System).  
All online values are stored and can be used for analyses.  
Detailed protocols of provider can be requested at any time.

## AUDIT PHASE

### COMPLIANCE AUDIT 2011

**Compliance Level suggestion by the audit team:**

NC

**Explanation for the suggested compliance level:**

Primary reserve market is completely covered by the German regulator BNetzA regulation BK6-10-097, 12.4.2011 which is implemented to German Grid Code. 50HzT has contracts with pre qualified primary reserve providers with real-time monitoring which is implemented into 50HzT SCADA. The primary reserve market treats Germany as a whole and the physical location of the reserve is not restricted in anyway within pre qualified reserve providers. All pre qualified reserve providers in Germany may bid to the common German primary reserve market. All pre qualified reserve providers are required to report ex-post on their reserve provision realisation if a TSO so requires. The 50HzT practice covers the requirements of P1-A-S1.1.

50HzT does not follow the provisions of the standard P1-A-3.1 "Contribution to PRIMARY CONTROL RESERVE" which is covered by an addendum due to BNetzA regulation BK6-10-097 which does not allow any limitation of primary reserve exchange inside of German Control Areas. Due to that fact the audit team assess the level of compliance for P1-A-S1.1 as non compliant.

## 4.2 P1-B-S4 SECONDARY CONTROL RESERVE

### PREPARATORY PHASE

## SELF-ASSESSMENT QUESTIONNAIRE 2010

**P1-B-S4.**

SECONDARY CONTROL RESERVE. An adequate SECONDARY CONTROL RESERVE must be available to cover expected DEMAND and generation fluctuations. If the loss of the largest generating unit of the CONTROL AREA is not already covered by the requisite SECONDARY CONTROL RESERVE, additional TERTIARY CONTROL RESERVE (see -> P1-C) has to be activated to offset the shortfall within the required time (see P1-B-S2.1).

**Compliance Level:** FC

**Explanation for the full compliance declaration:**

**Additional Questions**

Does the sum of allocated Secondary and Tertiary Reserve cover normally and within the required time the loss of the largest generation unit connected in your control area? yes

How does your TSO monitor and report about the technical availability of TERTIARY RESERVE?

The technical availability of tertiary control reserve is guaranteed by a daily allocation process. All participants have to deliver the energy according to predefined auction rules. All requirements are defined within a master agreement based on the current version of the Operational Handbook.

## AUDIT QUESTIONNAIRE 2011

**P1-B-S4 SECONDARY CONTROL RESERVE.** An adequate SECONDARY CONTROL RESERVE must be available to cover expected DEMAND and generation fluctuations. If the loss of the largest generating unit of the CONTROL AREA is not already covered by the requisite SECONDARY CONTROL RESERVE, additional TERTIARY CONTROL RESERVE (see P1-C) has to be activated to offset the shortfall within the required time (see P1-B-S2.1).

**Compliance level**    FC             SC             NC

Concise explanation for declared compliance level:

The sizing of Secondary and Tertiary Control Reserve (SCR and TCR) is realized by a probabilistic approach. Outages of generation units, exchange schedules, forecast errors as well as (load) noise are respected. A decision of the BNetzA (BK6-08-111 16.03.2010) requires a common sizing within Germany. The total demand on reserve is split according to the individual demands of the four TSOs. The common sizing increase the security, because the total amount on SCR and TCR is available for each TSO and there are no permanent congestions within Germany. Additionally the probability of missing reserve was reduced from 0,1% to 0,025% for common sizing.

The outage of the largest generation unit is covered by the available SCR and TCR: Boxberg Q (900MW; at 50HzT) as well as Isar 2 (1475MW; in Germany) are covered by German SCR (currently 2075MW). The individual sizing would lead to 655MW SCR and 490MW TCR at 50HzT ( $\Sigma=1145MW$ ), which would also covers the loss of the largest generation unit.

**Do you have an addendum to the standard?**    Yes             No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

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*Does the sum of allocated Secondary and Tertiary Reserve cover normally and within the required time (Secondary: 15 min and Tertiary: 30 min) the loss of the largest generation unit connected in your control area?*

Yes  No

List of evidences, comments:

Within Germany 2073MW positive SCR and 1812MW positive TCR are allocated. This amount is available for all German TSOs and covers the biggest generation unit at 50HzT (Boxberg Q: 900MW) as well as the biggest generation in Germany (Isar 2: 1475MW).  
The German SCR is availability for all German TSOs by the GCC. The TCR is available for all German TSOs by the GCC as well as by Schedule.  
TCR can be activated at any time and has to be delivered by the provider within 15 Minutes.

*How does your TSO monitor and report about the technical availability of TERTIARY RESERVE?*

Within Germany the reserve connecting TSO is responsible for the monitoring, reporting and accounting of Control Reserve.

There is a weekly allocation of SCR and a daily allocation of TCR. The provider have to inform the responsible TSO in case of any unavailability of contracted reserve (Emails).The availability can be checked by test activation of TCR. The available TCR is relevant for the accounting.

Basing on the results of the allocation the provider have to deliver detailed information on the contracted reserve (e.g. the used generation units).

Effects of the activation of TCR are monitored for Germany within the "NRV-Report".

List of evidences, comments:

Summary of the allocation procedure as well as regarding the contracted reserve within Germany as well as within 50HzT.  
Daily information of provider (e.g. the used generation units).  
Information regarding the state, the schedule and the feed-in of relevant generation units  
NRV-Report

## AUDIT PHASE

### COMPLIANCE AUDIT 2011

#### Compliance Level suggestion by the audit team:

NC

#### Explanation for the suggested compliance level:

50HzT presented their Grid Control Cooperation scheme to audit team. The whole scheme is automatic and it is implemented to all German TSOs' SCADA systems

50HzT does not follow the provisions of the sub standard P1-B-S4.5 "Border-crossing SECONDARY CONTROL RESERVE" which is covered by an addendum due to BNetzA regulation BK6-08-111,

16.03.2010 and BK6-10-098, 12.04.2011 which does not allow any limitation of secondary reserve exchange inside of German Control Areas. Due to a non compliance to a sub standard the main standard cannot be considered anything else than non compliant as it refers to sub standards.

### 4.3 P2-A-S4 General Agreements between UCTE System Operators who are affected by cross border scheduling

#### PREPARATORY PHASE

#### SELF-ASSESSMENT QUESTIONNAIRE 2010

##### P2-A-S4.

General Agreements between UCTE System Operators who are affected by cross border scheduling. For performing a proper matching process and especially for cases of troubleshooting the UCTE bodies (Control Areas, ControlBlocks and CO-ORDINATION CENTRES) have to document common agreed rules e.g.

Compliance Level: FC

Explanation for the full compliance declaration:

##### Additional Questions

Do you have common agreed documents with corresponding ENTSOe bodies for Scheduling of Power Exchange? yes

Do you have an agreement which specifies MTF (Multi Time Frame System) and number of digits? yes

What procedure do you apply for solving mismatches ?

The procedures, described in P2-A-G2, P2-A-G3 and P2-A-G4, are applied in case of mismatches. The market parties are informed in case of mismatches and can adapt their schedules until GCT.

#### AUDIT QUESTIONNAIRE 2011

**P2-A-S4 General Agreements between UCTE System Operators who are affected by cross border scheduling.** For performing a proper matching process and especially for cases of troubleshooting the UCTE bodies (Control Areas, Control Blocks and CO-ORDINATION CENTRES) have to document common agreed rules e.g.

A-S-4.1 Agreed MTF and number of digits

A-S-4.2 Solution for mismatches (see Guidelines)

A-S-4.3 Troubleshooting in case of problems with data exchange and matching process. (see P2-A-G2 & P2-A-G3 & P2-A-G4)

Compliance level    FC             SC             NC

Concise explanation for declared compliance level:

The German scheduling process is coordinated by the BDEW (old expression VDN). Additionally this topic is described in the System Operational Agreements with neighbouring TSOs (SOA) and within the Auction Rules at congested borders.

**Do you have an addendum to the standard?** Yes  No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

*Do you have common agreed documents with corresponding ENTSO-E bodies for Scheduling of Power Exchange?*

Yes  No

List of evidences, comments:

Entso-e rules, e. g.: ESS\_Implementation\_Guides/ ECAN\_Guides/ ERRP\_Guides/ various Auction Rules and Implementation Guides/ TransmissionCode-2007.

REQUIREMENTS ARE FULFILLED

*Do you have an agreement which specifies MTFIS (Multi Time Frame System) and number of digits?*

Yes  No

List of evidences, comments:

Entso-e rules, In reference to document: Fahrplananmeldung in Deutschland mit Hilfe des entso-e Scheduling System (ESS) at point 6.1.4 Interval Level b) Interval/Qty

REQUIREMENTS ARE FULFILLED

*What procedure do you apply for solving mismatches?*

The procedures, described in P2-A-G2, P2-A-G3 and P2-A-G4, are applied in case of mismatches. The market parties are informed in case of mismatches and can adapt their schedules until GCT.

List of evidences, comments:

In reference to document: ESS\_Implementation\_Guide/ PassageIT\_TF\_V6\_April.pdf at point 3.1.2, REQUIREMENTS ARE FULFILLED

## AUDIT PHASE

### COMPLIANCE AUDIT 2011

**Compliance Level suggestion by the audit team:**

FC

**Explanation for the suggested compliance level:**

All System Operation Agreements with 50HzT neighbours have a provision on scheduling, e.g. chapter 3.2. for CEPS and annex 1 for PSE-O which cover the requirements of the main standard.



