EUROPEAN GRID REPORT

Beyond Public Opposition
Lessons Learned Across Europe

Update 2013

Renewables Grid Initiative

Imprint
The Renewables-Grid-Initiative is managed and legally represented by Renewables Grid gUG.

Haydnstraße 1
12203 Berlin, Germany
Managing Director: Antonella Battaglini
Jurisdiction: AG Charlottenburg / HR 141989 B
Tax number: 27/602/56382

Authors: Theresa Schneider, Stephanie Bätjer

The Renewables-Grid-Initiative (RGI) gratefully acknowledges funding support from the European Commission. All content and opinions expressed in this publication are solely those of RGI.

Table of Contents

List of Abbreviations

3D VR	3 Dimensional Virtual Reality
AC	Alternating Current
ARE	Swiss Federal Office for Spatial Development
DC	Direct Current
DETEC	Federal Department of the Environment, Transport, Energy and Communications Switzerland
EIA	Environmental Impact Assessment
EMF	Electromagnetic Fields
ENTSO-E	European Network of Transmission System Operators for Electricity
ESTI	Federal Inspectorate for Heavy Current Installations Switzerland
EU	European Union
FAQ	Frequently Asked Questions
FOEN	Federal Office for the Environment Switzerland
FOT	Federal Office of Transport Switzerland
HVDC	High Voltage Direct Current
NGO	Non-Governmental Organisation
RGI	Renewables-Grid-Initiative
SEA	Strategic Environmental Assessment
SFOE	Swiss Federal Office of Energy
TSO	Transmission System Operator

1 Introduction

The transformation of the electricity sector is an inevitable building block in the fight against climate change. There is a broad consensus among transmission system operators (TSOs) and environmental non-governmental organisations (NGOs) that the electricity grid is a key enabler of this transformation. However, the current grid system is out-dated. Thus, the effective integration of electricity stemming from 100% renewable sources into the grid depends on the successful modernisation and development of power grids across the EU.
Yet, there is no consensus in society on how to build the grid. Affected communities are often very successful in organising an opposition. What's more, local NGOs often state their concerns regarding grid impacts on nature, protected areas and biodiversity.

In 2012, the Renewables-Grid-Initiative had initiated a project on best practices. On-going grid development projects have been considered in order to identify the most urgent challenges, attempt to meet them, and to identify lessons learned for future action. The European Grid Report summarises these findings showing the current state of the art in harmonising grid expansion with environmental protection principles and improving public participation in planning procedures.
This update complements the findings of the European Grid Report on what has been attempted, what works and what needs further review in grid planning and permitting procedures.

To achieve these aims, this update covers on-going activities and relevant experiences of RGI's TSO members. As in the 2012 report, it focuses on the need determination, spatial planning and permitting processes of grid development projects.

1.1. The added value of this update

The European Grid Report only marked the beginning of a systematic assessment of best practices and lessons learned. This update is the first in a series of follow-ups that we plan to publish in the coming years.

Compared to the findings showcased in the European Grid Report, many of the grid projects described are now in a later stage of development. This is often related to much more detailed knowledge about the specifics of the project which calls for new customised participation approaches.

This update focuses on the experiences of five TSOs, including Swissgrid – a new addition to the report.
The chapter on Switzerland was not included in the 2012 report due to a then on-going reorganisation of the Swiss electricity market. It is only as of January 2013 that Swissgrid both owns and operates the 6700 km of grid lines that constitute the Swiss transmission system.

Equivalent to the 2012 report, this update presents very practical examples of how challenges in grid planning can be dealt with. Just as in 2012, they are easily traceable, as they are indicated by the highlighted green boxes.

1.2. Scope and methodology

Findings of this update were compiled with the help of a questionnaire that RGI partners filled in. [1] Afterwards, telephone interviews were conducted and the information provided was supported by relevant material from the TSO.

[1] An examplary questionnaire can be found in Annex

2 Challenges

The European Grid Report illustrates that many TSOs recognise the importance of addressing different concerns that stakeholders bring forward regarding grid development projects. They are aware that such efforts help in reducing conflicts and speeding-up the grid development process as a whole. However, putting this participatory approach into practice still comes with many challenges.