System Operation Agreement signature dates:

CEPS 24.3.2009

PSE-O 24.10.2008

TenneT 25.7.2008

50HzT and its neighbours belong to Central Eastern Europe region which follows the “Implementation guide CEE scheduling”, 22.4.2010 which covers the three sub standards’ requirements

## 4.4 P2-A-S5 GENERAL AGREEMENTS BETWEEN NEIGHBOURING CONTROL AREAS

### PREPARATORY PHASE

#### SELF-ASSESSMENT QUESTIONNAIRE 2010

##### P2-A-S5.

General Agreements between neighbouring CONTROL AREAS. For automatic matching neighbouring CONTROL AREAS have to document their agreement for common rules for their border. Rules relevant for Market Parties must be published or communicated towards the parties in question. This document has to contain:

**Compliance Level:**

**Additional Questions**

Do you perform automatic matching with your neighbouring CONTROL AREAS?	yes
Do you have documented agreements on automatic matching with your neighbours?	yes
Do you have agreements which define the contents and granularity of the exchanged CAS in order to allow sufficient matching?	yes
Do the agreements include timing for processes (e.g. exchange of programs, matching, day ahead and intra day process, Gate Closure, Cut-Off Time )?	yes
How are the relevant rules communicated to the Market Parties?	
The relevant rules are published at the bdew website. Additionally the master agreement for balancing groups contains information.	
Do you have rules which are agreed in advance to solve mismatches at Cut-Off Time?	yes
Do the agreed responsibilities assignation follow the “Implementation Guide for the ESS (ETSO Scheduling System) in the UCTE processes”?	yes

#### AUDIT QUESTIONNAIRE 2011

**P2-A-S5 General Agreements between neighbouring CONTROL AREAS.** For automatic matching neighbouring CONTROL AREAS have to document their agreement for common rules for their border. Rules relevant for Market Parties must be published or communicated towards the parties in question. This document has to contain:

A-S-5.1 Identification Code used-either EIC or GS1 (former EAN)

A-S-5.2 Agreement on the contents and granularity of the exchanged CAS (e.g. MTF5,

resolution) in order to allow a sufficient matching

A-S-5.3 Agreed timing for processes (e.g. exchange of programs, matching, day ahead and intra day process, Gate Closure, Cut-Off Time)

A-S-5.4 Rules to solve mismatches at Cut-Off Time

A-S-5.5 Responsibilities (e.g. matching, CAPACITY check)

Neighbouring CONTROL AREAS shall implement and run their matching process according to the "Implementation Guide for the EES (ENTSO Scheduling System) in the UCTE processes"

**Compliance level**    **FC**             **SC**             **NC**

Concise explanation for declared compliance level:

Scheduling process based on ESS\_Implementation\_Guide/ implementation in PassagelIT\_TF\_V6\_April.pdf, REQUIREMENTS ARE FULFILLED

**Do you have an addendum to the standard?**    **Yes**             **No**

In case of an existing addendum; list of evidences for a mitigation plan, comments:

*Do you perform matching with your neighbouring CONTROL AREAS?*

Yes             No

List of evidences, comments:

System Operation agreements with neighbouring TSO, Scheduling systems

*How are the relevant rules communicated to the Market Parties?*

The relevant rules are published at the BDEW and ENTSO-E website. Additionally the master agreement for balancing groups published at the Bundesnetzagentur website contains information.

List of evidences, comments:

BDEW and ENTSO-E documents and master agreements for balancing groups.  
REQUIREMENTS ARE FULFILLED

## AUDIT PHASE

### COMPLIANCE AUDIT 2011

**Compliance Level suggestion by the audit team:**

FC

**Explanation for the suggested compliance level:**

All System Operation Agreements with 50HzT neighbours have a provision on scheduling which

cover the requirements of the main standard.

System Operation Agreement signature dates:

CEPS 24.3.2009

PSE-O 24.10.2008

TenneT 25.7.2008

50HzT and its neighbours belong to Central Eastern Europe region which follows the "Implementation guide CEE scheduling", 22.4.2010 which covers the requirements of the standard.

## 4.5 P2-A-S-5.1 IDENTIFICATION CODE USED-EITHER EIC OR GS1 (FORMER EAN)

### PREPARATORY PHASE

#### SELF-ASSESSMENT QUESTIONNAIRE 2010

P2-A-S5.1.

Identification Code used - either EIC or GS1 (former EAN)

Compliance Level: FC

#### AUDIT QUESTIONNAIRE 2011

### P2-A-S-5.1 Identification Code used-either EIC or GS1 (former EAN)

Compliance level    FC             SC             NC

Concise explanation for declared compliance level:

EIC are used.

Do you have an addendum to the standard?    Yes             No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

## AUDIT PHASE

### COMPLIANCE AUDIT 2011

#### Compliance Level suggestion by the audit team:

FC

#### Explanation for the suggested compliance level:

All System Operation Agreements with 50HzT neighbours have a provision on scheduling which cover the requirements of the main standard.

System Operation Agreement signature dates:

CEPS 24.3.2009

PSE-O 24.10.2008

TenneT 25.7.2008

50HzT and its neighbours belong to Central Eastern Europe region which follows the "Implementation guide CEE scheduling", 22.4.2010 which covers the requirements of the standard.

## 4.6 P2-A-S-5.2 AGREEMENT ON THE CONTENTS AND GRANULARITY OF THE EXCHANGED CAS (E.G. MTFs, RESOLUTION) IN ORDER TO ALLOW A SUFFICIENT MATCHING

### PREPARATORY PHASE

#### SELF-ASSESSMENT QUESTIONNAIRE 2010

P2-A-S5.2.

Agreement on the contents and granularity of the exchanged CAS(e.g. MTFs, resolution) in order to allow a sufficient matching

Compliance Level: FC

#### AUDIT QUESTIONNAIRE 2011

#### P2-A-S-5.2 Agreement on the contents and granularity of the exchanged CAS (e.g. MTFs, resolution) in order to allow a sufficient matching

Compliance level    FC             SC             NC

Concise explanation for declared compliance level:

System Operation Agreements (SOA) contains for example the chapter 3.2 „Scheduling“ in reference e. g. to document "Agreement on Network and System Operation Management concerning System operation between CEPS and VE Transmission". In the course of data exchange standardization, the contracting parties have mutually coordinated a uniform identification scheme, the EIC (Energy Identification Code) for market participants and control areas. This scheme is described in the ETSO document „A Common Identification System for the Energy

Industry, EIC, Reference Manual“ and shall be applied between the contracting parties under the Agreement in its up-to-date version.

REQUIREMENTS ARE FULFILLED

Do you have an addendum to the standard? Yes  No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

Do you have documented agreements on matching with your neighbours?

Yes  No

List of evidences, comments:

System Operation Agreement (SOA) contains common obligations with respect to use ENTSO-E documents, REQUIREMENTS ARE FULFILLED

Do you have agreements which define the contents and granularity of the exchanged CAS in order to allow sufficient matching?

Yes  No

List of evidences, comments:

System Operation Agreement (SOA) contains common obligations with respect to use ENTSO-E rules and documents, requirements are fulfilled schedule system information e. g.:

- Message Identification
- MessageType
- Message date and time
- Sender Identification - Coding scheme
- Sender role
- Receiver Identification - Coding scheme
- Receiver role
- Schedule time interval
- ConfirmedMessageIdentification
- ConfirmedMessageVersion,

furthermore nomination in quarter hourly intervals, maximum length of the coding scheme 3 alphanumeric characters.

REQUIREMENTS ARE FULFILLED

## AUDIT PHASE

### COMPLIANCE AUDIT 2011

#### Compliance Level suggestion by the audit team:

FC

#### Explanation for the suggested compliance level:

All System Operation Agreements with 50HzT neighbours have a provision on scheduling which cover the requirements of the main standard.

System Operation Agreement signature dates:

CEPS 24.3.2009

PSE-O 24.10.2008

TenneT 25.7.2008

50HzT and its neighbours belong to Central Eastern Europe region which follows the "Implementation guide CEE scheduling", 22.4.2010 which covers the requirements of the standard.

## 4.7 P2-A-S-5.3 Agreed timing for processes (e.g. exchange of programs, matching, day ahead and intra day process, Gate Closure, Cut-Off Time)

### PREPARATORY PHASE

#### SELF-ASSESSMENT QUESTIONNAIRE 2010

P2-A-S5.3.

Agreed timing for processes (e.g. exchange of programs, matching, day ahead and intra day process, Gate Closure, Cut-Off Time )

Compliance Level: FC

#### AUDIT QUESTIONNAIRE 2011

### P2-A-S-5.3 Agreed timing for processes (e.g. exchange of programs, matching, day ahead and intra day process, Gate Closure, Cut-Off Time)

Compliance level    FC             SC             NC

Concise explanation for declared compliance level:

Information are published at the bdew website.  
Regarding neighbouring TSO's the "ENTSO Scheduling System (ESS) Implementation Guide" is contractually agreed and applied.

Do you have an addendum to the standard?    Yes             No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

*Do the agreements include timing for processes (e.g. exchange of programs, matching, day ahead and intraday process, Gate Closure, Cut-Off Time)?*

Yes  No

List of evidences, comments:

Master agreements for balancing groups, Annex 3, contains this information.  
REQUIREMENTS ARE FULFILLED

## AUDIT PHASE

### COMPLIANCE AUDIT 2011

**Compliance Level suggestion by the audit team:**

FC

**Explanation for the suggested compliance level:**

All System Operation Agreements with 50HzT neighbours have a provision on scheduling which cover the requirements of the main standard.

System Operation Agreement signature dates:

CEPS 24.3.2009

PSE-O 24.10.2008

TenneT 25.7.2008

50HzT and its neighbours belong to Central Eastern Europe region which follows the "Implementation guide CEE scheduling", 22.4.2010 which covers the requirements of the standard.

## 4.8 P2-A-S-5.4 RULES TO SOLVE MISMATCHES AT CUT-OFF TIME

### PREPARATORY PHASE

<b>SELF-ASSESSMENT QUESTIONNAIRE 2010</b>
<b>P2-A-S5.4.</b>
Rules to solve mismatches at Cut-Off Time
Compliance Level: FC

<b>AUDIT QUESTIONNAIRE 2011</b>
<b>P2-A-S-5.4 Rules to solve mismatches at Cut-Off Time</b>
<b>Compliance level</b> FC <input checked="" type="checkbox"/> SC <input type="checkbox"/> NC <input type="checkbox"/>
Concise explanation for declared compliance level:
<div style="border: 1px solid black; padding: 5px;"><p>Auction rules, CAO – documents, short and Long Term nominations with Correction Cycle e. g. "user_guide_to_scheduling_in_cee_region_1.3.pdf", this document was developed by the representatives of the CEE TSO's using state of the art technology and best business practices in the field of cross-border schedule nomination, for the sake of clarification, the document provides general description of the functionalities of all scheduling processes; however its main target is exact definition of necessary changes in the User's IT systems as well as the description of possible responses/scenarios in case of mismatched nomination for long-term and short-term processes.</p><p>Cut-Off Time - Gate by this Interconnection Trade Responsible (ITRs) have the possibility to correct nominations referring to time series submitted by an Anomaly document from TSO, received after relevant Gate Closure Time (GCT).</p></div>
<b>Do you have an addendum to the standard?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
In case of an existing addendum; list of evidences for a mitigation plan, comments:
<div style="border: 1px solid black; height: 20px; width: 100%;"></div>
<hr/>
<i>Do you perform matching with your neighbouring CONTROL AREAS?</i>
Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
List of evidences, comments:
<div style="border: 1px solid black; padding: 5px;"><p>System Operation Agreements (SOA) with our neighbouring TSOs and agreements for balancing groups contains this information. REQUIREMENTS ARE FULFILLED</p></div>



## AUDIT PHASE

### COMPLIANCE AUDIT 2011

**Compliance Level suggestion by the audit team:**

FC

**Explanation for the suggested compliance level:**

All System Operation Agreements with 50HzT neighbours have a provision on scheduling which cover the requirements of the main standard.

System Operation Agreement signature dates:

- CEPS 24.3.2009
- PSE-O 24.10.2008
- TenneT 25.7.2008

50HzT and its neighbours belong to Central Eastern Europe region which follows the "Implementation guide CEE scheduling", 22.4.2010 which covers the requirements of the standard.

## 4.9 P2-A-S-5.5 RESPONSIBILITIES (E.G. MATCHING, CAPACITY CHECK)

### PREPARATORY PHASE

**SELF-ASSESSMENT QUESTIONNAIRE 2010**

<b>P2-A-S5.5.</b>
Responsibilities (e.g. matching, CAPACITY check)Neighbouring CONTROL AREAS shall implement and run their matching process according to the "Implementation Guide for the ESS (ETSO Scheduling System) in the UCTE processes".
<b>Compliance Level:</b> SC
<b>Actions taken to reach compliance:</b>  The system is updated permanently to implement all elements of the ETSO scheduling system.
<b>Deadline:</b> 12/2011

### AUDIT QUESTIONNAIRE 2011

**P2-A-S-5.5 Responsibilities (e.g. matching, CAPACITY check)**

**Compliance level**    FC         SC         NC

Concise explanation for declared compliance level:

Responsibilities are described in the relevant contracts (System Operation Agreements with our neighbouring TSOs and agreements for balancing groups).

**Do you have an addendum to the standard?**    Yes         No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

*Does the agreed responsibilities assignment follow the “Implementation Guide for the ESS (ETSO Scheduling System) in the UCTE processes”?*

Yes  No

List of evidences, comments:

German agreements require the implementation ESS2.3,  
The defined communication standards are:

- /1/ ETSO ESS 2.3 and/or ETSO ESS 3.3 - according to local market rules
- /2/ ETSO ECAN 4.0
- /3/ ETSO ESS Code list 10.0
- /4/ ETSO Acknowledgement 5.0 if ETSO ESS 3.3 or ECAN 4.0 is used Curtailment of nominated transmission rights,  
Curtailment is processed according to following rules:
  - Curtailed nominated transmission right = (nominated transmission right \* Total curtailed nominated transmission right) / Total of nominated transmission right per Capacity Agreement Identification (CAI)
  - Decimals of the result will be rounded down.

REQUIREMENTS ARE FULFILLED

## AUDIT PHASE

### COMPLIANCE AUDIT 2011

**Compliance Level suggestion by the audit team:**

FC

**Explanation for the suggested compliance level:**

All System Operation Agreements with 50HzT neighbours have a provision on scheduling which cover the requirements of the main standard.

System Operation Agreement signature dates:

CEPS 24.3.2009

PSE-O 24.10.2008

TenneT 25.7.2008

50HzT and its neighbours belong to Central Eastern Europe region which follows the “Implementation guide CEE scheduling”, 22.4.2010 which covers the requirements of the standard.

## 4.10 P3-A1-S2 Coordination for exceptional type of contingency

### PREPARATORY PHASE

## SELF-ASSESSMENT QUESTIONNAIRE 2010

**P3-A1-S2.**

Coordination for exceptional type of contingency. It is the responsibility of the operator of the concerned network elements to establish the list of the exceptional type of contingency for security calculation based on the likelihood of occurrence of the event and to communicate this list to the neighbouring TSOs. Each TSO selects these exceptional contingencies based on the respective risk assessment by itself (see P3-A2-S1). Some exceptional events are considered only in case of temporary specific operational conditions, which have to be communicated to neighbours with a view of security calculation. If a TSO A considers a resulting risk for an exceptional type of contingency for elements located in the area of TSO B not considered in the contingency list of TSOB, both TSOs reconsider together their contingency lists.

**Compliance Level:** NC

<b>CEPS</b> NC	<b>PSE-Operator SA</b> NC	<b>transpower</b> NC
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**Actions taken to reach compliance:**

Establishing such a list of network elements requires a systematical risk assessment, which is not yet implemented. Action: Establishing a risk assessment according to the appendix of policy 3 and analyzing the responsibility area of 50Hertz Transmission GmbH. In case some exceptional contingency appear, they will be announced to the concerned neighbouring TSO and added into our contingency list.

**Deadline:** 12/2011

**Temporary measures to preserve the security of interconnected system**

Based on the operational experience, there are no such exceptional contingencies in our responsibility area. In case of a double line / busbar outage or common mode failure we will analyse its effect on neighbouring TSOs. All contingencies can be respected manually.

**Existing addendum for this Policy reference** yes

**Additional Questions**

Do you establish and communicate to other TSOs a formal list of exceptional contingencies?

<b>CEPS</b> no	<b>PSE-Operator SA</b> no	<b>transpower</b> no
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Do you consider the exceptional list from the neighbouring TSOs and reconsider your own contingency list with your neighbour TSO if needed?

<b>CEPS</b> yes	<b>PSE-Operator SA</b> yes	<b>transpower</b> yes
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How do you coordinate with your neighbouring TSOs the exceptional contingency list as of what to take into account and how to manage the list?

**CEPS**  
Relevant data are permanently exchanged in real time as well as in operational planning phase. An exceptional contingency list is currently not exchanged.

**PSE-Operator SA**  
Relevant data are permanently exchanged in real time as well as in operational planning phase. An exceptional contingency list is currently not exchanged.

**transpower**  
Relevant data are permanently exchanged in real time as well as in operational planning phase. Rules for the exceptional contingency list are commonly determined.

## AUDIT QUESTIONNAIRE 2011

**P3-A1-S2 COORDINATION FOR EXCEPTIONAL TYPE OF CONTINGENCY.** It is the responsibility of the operator of the concerned network elements to establish the list of the exceptional type of contingency for security calculation based on the likelihood of occurrence of the event and to communicate this list to the neighbouring TSOs. Each TSO selects these exceptional contingencies based on the respective risk assessment by itself (see P3-A2-S1). Some exceptional events are considered only in case of temporary specific operational conditions, which have to be communicated to neighbours with a view of security calculation.

If a TSO A considers a resulting risk for an exceptional type of contingency for elements located in the area of TSO B not considered in the contingency list of TSO B, both TSOs reconsider together their contingency lists.

**Overall Compliance level**    FC                     SC                     NC

Neighbour	Compliance level
CEPS	SC
TenneT D	SC
PSE- O	SC
Amprion	SC
EnBW	SC
SEPS	SC
Energinet	N/A

Concise explanation for declared compliance level:

50HzT has determined his exceptional type of contingency according of the provisions of the German PG System Security and distributed it to the concerned neighbours in its observability area. 50HzT received the results also from the partners. For this is the implementing and checking in the new network calculation tool necessary. It should be complete in late 2011.