Compared to the findings of 2012, many TSOs are now in the later stages of their projects (end of permitting and preparation of construction). Other TSOs are dealing with the implementation of a new legislative background and related challenges. Moreover, new technologies like underground cabling or HVDC are currently being realised for the first time or will be in the coming years.

2.1. Planning and Approval Process and Interaction with Stakeholders

Many TSOs still face challenges concerning the involvement of different stakeholder groups during the planning and permitting of grid expansion projects. Often, this is dependent on the legislative framework on which the interaction is based.

Legislative challenges

Current challenges that German TSOs face are mainly related to the fact that a new permitting regime needs to be implemented. All actors involved – including the regulator who will act as the permitting authority for projects spanning more than one German federal state ("Land") – need to learn how to fulfil their new role, how to put their new tasks into practice and how to interpret the defined procedures.

The current transition period encompassing projects run according to two legislations is a communicative and procedural challenge. Some transport needs had been determined under the old legal framework, thus using another methodology. The new legal framework tries to ensure consistency and to build a bridge between those formerly identified projects to the fully new ones that are identified and justified under the new planning method. However, during this transition period, misunderstandings arise making it even more important to explain procedures and remain transparent on decision-making processes.

With the new legislation, some difficulties regarding legal

conformity versus informing the public also arise. The introduction of the new permitting procedure had two purposes: firstly, to speed up the procedures and secondly to enhance public acceptance. These two goals can be conflicting if not properly managed. In order to achieve the first goal of timely procedures, time limits have been introduced for certain phases. All those tight phases must be accompanied by appropriate communication and participation formats.

In addition, some of the upcoming projects listed in the "Federal Requirement Act"[2] are of massive extent. The DC corridor Sued.Link will span from Northern Germany to the South with a total length of ~800km. It will be developed as a joint project between TenneT and another German TSO, TransnetBW. A second 500km DC connection linking Saxony-Anhalt to the South of Bavaria is developed by the other two TSOs, 50Hertz and Amprion. Several questions arise debating how to best pursue one permitting procedure for the whole project that takes into consideration the regional specificities at best. It is also a huge challenge to find out how to best interact with the different stakeholder groups along the line in the various stages of the project. What is even more challenging, this line will employ HVDC technology which has not yet been attempted on land in Germany. Thus, the TSOs will have to deal with a new permitting regime that entails new requirements for public participation, a wide area affected by the project, and the use of new technology.

Examples addressing this challenge:
- Multi-stakeholder working groups, Germany (p. 21)

Early engagement

Many TSOS still face challenges regarding public engagement regardless of the country they are located in. The best point in time to inform the greater public about a project and engage them in discussions is still disputed. On the one hand, TSOs have learned from experience that detailed discussions can only begin as soon as some details concerning the route corridor have been decided. On the other hand, they also know that there is an inherent need to start informing and including stakeholders at an earlier point in time.

Examples addressing this challenge:
- Expert workshops on scenarios and sensitivities of grid development planning, Germany (p. 21)
- Information and learning exhibitions in schools, 50Hertz (p. 22)
- Continuous stakeholder dialogue for project Wahle-Mecklar, TenneT (p. 22)
- Advisory group during spatial planning, Swissgrid (p. 14)
- Strategic approach for stakeholder engagement, Swissgrid (p. 14)

Informing the public

Providing credible and understandable information

The European Grid Report has shown that it is often necessary to demonstrate and rationalise the choice for a specific technology option. The possibility of laying new

[2] Bundesbedarfsplangesetz

cables underground instead of building them overhead, for example, often causes lengthy debates with external stakeholders. In one cross-border project between the Netherlands and Germany, for example, doubts about the technical feasibility of underground cabling were not minimised. The Dutch government was prompted to commission a second study on this issue.