**Do you have an addendum to the standard?**    Yes                     No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

1. Establishing a risk assessment according to the appendix of policy 3 and analyzing to responsibility area of the 50 Hertz Transmission GmbH. In case some exceptional contingency appear they will be announced to the concerned neighbouring TSO and added into our contingency list.
2. Based on the operational experience, there are no such exceptional contingencies in our responsible area. In case of a double line/ busbar outage or common mode failure we will analyse its effects on neighbouring TSO's.

*Do you establish and communicate to other TSOs a formal list of exceptional contingencies?*

Neighbour	Yes	No
EnBW	X	
TenneT G...	X	
Amprion	X	
PSE-O	X	
CEPS	X	
SEPS	X	

List of evidences, comments:

50Hertz sent on 7<sup>th</sup> and 8<sup>th</sup> march 2011 to the affected neighbours the Email “External contingency list of 50HzT with network elements of XXX=PSE-O/CEPS/TenneT D/Amprion/EnBW/SEPS”. The Emails and the responses were stored in folder.

*Do you consider the exceptional list from the neighbouring TSOs and reconsider your own contingency list with your neighbour TSO if needed?*

Neighbour	Yes	No
CEPS	X	
TenneT D	X	
PSE- O	X	
Amprion	X	
EnBW	X	
SEPS	X	

List of evidences, comments:

50HzT received from all the above TSO’s an answer. Whether 50HzT checked to expands your own exceptional contingency list on the observation area. A partly implementing and testing will be performed with the new network calculations complex.

*How do you coordinate with your neighbouring TSOs the exceptional contingency list as of what to take into account and how to manage the list?*

Neighbour	Explanation
Germany	once time an year, additional by requirement and experience
CEPS	once a year and by requirement and experience via email
SEPS	once a year and by requirement and experience via email
PSE-O	once a year and by requirement and experience via email


List of evidences, comments:

The Emails are stored in folder. The experience will be won with the new network calculations complex.

## AUDIT PHASE

# COMPLIANCE AUDIT 2011

**Compliance Level suggestion by the audit team:**

FC

**Explanation for the suggested compliance level:**

50HzT coordinates annually the list of exceptional contingencies with its neighbours. The audit team was presented email exchange with attachments regarding the topic. 50HzT has System Operation Agreement appendix 12 "On line data Exchange" with physical neighbours and verbal agreements with second order neighbours. All the coordinated contingencies with physical neighbours are implemented to 50HzT SCADA which was verified by the audit team by checking the SCADA system. 50HzT will also implement a "network calculation tool" to have online update of its contingency list.

Audit team upgrades 50HzT compliance level to FC as they fulfil the requirements of the standard by implementation of the risk assessment procedure.

## 4.11 P3-A2-S1 DETERMINATION OF THE EXTERNAL CONTINGENCY LIST AND OBSERVABILITY AREA.

### PREPARATORY PHASE

<b>SELF-ASSESSMENT QUESTIONNAIRE 2010</b>		
<b>P3-A2-S1.</b>		
Determination of the external contingency list and observability area. Each TSO is required to determine the external contingency list and the external observability list related to its responsibility area. External contingency list items must be treated as normal type of contingencies in all N-1 security calculations in all timeframes. Additionally exceptional contingencies (double lines, busbars) as announced by a neighboring TSO have to be included by the TSO if it considers them very relevant for risks.		
Compliance Level: FC		
CEPS FC	PSE-Operator SA FC	Transpower FC

<b>AUDIT QUESTIONNAIRE 2011</b>																									
<b>P3-A2-S1 Determination of the external contingency list and observability area.</b>																									
Each TSO is required to determine the external contingency list and the external observability list related to its responsibility area. External contingency list items must be treated as normal type of contingencies in all N-1 security calculations in all timeframes. Additionally exceptional contingencies (double lines, busbars) as announced by a neighboring TSO have to be included by the TSO if it considers them very relevant for risks.																									
Overall Compliance level    FC <input checked="" type="checkbox"/> SC <input type="checkbox"/> NC <input type="checkbox"/>																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Neighbour</th> <th style="width: 50%;">Compliance level</th> </tr> </thead> <tbody> <tr><td>CEPS</td><td>FC</td></tr> <tr><td>TenneT D</td><td>FC</td></tr> <tr><td>PSE- O</td><td>FC</td></tr> <tr><td>Amprion</td><td>FC</td></tr> <tr><td>EnBW</td><td>FC</td></tr> <tr><td>SEPS</td><td>FC</td></tr> <tr><td>Energinet</td><td>FC</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	Neighbour	Compliance level	CEPS	FC	TenneT D	FC	PSE- O	FC	Amprion	FC	EnBW	FC	SEPS	FC	Energinet	FC									
Neighbour	Compliance level																								
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TenneT D	FC																								
PSE- O	FC																								
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Energinet	FC																								
Concise explanation for declared compliance level:																									
FGH (an external company) has checked the observation area of 50HzT. 50HzT updates the observation area constantly. The implemented observability area will be checked on the (n-1) criterion and their impact of the responsible area for 50HzT all 5min. The exceptional contingency can be checked only manually within the responsible area of 50HzT. Currently busbar failure can not be respected regularly by dispatcher, but within																									

special analyses of experts.

**Do you have an addendum to the standard?**    Yes     No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

-----  
*Do you determine the external contingency list? If yes how often do update it?*

By requirement and experience .It is estimated once in the year.

List of evidences, comments:

The Emails were stored in the folder.

*Is your external contingency list integrated in all your N-1 security calculations?*

Yes     No

List of evidences, comments:

The network calculation tool checked all determined external contingencies on the (n-1) criterion and their impact of the responsible area for 50HzT in the implemented observability area. It will be use only the elements with an actually load over 30% of the nominal value.

## AUDIT PHASE

### COMPLIANCE AUDIT 2011

**Compliance Level suggestion by the audit team:**

FC

**Explanation for the suggested compliance level:**

50HzT constantly exchanges the list of external contingencies with its neighbours. The audit team was presented email exchange with attachments regarding the topic. 50HzT has System Operation Agreement, appendix 12 "On line data Exchange" with physical neighbours and verbal agreements with second order neighbours. All the coordinated contingencies with physical neighbours are implemented with a dynamic principle in 1 minute intervals (Only elements with over 30% load) and with all elements in 5 minute intervals to 50HzT SCADA security analysis which was verified by the audit team by checking the SCADA system database.

System Operation Agreement signature dates:

CEPS 24.3.2009

PSE-O 24.10.2008

TenneT 25.7.2008

50HzT is implementing new estimation tool to their SCADA to indentify and update contingency list automatically. The finalisation of the tool is seen by beginning of 2012.



## 4.12 P3-A2-S2 IMPLEMENTATION OF OBSERVABILITY AREA

### PREPARATORY PHASE

<b>SELF-ASSESSMENT QUESTIONNAIRE 2010</b>
<b>P3-A2-S2.</b>
Implementation of observability area. The external network model corresponding to the observability area must be implemented in the SCADA system and its real-time observability by state estimator must be ensured by a proper amount of exchanged online data.
Compliance Level: FC

<b>AUDIT QUESTIONNAIRE 2011</b>																						
<b>P3-A2-S2 Implementation of observability area.</b> The external network model corresponding to the observability area must be implemented in the SCADA system and its real-time observability by state estimator must be ensured by a proper amount of exchanged online data.																						
Overall Compliance level    FC <input checked="" type="checkbox"/> SC <input type="checkbox"/> NC <input type="checkbox"/>																						
<table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 30%; padding: 5px;">Neighbour</th> <th style="padding: 5px;">Compliance level</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">CEPS</td> <td style="padding: 5px;">FC</td> </tr> <tr> <td style="padding: 5px;">TenneT D</td> <td style="padding: 5px;">FC</td> </tr> <tr> <td style="padding: 5px;">PSE- O</td> <td style="padding: 5px;">FC</td> </tr> <tr> <td style="padding: 5px;">Energinet</td> <td style="padding: 5px;">FC</td> </tr> <tr> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> </tr> <tr> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> </tr> <tr> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> </tr> <tr> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> </tr> <tr> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> </tr> <tr> <td style="padding: 5px;"> </td> <td style="padding: 5px;"> </td> </tr> </tbody> </table>	Neighbour	Compliance level	CEPS	FC	TenneT D	FC	PSE- O	FC	Energinet	FC												
Neighbour	Compliance level																					
CEPS	FC																					
TenneT D	FC																					
PSE- O	FC																					
Energinet	FC																					
Concise explanation for declared compliance level:																						
The observability area is continuously monitored and displayed with online data. 50HzT has mapped currently at least two electrical circles of the immediate neighbours in the SCADA. This area is constantly expanding on the determined observability area. The connection to Energinet is a DC-cabel. It is considered as an infeed.																						

**Do you have an addendum to the standard?** Yes  No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

-----  
*Is the observability area implemented in the SCADA? If yes how often do update it?*

The first determination of the observability area is implemented. The next update is done with the implementation of the new network calculation tool in late 2011.

List of evidences, comments:

Examples of the SCADA system.

*Do you have a proper amount of exchanged online data to ensure the real time observability by the state estimator*

Yes  No

List of evidences, comments:

The exchanged online data containing the actual switching state of the elements in the substation, their currents and voltages and the major frequencies. This information has been agreed in the bilateral System Operation Agreements. 50HzT receive additional information over the regional awareness and alarm system of the Central East Europe Region (the sum of the realized exchange program and the schedule for exchange of the different TSO's to the neighbour in the region).

## AUDIT PHASE

### COMPLIANCE AUDIT 2011

**Compliance Level suggestion by the audit team:**

FC

**Explanation for the suggested compliance level:**

Physical neighbours are implemented to observability of 50HzT SCADA which was verified by the audit team by checking the SCADA system. Substations Kocin and Nosovice were checked. Also second order neighbours are partially implemented to the observability area. 50HzT has System Operation Agreements' appendix 12 "On line data Exchange" with physical neighbours where the observability area is stated. The appendices to SOA are updated annually.

50HzT observability also covers partially second order neighbours: SEPS, EnBW, Amprion, Energinet.dk.

System Operation Agreement signature dates:

CEPS 24.3.2009

PSE-O 24.10.2008

TenneT 25.7.2008

## 4.13 P3-A2-S5.2 Abroad consequences of TSOs decisions in operational planning and in real time

### PREPARATORY PHASE

<b>SELF-ASSESSMENT QUESTIONNAIRE 2010</b>		
<b>P3-A2-S5.2.</b>		
Abroad consequences of TSOs decisions in operational planning and in real time. In case of changing the network configuration for network branches included in the external observability list of neighbors (e.g. outage of elements, double busbar operation) or major changes of generation pattern, the TSO must inform in due time and firstly in the operational planning phase its affected neighbors2. If needed corresponding measures have to be coordinated to prevent counter-effects in neighboring networks.		
<b>Compliance Level:</b> FC		
<b>CEPS</b> FC	<b>PSE-Operator SA</b> FC	<b>transpower</b> FC
<b>Explanation for the full compliance declaration:</b>		
<b>Additional Questions</b>		
Have you implemented a procedure ensuring exchange of information related to changes of network configuration or major changes of generation pattern in operational planning and real time operation?		
<b>CEPS</b> yes	<b>PSE-Operator SA</b> yes	<b>transpower</b> yes
Do you have any agreed procedures in which counter measures to prevent counter-effect in neighbouring networks are determined?		
<b>CEPS</b> yes	<b>PSE-Operator SA</b> yes	<b>transpower</b> yes

## AUDIT QUESTIONNAIRE 2011

**P3-A2-S5.2 ABROAD CONSEQUENCES OF TSOs DECISIONS IN OPERATIONAL PLANNING AND IN REAL TIME.** In case of changing the network configuration for network branches included in the external observability list of neighbours (e.g. outage of elements, double busbar operation) or major changes of generation pattern, the TSO must inform in due time and firstly in the operational planning phase its affected neighbours. If needed corresponding measures have to be coordinated to prevent counter-effects in neighbouring networks.

**Overall Compliance level**    FC             SC             NC

Neighbour	Compliance level
CEPS	FC
TenneT D	FC
PSE- O	FC
Energinet	FC

Concise explanation for declared compliance level:

50HzT communicates and coordinates all the changes of the observability grid with the affected neighbours regularly. 50HzT use different ways for that. All the technical changes in the 50HzT grid and the affect neighbours of the observability area with effect of the observed transmission grid will be exchange in sufficient lead time before an event over special e-mail post offices like it is described in the different System Operation Agreements. All planned disconnection or disturbances (long time) will be coordinated or communicate in different time slices (annual, monthly, weekly, daily and in real time) on common meetings, with E-mails or per telephone directly. The process is described also in the SOA. This information will be published partially also about different internet platforms.

**Do you have an addendum to the standard?**    Yes             No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

-----  
*Have you implemented a procedure ensuring exchange of information related to changes of network configuration or major changes of generation pattern in operational planning and real time operation?*

Neighbour	Yes	No
CEPS	X	
TenneT D	X	
PSE- O	X	
Energinet	X	

List of evidences, comments:

The coordination takes place with the immediate neighbours as defined in the SOA. This information will be exchanged in further frame also by regional initiatives (TSC and Coreso daily, weekly CEE region). This initiative are not bordered some immediate neighbours. It connects our region.

*Do you have any agreed procedures in which counter measures to prevent counter-effect in neighbouring networks are determined?*

Neighbour	Yes	No
CEPS	X	
TenneT D	X	
PSE- O	X	
Energinet	X	

List of evidences, comments:

The measures identified in the SOA or in individually Redispatch Agreements in detail. Within Germany are further agreements. A nationwide Agreement under TSC is currently developed.

**AUDIT PHASE**

**COMPLIANCE AUDIT 2011**

**Compliance Level suggestion by the audit team:**

FC

**Explanation for the suggested compliance level:**

50HzT holds weekly operational teleconferences with its neighbours to exchange views on the operational situation. Audit team saw coordinated outage plans and emails with the physical neighbours. Audit team also reviewed 50HzT annual outage plan and SOAs chapter 4.1. "Normal network configuration and outage coordination". 50HzT takes into consideration data from TSC and Coreso.

System Operation Agreement signature dates:

CEPS 24.3.2009

PSE-O 24.10.2008

TenneT 25.7.2008

## 4.14 P3-A2-S6 DATA PROVISION

### PREPARATORY PHASE

#### SELF-ASSESSMENT QUESTIONNAIRE 2010

**P3-A2-S6.**

Data provision. The TSO has to provide its neighbors in due time with all needed information for adequate simulations. Each TSO must provide the real-time telemetry and the network characteristics to its neighbors that is necessary for the neighboring TSOs to have a sufficient external network model of the observability area for the state estimator and for the N-1 security calculations. This implies among others all data related to switching status, active and reactive power flows, voltage, injections and loads, tap changer position of transformers.

**Compliance Level:** FC

<b>CEPS</b>	<b>PSE-Operator SA</b>	<b>transpower</b>
FC	FC	FC

**Explanation for the full compliance declaration:**

**Additional Questions**

Do you have an agreement with your neighbouring TSOs which precises in details what data have to be exchanged concerning the network elements identified in the observability area ?

<b>CEPS</b>	<b>PSE-Operator SA</b>	<b>transpower</b>
yes	yes	yes

What kind of communication methods do you use for data provision? (e.g. email, data server...)

**CEPS**  
Online data are exchanged via EH or direct links, additional data are exchanged by registered mail or email.

**PSE-Operator SA**  
Online data are exchanged via EH or direct links, additional data are exchanged by registered mail or email.

**Transpower**  
Online data are exchanged via EH or direct links, additional data are exchanged by registered mail or email.

**AUDIT QUESTIONNAIRE 2011**

**P3-A2-S6 DATA PROVISION.** The TSO has to provide its neighbours in due time with all needed information for adequate simulations. Each TSO must provide the real-time telemetry and the network characteristics to its neighbours that is necessary for the neighbouring TSO's to have a sufficient external network model of the observability area for the state estimator and for the N-1 security calculations. This implies among others all data related to switching status, active and reactive power flows, voltage, injections and loads, tap changer position of transformers.

**Overall Compliance level**    FC                     SC                     NC

Neighbour	Compliance level
CEPS	X
TenneT D	X
PSE- O	X
Energinet	X

Concise explanation for declared compliance level:

50HzT exchange all necessary online data with all immediate neighbours data to evaluate and calculate of effects each on the other's. The real time data is exchanged via TASE2 and are implemented in the SCADA system of 50HzT. The information will be continuously expanded and edited. Additional information are exchanged within the German TSO's because of the peculiarities in Germany. Examples are the virtually lines and data for the common grid control.

**Do you have an addendum to the standard?**    Yes                     No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

*Do you have an agreement with your neighbouring TSOs which describe in detail what data have to be exchanged concerning the network elements identified in the observability area?*

Neighbour	Yes	No
CEPS	X	
TenneT D	X	
PSE- O	X	

List of evidences, comments:

Separate bilateral System Operation Agreements

*Do you provide the realtime telemetry necessary for the state estimator and for the N-1 calculations to the neighbouring TSOs? (to be asked border by border),...)*

Neighbour	Yes	No
CEPS	X	
TenneT D	X	
PSE- O	X	
Energinet	X	

List of evidences, comments:

The general requirements are noted in each SOA. The requested data are delivered via TASE2. This data volume is constantly adapted to the requirements.

**AUDIT PHASE**

**COMPLIANCE AUDIT 2011**

**Compliance Level suggestion by the audit team:**  
FC

**Explanation for the suggested compliance level:**  
System Operation Agreements chapter 4.1. "Normal network configuration and outage coordination"



covers the requirements of the standard. 50HzT considers Energinet.dk (Kontek cable) as a single load/generation unit and does not have data exchange agreement as with other physical neighbours. The data exchange with Energinet.dk is covered with SOA of the DC interconnector. All exchanged data is implemented to 50HzT SCADA.

System Operation Agreement signature dates:

CEPS 24.3.2009

PSE-O 24.10.2008

TenneT 25.7.2008

Kontek ("Betriebsvertrag", DC interconnector between 50HzT and Energinet.dk) 10.12.2003

## 4.15 P3-A3-S2 Overloads in N-1 situation (simulation).

### PREPARATORY PHASE

#### SELF-ASSESSMENT QUESTIONNAIRE 2010

**P3-A3-S2.**

Overloads in N-1 situation (simulation). Considering the loss of a network element(N-1 situation) overloads on impacted network elements are admitted only if remedialactions are available as to get back any overloaded network element below itsrespective Permanent Admissible Transmission Loading PATL.

**Compliance Level:** FC

**Explanation for the full compliance declaration:**

**Additional Questions**

Which measures do you take if there is no possible remedial action in terms of topological modifications and generation redispatching available in such a case? (That means remedial actions allowed by laws, regulators, which can be applied in such a situation, but which are not prepared in advance for regular application, e.g. no contracts,...)