Examples addressing this challenge:
- Evaluation scheme for underground cables vs. overhead lines, Switzerland (p.14)
- Underground cabling: meta study from Swissgrid (p.16)
- Augmented reality app, Swissgrid (p.16)

People often pose questions concerning AC and DC cables as well. They tend to demand DC solutions after having heard that DC cables are smaller and do not produce electromagnetic fields. However, many people do not understand the enormous technical implications of DC cables, such as the need for a converter station on both sides of the cable. Hence, it is the TSOs' continuous task to explain all of the aspects that need to be taken into account when deciding on technical options.

Examples addressing this challenge:
- Independent feasibility studies for underground cables, TenneT (p. 24)

Comprehensive information throughout different stages of the project

In comparison to 2012, many grid development projects of TSOs have reached a later stage in the permitting procedure. These projects now face different sets of challenges than they did at the outset. In the planning phase of a project, themes are more abstract. In the later stages, project promoters deal with a much higher level of detail. There is increasing information on which trees will have to be cut and which locations and residents will be affected by noise pollution due to construction work and related traffic. This can be imposing to some individuals.

Normally, the public is already well informed at the more abstract level, but in these later stages, detailed information that has not been made known before, becomes available. Besides this, there are always stakeholders who are new to discussions. It is therefore important to repeatedly explain the procedure and ensure that all necessary information and increasingly profound details are provided both to the general public and to any affected individuals (in particular during the construction phase).

Examples addressing this challenge:
- Newspaper supplement, 50Hertz (p. 21)
- Market place style information event, Swissgrid (p. 15)

Informing about electromagnetic fields

In many countries, stakeholders and the public are persistently concerned about the negative impacts that electromagnetic fields (EMF) may have on their health.

In the Netherlands, a new recommendation has been introduced encouraging project developers to apply a more advanced method when calculating

EMF zones. This however, also bears the potential to fuel mistrust since some people might perceive it as a confession that the old method was never good enough. Nevertheless, there are also advantages that come with the modification. People who benefit from the new method (e.g. those who will be compensated due to the new calculation scheme) may appreciate the attempt to improve approaches.

Examples addressing this challenge:
- New method to calculate EMF zones, TenneT (p. 25)
- High threshold values and information material, Swissgrid (p. 16)

Transparent process and decision

This challenge has already been examined in the 2012 report. Many TSOs still face challenges when explaining procedures and decisions. Many stakeholders and the public have very high expectations concerning their level of influence. In Germany, for instance, newly introduced measures for public participation have been promoted by politicians, the regulator and others. Thus, some people expect that their viewpoint have an impact on every decision. Also in other countries, people taking part in consultations expect their recommendations to be implemented. At the same time, suggestions are very different from each other. This is particularly challenging for determining the route since many different route options compete against each other. It is thus very important to convey to all participants that involvement does not necessarily mean deciding what will be built in the end. TSOs and others conducting public consultations need to manage these expectations and explain in detail how much leeway is available in which phase of the projects.

Examples addressing this challenge:
- 3D Virtual Reality used before court, TenneT (p. 24)
- Computer game – how to balance out different interests, 50Hertz (p. 22)

In many countries, TSOs call for a simplification of procedures. For some major projects, permitting procedures are very complex and hard to understand – both for administrations and for other stakeholders like NGOs and affected citizens. In Belgium, for example, eight public consultations had to be conducted for one major project. This can be very confusing for stakeholders, especially since they include varying levels of detail and differing foci which each relate to a specific permit. Furthermore, the amount of different procedures makes it more likely that there are procedural errors, which can in turn lead to legal complaints.

One of the main challenges that lead to delays in the planning procedures and the approval processes for new electricity grids in Switzerland is the system of legal actions. Even all decisions made at early points in the spatial planning procedure can be appealed against after the whole procedure is finalised. In some instances, this may mean that the spatial planning procedure has to be redone from the very beginning. Obviously, this is both time and resource consuming and Swissgrid, the concerned TSO, actively

advocates a review of this aspect of the permitting procedure.

2.2. Nature Conservation and Environment

Addressing the wishes of affected citizens while, at the same time, considering environmental concerns is one of the biggest challenges for grid planners. Also here, challenges mainly arise owing to the early engagement of environmental stakeholders and due to the fact that projects have reached later project stages, such as the preparation of construction work.