There are different measures allowed by laws or regulators within Germany. In emergency cases direct instructions for generators and consumers, as well as load shedding are possible. Additionally the priority of dispatch of renewable generation units can be limited and trading can be suspended.

If a remedial action is considered as "available", which time lag is taken into account for this action to become effective?

The respected delay depends on the kind of measure: topological measures – minutes; redispatch (internal) – 1/2 hour; redispatch (cross-border) – 1 hour; counter trading – (D-1) or intraday trading; stop intraday market – timeframe of hours; curtailment of generation – 1h.

#### AUDIT QUESTIONNAIRE 2011

**P3-A3-S2 "OVERLOADS IN N-1 SITUATION (SIMULATION).** Considering the loss of a network element (N-1 situation) overloads on impacted network elements are admitted only if remedial actions are available as to get back any overloaded network element below its respective Permanent Admissible Transmission Loading PATL."

**Compliance level**    FC             SC             NC

Concise explanation for declared compliance level:

50HzT is an export TSO for renewable energy what can lead to temporary congestion. 50HzT checked the ability of transfer capacity continuously in advance to avoid (n-1) violation. 50HzT has a wide measure catalogue which it uses also in the intraday. For example: get back in operation of planned disconnections in access time, fixed special

switching states, countertrading, stop of the intraday market, review of the (n-1) violation depend outdoor temperature, internal and external redispatch for particular elements, and finally energy management based on the German law ENWG §13(2) and EEG § 11.

**Do you have an addendum to the standard?**    Yes     No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

*Which measures do you take if there is no possible remedial action in terms of topological modifications and generation redispatching available in such a case? (That means remedial actions allowed by laws, regulators, which can be applied in such a situation, but which are not prepared in advance for regular application, e.g. no contracts,...)*

The German government give the German TSO's the right for a directly energy management. The right is fixed in the German laws EEG 2009 and ENWG 2011. 50HzT has already used it und described the process for the relevant partners.

List of evidences, comments:

German Renewable Energy Act, German Energy Act, fax exchange regarding §13(2) ENWG (cascading), bilateral contracts

*If a remedial action is considered as "available", which time lag is taken into account for this action to become effective?*

topological measures – minutes with remote control  
 Redispatch (internal) – 1/2 hour  
 Redispatch (cross-border) – 1 hour  
 DC loop flow (cross-border between Energinet, 50HzT, PSE-O and Svenska Kraftnät over the DC-connection) – 1 hour  
 Counter trading – (D-1) or intraday trading – until 1 hour before event  
 Stop intraday market – hours  
 Curtailment of generation – 1h

List of evidences, comments:

contracts with the TSO, DSO and Generation; e.g. SOA, Redispatch, DC-loop-flow ...

## AUDIT PHASE

# COMPLIANCE AUDIT 2011

**Compliance Level suggestion by the audit team:**

FC

**Explanation for the suggested compliance level:**

50HzT has escalation lists of remedial actions with all its physical neighbours as SOA appendix 10 "List of remedial measures". SCADA system of 50HzT has also a tool to reduce renewable energy production by giving orders to distribution system operators in a case of emergency. 50HzT has an internal document "Anweisung zur System und Netzfürung", January 2010 which describes 50HzT internal procedures to cope with overload situation.

System Operation Agreement signature dates:

CEPS 24.3.2009

PSE-O 24.10.2008

TenneT 25.7.2008

## 4.16 P3-A3-S4.1 Tie-lines operating conditions

### PREPARATORY PHASE

SELF-ASSESSMENT QUESTIONNAIRE 2010		
<b>P3-A3-S4.1.</b>		
Tie-lines operating conditions. The information on values of PATL, TATL or couples (TATL)		
<b>Compliance Level:</b> FC		
<b>CEPS</b> FC	<b>PSE-Operator SA</b> FC	<b>transpower</b> FC
<b>Explanation for the full compliance declaration:</b>		
<b>Additional Questions</b>		
Do you share values of PATL, TATL and TC for all tie-line with adjacent TSOs?		
<b>CEPS</b> yes	<b>PSE-Operator SA</b> yes	<b>transpower</b> yes
Do you inform neighbours in case of settings changes at the time of the change?		
<b>CEPS</b> yes	<b>PSE-Operator SA</b> yes	<b>transpower</b> yes

## AUDIT QUESTIONNAIRE 2011

**P3-A3-S4.1 TIE-LINES OPERATING CONDITIONS.** The information on values of PATL, TATL or couples (TATL; Duration), overload conditions (acceptable duration of overload), and TC of tie-lines must be shared with adjacent TSOs. Mutual information must be agreed and implemented. In case of settings changes TSO has to inform the adjacent TSO on the new values.

**Overall Compliance level**    FC                     SC                     NC

Neighbour	Compliance level
CEPS	FC
TenneT D	FC
PSE- O	FC
Energinet	FC

Concise explanation for declared compliance level:

The values are contents of the bilateral System Operation Agreements between the neighbouring TSO's and in diverse antihavarie concepts. The German TSOs work to a general German limit concept.

**Do you have an addendum to the standard?**    Yes                     No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

-----

*Do you share values of PATL, TATL and TC for all tie-line with adjacent TSOs?*

Neighbour	Yes	No
CEPS	X	
TenneT D	X	
PSE- O	X	
Energinet	X	

List of evidences, comments:

The values are contents of the separate bilateral System Operation Agreements between the neighbouring TSO's and in diverse antihavarie concepts. The German TSOs work to a general German limit concept.

*Do you inform neighbours in case of settings changes at the time of the change?*

Yes  No

List of evidences, comments:

50HzT informs their neighbours within a reasonable period before the event according to the specifications in the SOA. It means a special E-mail post office named on the 50HzT side "Netzdatenänderungdienst". The appropriate attachments to be adjusted immediately. 50HzT informs also about the common WOPT and DOPT in the region if the changes are shortly and depending on a disturbance.

## AUDIT PHASE

### COMPLIANCE AUDIT 2011

**Compliance Level suggestion by the audit team:**

FC

**Explanation for the suggested compliance level:**

50HzT has a system "Netzdatenänderungdienst" to immediately inform neighbours on the new values which was presented to audit team. The procedure is described in SOAs appendix 19 "Update of technical parameters" with physical neighbours.

System Operation Agreement signature dates:

CEPS 24.3.2009

PSE-O 24.10.2008

TenneT 25.7.2008

## 4.17 P3-A4-S3 PRINCIPLE OF “NO CASCADING WITH IMPACT OUTSIDE MY BORDER”

### PREPARATORY PHASE

<b>SELF-ASSESSMENT QUESTIONNAIRE 2010</b>		
<b>P3-A4-S3.</b>		
Principle of "No cascading with impact outside my border". TSOs commonly identify, prepare and implement in a coordinated way all possible operational measures and remedial actions (doing their best efforts in accordance with their legal framework) so that the simulated situations <sup>4</sup> based on the contingency lists cannot lead to the propagation of cascading effects outside their borders.		
<b>Compliance Level:</b> FC		
<b>CEPS</b> FC	<b>PSE-Operator SA</b> FC	<b>transpower</b> FC
<b>Explanation for the full compliance declaration:</b>		
<b>Additional Questions</b>		
Do you share datasets and additional information to identify risks of cascading effects on the interconnection by the means of calculations?		
<b>CEPS</b> yes	<b>PSE-Operator SA</b> yes	<b>transpower</b> yes
Do you define in advance a set of contingencies and relative coordinated remedial actions with neighbouring TSOs?		
<b>CEPS</b> yes	<b>PSE-Operator SA</b> yes	<b>transpower</b> yes
How do you check the effectiveness of prepared measures for situations based on the contingency list?		
<b>CEPS</b> The measures are checked by online (real time) and offline (forecast stage) load flow calculation for relevant outages.		
<b>PSE-Operator SA</b> The measures are checked by online (real time) and offline (forecast stage) load flow calculation for relevant outages.		
<b>Transpower</b> The measures are checked by online (real time) and offline (forecast stage) load flow calculation for relevant outages.		
Do you have a procedure to coordinate remedial actions with your neighbouring TSOs in case of detected violations on the interconnection?		
<b>CEPS</b> yes	<b>PSE-Operator SA</b> yes	<b>transpower</b> yes

Do you have agreed methods of cost sharing?		
<b>CEPS</b> yes	<b>PSE-Operator SA</b> yes	<b>transpower</b> yes

## AUDIT QUESTIONNAIRE 2011

**P3-A4-S3 PRINCIPLE OF “NO CASCADING WITH IMPACT OUTSIDE MY BORDER”.** TSOs commonly identify, prepare and implement in a coordinated way all possible operational measures and remedial actions (doing their best efforts in accordance with their legal framework) so that the simulated situations based on the contingency lists cannot lead to the propagation of cascading effects outside their borders.

**Overall Compliance level**    **FC**             **SC**             **NC**

Neighbour	Compliance level
CEPS	FC
TenneT D	FC
PSE- O	FC
Energinet	FC

Concise explanation for declared compliance level:

50HzT leads their grid after the (n-1) criterion. It shouldn't be come to a cascading. The dispatchers have the possibility to calculate the grid manually if they see a temporary violation. This is also a part of the regularly calculation in the new network calculation tool in the future, which will also automatically respect the protection limit current.

**Do you have an addendum to the standard?**    **Yes**             **No**

In case of an existing addendum; list of evidences for a mitigation plan, comments:

Do you share datasets and additional information to identify risks of cascading effects on the interconnection by the means of calculations?

Neighbour	Yes	No
CEPS	X	
TenneT D	X	
PSE- O	X	

List of evidences, comments:

50HzT is participant of a regional security initiative (TSC). The participants analyse the (n-1) criterion and critical situations together on the common forecast data. The participants coordinate their remedial actions based on their results. If 50HzT observe a (n-1) violation on the tie lines in real time 50HzT will analyse possible solutions and if necessary implement contractually agreed measures with neighbours.

Do you define in advance a set of contingencies and relative coordinated remedial actions with neighbouring TSOs?

Neighbour	Yes	No
CEPS	X	
TenneT D	X	
PSE- O	X	

List of evidences, comments:

The measures are part of the individual SOA. A multilateral redispatch agreement in frame of the TSC is at work.

How do you check the effectiveness of prepared measures for situations based on the contingency list?



Neighbour	Explanation
CEPS	It exist a sensibilities matrix in the SOA
TenneT D	It exist a sensibilities matrix
PSE- O	experience in use and available options

List of evidences, comments:

There are individual sensibility within Germany and between CEPS and 50HzT. An international matrix is at work

*Do you have a procedure to coordinate remedial actions with your neighbouring TSOs in case of detected violations on the interconnection?*

Neighbour	Yes	No
CEPS	X	
TenneT D	X	
PSE- O	X	
energinet	X	

List of evidences, comments:

The procedure is documented in the various bilateral agreements (SOA, Redispatch agreement, emergency energy exchange,..). 50HzT uses also other international platforms e.q. TSC or Coreso for the coordination of remedial action to avoid the opposition in the apron.

**AUDIT PHASE**

**Compliance Level suggestion by the audit team:**

FC

**Explanation for the suggested compliance level:**

50HzT participates in TSO Security Cooperation which has developed common IT-platform which analyses next day operation situation within TSC region. After automatic analysis the specialists from each TSC member have a daily 21:00 teleconference to solve next day operational challenges. Audit team reviewed international and 50HzT internal results from the teleconferences.

## 4.18 P3-A4-S4.1 REGIONAL AGREEMENT FOR THE SET OF REMEDIAL ACTIONS

### PREPARATORY PHASE

SELF-ASSESSMENT QUESTIONNAIRE 2010		
<b>P3-A4-S4.1.</b>		
Regional agreement for the set of remedial actions. For probable constraints impacting neighboring control areas TSOs have to agree in advance with their neighbors in the same region on a set of remedial actions and on related procedures of activation.		
<b>Compliance Level:</b> FC		
<b>CEPS</b> FC	<b>PSE-Operator SA</b> FC	<b>transpower</b> FC
<b>Explanation for the full compliance declaration:</b>		
<b>Additional Questions</b>		
Do you have any written agreements on procedures to provide maximal assistance to adjacent TSOs no longer capable to face a critical situation, taking into account cross-border remedial actions. (i.e. changes of network topology, cross-border re-dispatching, counter-trading, NTC curtailment, etc.)?		
<b>CEPS</b> yes	<b>PSE-Operator SA</b> yes	<b>transpower</b> yes

AUDIT QUESTIONNAIRE 2011											
<b>P3-A4-S4.1 REGIONAL AGREEMENT FOR THE SET OF REMEDIAL ACTIONS.</b> For probable constraints impacting neighbouring control areas TSOs have to agree in advance with their neighbours in the same region on a set of remedial actions and on related procedures of activation.											
<b>Overall Compliance level</b> FC <input checked="" type="checkbox"/> SC <input type="checkbox"/> NC <input type="checkbox"/>											
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Neighbour</th> <th style="width: 50%;">Compliance level</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">CEPS</td> <td style="padding: 2px;">FC</td> </tr> <tr> <td style="padding: 2px;">TenneT D</td> <td style="padding: 2px;">FC</td> </tr> <tr> <td style="padding: 2px;">PSE- O</td> <td style="padding: 2px;">FC</td> </tr> <tr> <td style="padding: 2px;"> </td> <td style="padding: 2px;"> </td> </tr> </tbody> </table>	Neighbour	Compliance level	CEPS	FC	TenneT D	FC	PSE- O	FC			
Neighbour	Compliance level										
CEPS	FC										
TenneT D	FC										
PSE- O	FC										


Concise explanation for declared compliance level:

The immediate neighbours of 50HzT are in the same regional security initiative (TSC). One goal of this initiative is the above described coordination in this region. The participating TSO's have installed also a common awareness system to reflect the individual grid situations for the neighbours in real time. (traffic lights)

Do you have an addendum to the standard?    Yes     No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

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*Have you agreed with your neighbouring TSOs in the same region on a set of remedial actions and on activation of related procedures for probable constraints impacting neighbouring control areas?*

Yes     No

List of evidences, comments:

see above

## AUDIT PHASE

# COMPLIANCE AUDIT 2011

**Compliance Level suggestion by the audit team:**

FC

**Explanation for the suggested compliance level:** 50HzT participates in TSO Security Cooperation which has developed common IT-platform (CTDS) which analyses next day operation situation within TSC region. After automatic analysis the specialists from each TSC member have a daily 21:00 teleconference solve next day operational challenges, e.g. remedial actions. Audit team checked TSC CTDS platform in operation.

## 4.19 P3-B-S1.2.2 OTHER REACTIVE POWER GENERATION/ABSORPTION RESOURCES

### PREPARATORY PHASE

<b>SELF-ASSESSMENT QUESTIONNAIRE 2010</b>	
<b>P3-B-S1.2.2.</b>	
Other REACTIVE POWER generation/absorption resources. TSO shall keep available a sufficient number of other reactive power sources like generators, capacitors and reactors connected to the grid, which contribute to REACTIVE POWER generation or absorption, in order to maintain or get back the voltage in normal ranges after any contingency.	
<b>Compliance Level:</b> FC	
<b>Explanation for the full compliance declaration:</b>	
<b>Additional Questions</b>	
Do you check regularly whether you have a sufficient additional reserve of reactive power in order to recover the normal range in N-1 situation	yes
Do you have information about the availability/restriction of reactive power reserves?	yes
Do you have any contracts with adjacent TSOs for the exchange of reactive power reserve in case of necessity (e.g. voltage margins violations)?	yes

<b>AUDIT QUESTIONNAIRE 2011</b>	
<b>P3-B-S1.2.2 OTHER REACTIVE POWER GENERATION/ABSORPTION RESOURCES.</b> TSOs have to keep available a sufficient number of other reactive power sources like generators, capacitors and reactors connected to the grid, which contribute to REACTIVE POWER generation or absorption, in order to maintain or get back the voltage in normal ranges after any contingency.	
<b>Compliance level</b> FC <input checked="" type="checkbox"/> SC <input type="checkbox"/> NC <input type="checkbox"/>	
Concise explanation for declared compliance level:	
50HzT maintains the voltage level in its grid with the use of own coils and the transformer taps. 50HzT has also agreements over the reactive power management with immediate connected power plants and with the DSO's of Berlin and Hamburg. Due to the phase out of the German NPP it was necessary to develop a common reactive power concept around area Hamburg together with TenneT D and the DSO Hamburg.	
<b>Do you have an addendum to the standard?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
In case of an existing addendum; list of evidences for a mitigation plan, comments:	

Do you check regularly whether you have a sufficient additional reserve of reactive power in order to recover the normal range in N-1 situation?

Yes  No

List of evidences, comments:

The check of the voltage in the responsible area of 50HzT is part of the regular n-1 calculations. Due the phase out of the German NPP's the German TSOs has the expected winter season with the available reactive power in the focus and investigate diverse possible scenarios. The German TSOs want to develop a weekly forecast with view of voltage as one aim.

Do you have information about the availability/restriction of reactive power reserves?

Yes  No

List of evidences, comments:

The coils are part of the planned disconnection. The available power units come regular from the connected generation park, at least once time per week.

## AUDIT PHASE

### COMPLIANCE AUDIT 2011

#### Compliance Level suggestion by the audit team:

FC

#### Explanation for the suggested compliance level:

The current German Grid Code has a provision on minimum requirement of reactive power supply (3.3.8.1.) for a generator. 50HzT has financial contracts with each generator for supply of reactive power. The sufficient amount of reactive power reserve is defined by not violating operational voltage limits.

50HzT also presented their study conclusions on how to manage on coming winter without eight German nuclear power plants which is an evidence for 50HzT commitment to ensure sufficient amount of reactive power also for the future.