Examples addressing this challenge:
- Availability and quality of cartographic data, Elia (p. 19)

Interplay of nature conservation and timelines

During the construction phase, timeframes for building or upgrading works become shorter. More often than ever, power lines are intensively used. It is therefore challenging to find the right slot to upgrade lines while at the same time respecting the environment in the best possible manner. When considering the natural wildlife habitat, the time for construction works is often limited.

Continuous cooperation with environmental NGOs

Some TSOs face continuous difficulties in engaging with local NGOs. While they try to approach NGO representatives and involve them in discussions very early on in the project, they are not always successful.

Examples addressing this challenge:
- General meeting with NGOs, Swissgrid (p. 17)

3 Switzerland

3.1. Terminology

Transmission Lines Sectoral Plan
The electricity transmission lines sectoral plan (Sachplan Übertragungsleitungen) is the spatial planning procedure in Switzerland. The Swiss Federal Office of Energy (SFOE) is responsible for this sectoral plan in co-operation with the Swiss Federal Office for Spatial Development (ARE).

Swiss Federal Office of Energy (SFOE)
The SFOE (Bundesamt für Energie) is the country's competence centre for issues relating to energy supply and energy use at the Federal Department of the Environment, Transport, Energy and Communications (DETEC, Eidgenössisches Departement für Umwelt, Verkehr, Energie und Kommunikation). It is the competent authority for the spatial planning procedure.

Federal Office for Spatial Development (ARE)
The ARE (Bundesamt für Raumentwicklung) is the federal government's centre of excellence for issues concerning spatial development, transport policy, sustainable development and international cooperation in spatial planning matters.

Federal Inspectorate for Heavy Current Installations (ESTI)

ESTIs (Eidgenössisches Starkstrominspektorat) main mission is to ensure the safe use of electricity. It is a subordinate authority of the DETEC and is the competent authority for the permitting procedure. However, if there are too many or too complex objections during the procedure, the task is transferred to the SFOE.

Federal Office for the Environment (FOEN)
The FOEN (Bundesamt für Umwelt) is the federal government's centre for environmental expertise and is part of the DETEC. It is responsible for ensuring that natural resources are used sustainably, that the public is protected against natural hazards, and that the environment is protected from unacceptable adverse impacts
It conducts the Environmental Impact Assessment during the permitting procedure.

3.2. Planning and Approval Process and Interaction with Stakeholders

At the beginning of 2013, Swissgrid has taken ownership of the high voltage electricity grid of Switzerland. Swissgrid has assumed overall responsibility for the Swiss transmission grid, and will

now be handling all key activities itself. The company is also responsible for maintenance, grid modernisation and expansion projects. Until then, the Swiss grid was owned and operated by different electricity companies. All grid development projects that are currently underway have been initiated by Swissgrid's predecessors. This puts Swissgrid in an extraordinary position, in particular regarding the interaction with external stakeholders.

3.2.1. Need determination

In 2005, the Swiss government had established a working group that defined strategically important transmission lines which are necessary to guarantee security of energy supply. The Swiss government in 2009 adopted the result of this working group, which comprehended the "strategic grid" for 2015 including necessary grid expansion projects. Since then, the "strategic grid" has been updated once.

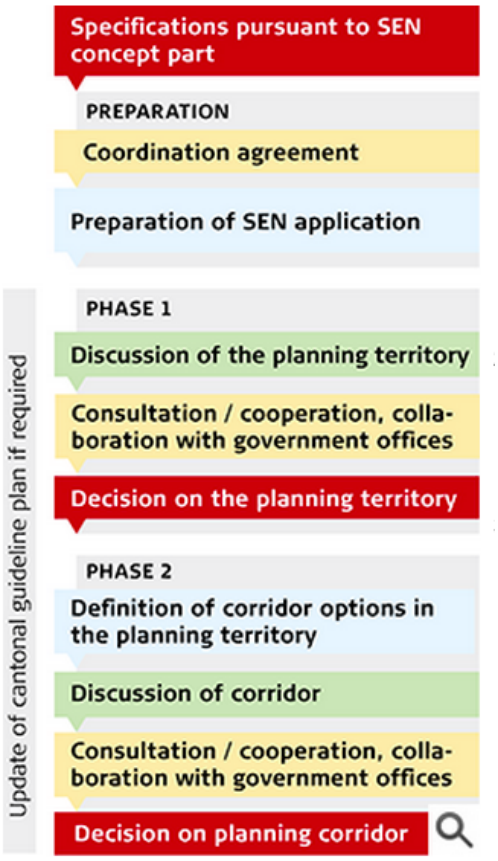
Box 1[3]: Developing the target grid for 2035