## 4.20 P3-B-S2.1.2 COORDINATION FOR VOLTAGE AND REACTIVE POWER MANAGEMENT

### PREPARATORY PHASE

<b>SELF-ASSESSMENT QUESTIONNAIRE 2010</b>		
<b>P3-B-S2.1.2.</b>		
Coordination for voltage and reactive power management. A coordination between adjacent TSOs is needed in order to manage voltage control (primary and other means) and reactive power resources near boundary preventing that individual actions have a contrary effect to the security of neighbours (including border nodes for voltage) in normal operation and in case of disturbances.		
<b>Compliance Level:</b> FC		
<b>CEPS</b> FC	<b>PSE-Operator SA</b> FC	<b>transpower</b> FC
<b>Explanation for the full compliance declaration:</b>		
<b>Additional Questions</b>		
Do you have any reactive power resources which are placed near to the boundaries of your system?		
<b>CEPS</b> yes	<b>PSE-Operator SA</b> yes	<b>transpower</b> yes
Do you inform your neighbours in advance if you intend to perform an action that will cause significant increase or decrease of voltage at your boundary substations?		
<b>CEPS</b> yes	<b>PSE-Operator SA</b> yes	<b>transpower</b> yes
Do you inform your neighbours if a disturbance which occurred in your system causes a significant change of voltage at boundary substations and additional reactive flows on tie-lines?		
<b>CEPS</b> yes	<b>PSE-Operator SA</b> yes	<b>transpower</b> yes
How do you control voltages and reactive power flows on tie-lines (i.e. using of reactors or capacitors, generator based reactive power dispatch, etc.)?		
<b>CEPS</b> Voltages and reactive power flows are controlled by generators, capacitors, reactors or step changers.		
<b>PSE-Operator SA</b> Voltages and reactive power flows are controlled by generators, capacitors, reactors or step changers.		
<b>Transpower</b> Voltages and reactive power flows are controlled by generators, capacitors, reactors or step changers.		

## AUDIT QUESTIONNAIRE 2011

**P3-B-S2.1.2 COORDINATION FOR VOLTAGE AND REACTIVE POWER MANAGEMENT.** A coordination between adjacent TSOs is needed in order to manage voltage control (primary and other means) and reactive power resources near boundary preventing that individual actions have a contrary effect to the security of neighbours (including border nodes for voltage) in normal operation and in case of disturbances.

**Overall Compliance level**    FC             SC             NC

Neighbour	Compliance level
CEPS	FC
TenneT D	FC
PSE- O	FC

Concise explanation for declared compliance level:

The frame of the voltage on the tie lines is part of the individually SOA. In the operation time the affected dispatchers choose the relevant contact to find a solution.

**Do you have an addendum to the standard?**    Yes             No

In case of an existing addendum; list of evidences for a mitigation plan, comments:

-----  
*Do you inform your neighbours in advance if you intend to perform an action that will cause significant increase or decrease of voltage at your boundary substations?*

Neighbour	Yes	No
CEPS	X	
TenneT D	X	
PSE- O	X	


List of evidences, comments:

It is applied and part of the SOA.

*Do you inform your neighbours if a disturbance which occurred in your system causes a significant change of voltage at boundary substations and additional reactive flows on tie-lines?*

Neighbour	Yes	No
CEPS	X	
TenneT D	X	
PSE- O	X	

List of evidences, comments:

It is applied and part of the SOA

*How do you control voltages and reactive power flows on tie-lines (i.e. using of reactors or capacitors, generator based reactive power dispatch, etc.)?*

Neighbour	Explanation
CEPS	exchange of online data from all elements in the first electrical circle
TenneT D	exchange of online data from all elements in the first electrical circle
PSE- O	exchange of online data from all elements in the first electrical circle

List of evidences, comments:

The SCADA system contains information of the whole observability area (online-monitoring and activation), information exchange also via the regional alarm and awareness system

*Do you have any reactive power resources which are placed near to the boundaries of your*



system?

Neighbour	Explanation
CEPS	coils, nearly hydro power units, transformer taps
TenneT D	coils, nearly hydro power units, transformer taps
PSE-O	transformer taps,

List of evidences, comments:

see above
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**AUDIT PHASE**

**COMPLIANCE AUDIT 2011**

**Compliance Level suggestion by the audit team:**  
FC

**Explanation for the suggested compliance level:**

The System Operation Agreements' annex 7 "Voltage limit values" with physical neighbours covers the requirements of the standard. SOAs' chapter 3.4.10. has provisions for high level principles of voltage control cooperation

System Operation Agreement signature dates:

- CEPS 24.3.2009
- PSE-O 24.10.2008
- TenneT 25.7.2008

## 4.21 P3-D-S2 TRANSIENT ANGLE STABILITY CALCULATION

### PREPARATORY PHASE

SELF-ASSESSMENT QUESTIONNAIRE 2010	
<b>P3-D-S2.</b>	
Transient angle Stability calculation. Each TSO has at its own disposal relevant dynamic models and dedicated software in order to carry out dynamic simulations ensuring transient angle stability in its responsibility area.	
<b>Compliance Level:</b> FC	
<b>Explanation for the full compliance declaration:</b>	
<b>Additional Questions</b>	
Do you have relevant dynamic models in order to carry out dynamic simulations ensuring transient angle stability in your responsibility area.	yes

AUDIT QUESTIONNAIRE 2011	
<b>P3-D-S2 TRANSIENT ANGLE STABILITY CALCULATION.</b> Each TSO has at its own disposal relevant dynamic models and dedicated software in order to carry out dynamic simulations ensuring transient angle stability in its responsibility area	
<b>Compliance level</b>	FC <input checked="" type="checkbox"/> SC <input type="checkbox"/> NC <input type="checkbox"/>
Concise explanation for declared compliance level:	
The calculations are carried out within the framework of network planning 1-3 times a year.	
<b>Do you have an addendum to the standard?</b>	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
In case of an existing addendum; list of evidences for a mitigation plan, comments:	
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<i>Do you have relevant dynamic models in order to carry out dynamic simulations ensuring transient angle stability in your responsibility area?</i>	
Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
List of evidences, comments:	
The calculations are carried out within the framework of network planning 1-3 times a year.	

## AUDIT PHASE

### COMPLIANCE AUDIT 2011

**Compliance Level suggestion by the audit team:**

FC

**Explanation for the suggested compliance level:**

The dynamic model, DIgSILENT, simulations are executed couple of times per year as part 50HzT annual network planning frame work. Audit team checked the results of the dynamic simulations and conclusions of three studies from 2010. 50HzT also runs dynamic simulation in case significant change in the grid.

## 5 CONCLUSIONS

The representatives of 50HzT were well prepared for the audit. All documentation which the TSO had was available and well organised. The representatives of 50HzT clearly demonstrated that they are familiar with the content of every single document. The Audit Team particularly wishes to stress the easiness and quickness with which all required evidences were presented and explained.

A visit to the 50HzT control room helped the Audit Team members to better understand the processes implemented and the explanations given by the representatives later on.

In the beginning of the audit the Control Area Manager of 50HzT presented the organisation of 50HzT, how the grid looks like, where it is interconnected, and many facts related to operation of the current and future system that allow the Audit Team Members afterwards to understand adequately the particularity of the case.

The readiness of the 50HzT representatives to explain and discuss openly all subjects contributed to conclude the Audit Team members about the compliance level with requirements and the disparity between their conclusion and the previous declarations of 50HzT.

50HzT broad vision of the concept of neighbourhood leads to consider neighbour TSOs not only these physically connected (TenneT, PSE-O and CEPS with meshed AC connection plus Energinet.dk by a DC interconnector, Kontek, to Nordic synchronous system) but those TSOs (Amprion, EnBW and SEPS) with reciprocal influence too. This is the reason because of the set of neighbours varies within those self-assessments made neighbour by neighbour (i.e P3-A1-S2 Coordination for exceptional type of contingency and P3-A2-S6 Data provision). This perspective goes beyond the Operation Handbook use of the neighbourhood concept and has been well appreciated by the Audit Team. The Kontek interconnection was not assessed by audit team as it does not belong to the scope of the audit.

The Audit Team found that the evidences presented and explanations given by 50HzT during the audit were adequate and that 50HzT is fully compliant in case of 19 out of 21 investigated OH standards.

For the standard P3-A2-S2 "Implementation of observability area", the audit team assesses compliance level as fully compliant while 50HzT had self assessed to be sufficiently compliant.

Concerning the standards P1-A-S1.1 Primary Control Organisation and P1-B-S4 Secondary Control Reserve (for which 50 HzT self assessed FC) the Audit Team did not assess neither the technical soundness nor the efficiency of the implemented arrangements in terms of secure operation of the interconnected system because this lies beyond the purpose of the audit, doing then a formal checking of the compliance between the mechanism enforced by BNetzA regulation and the requirements of the standard. On this matter, the Audit Team points the following:

- The German reserve market system and its key subsystem the German Control Coordination (GCC) are enforced by BNetzA regulation to all German TSOs, not only to 50HzT.
- Other Non-German ENTSO-E Members are currently proceeding to join GCC.
- BNetzA regulation does not fulfil all standards of Policy 1 (i.e. the process is set for whole Germany as a single Control Area without differentiating between the areas conformed by each German ENTSO-E Members).
- It seems there is no room to suit in a short time both the German regulation and the RGCE Operation Handbook requirements.
- The management of reserves is a key factor for system operation and thus the national regulation is not a reason for declaring not applicable compliance level

For all the above mentioned reasons, the Audit Team concluded that the currently implemented arrangements do not comply with the OH requisites.

As a complementary outcome from the Audit Visit the Audit team suggested to 50 HzT

- to check the adequacy of the current document management system in order to ensure that only approved and updated documents are the available ones in the control room
- to review the in force System Operation Agreements with its neighbours on the light of the Implementation guide CEE scheduling (signed after those bilateral agreements) to check for possible overlapping or inconsistencies.

Accordingly with representatives information the preparation for the audit took 250 man-hours for 50HzT.

## 6 SIGNATURE PAGE

### ENTSO-E Audit Team Members:



Jaime Sanchiz (Audit Team Leader)



Olivier Beck (Audit Team Member)



Silvia Moroni (Audit Team Member)



Lasse Kontinen (Compliance Monitoring Advisor)

Date and Place: 18.4.2012, Brussels, Belgium