Currently, Swissgrid is developing the target grid for 2035. In cooperation with the federal government, the electricity industry and ENTSO-E, the plan for the future grid is being developed and bottlenecks are being identified. In order to achieve a well-rounded result, Swissgrid has established a "Regional Grid Development Coordination" working group, including distribution system operators and power plant operators.

3.2.2. Spatial planning

The sectoral plan for transmission lines is the overriding planning instrument for new power lines. During this procedure, possible conflicts are identified, solutions developed and in the end the best possible corridor for the new line is determined. Normally, the need for the specific power line needs to be proven as well. However, for all projects included in the "strategic grid" (see previous chapter), this requirement is already fulfilled. The Federal Office of Energy (SFOE) leads the procedure.

During the spatial planning, it is decided whether the future line will be overhead or underground. In the end, the government determines the most suitable corridor, which is the basis for the permitting procedures.



Source: Swissgrid

The procedure consists of three phases. Firstly, Swissgrid and the regions sign a coordination agreement. Afterwards, Swissgrid hands in an application for inclusion in the energy network

[3] The green boxes in the text show good practices. The numbers of the boxes correspond with the highlighted numbers in the chart at the end of this chapter. The chart illustrates the most important steps in the planning and permitting procedures of Switzerland.

sectorial plan. This contains a proposal for planning areas, i.e. areas that should be considered and analysed during the procedure. In the second phase, the advisory group (see below) discusses the planning areas and develops recommendations for the determination of one planning area. After the decision of the SFOE on the planning area, the third phase begins. Here, Swissgrid draws up various corridor options that are then discussed again in the advisory group. In the end, the group recommends one corridor. Finally, the SFOE has to decide again on the corridor and adopt the sectorial plan.

Box 2: Advisory group during spatial planning

The advisory group consists of representatives of the following institutions:

- Swiss Federal Office of Energy (SFOE) (leading role)
- Swissgrid
- Federal Office for Spatial Development (ARE)
- Federal Office for the Environment (FOEN)
- Federal Inspectorate for Heavy Current Installations (ESTI)
- Federal Office of Transport (FOT)
- Electricity Industry
- Swiss Federal Railways
- Swiss organizations for environmental protection
- Project engineer
- Local associations for environmental protection
- Concerned canton

During discussions, project specific knowledge is exchanged and possible areas of conflicts are identified. Together with the group, a scoping document for the Environmental Impact Assessment, which is conducted during the plan approval procedure, is compiled.

Box 3: Evaluation scheme for underground cables vs. overhead lines

Whether transmission lines are to be constructed overhead or placed underground is being decided on a case-by-case basis and in accordance with objective criteria. For this purpose the Swiss Federal Office of Energy (SFOE) has developed a "transmission lines evaluation model". The main objective of the new model is to evaluate various options in order to define the most suitable corridor for transmission lines. At the same time, the question whether transmission lines should be placed overhead or underground can be answered and the licensing procedure can therefore be accelerated. The model comprises four pillars, each of which contains three or four groups of criteria (spatial development, technology, environment and the economy). Projects are examined and evaluated on the basis of the criteria. After initial findings have been obtained, minor adjustments will be made to the new model and a manual will then be prepared.

The application of this evaluation model to every new project is mandatory for Swissgrid. This model makes decisions more transparent and helps stakeholders understand which details were taken into account when coming up with the decision.[4]

Box 4: Strategic approach for stakeholder engagement

At the beginning of a new project, the project manager (as part of the asset management team) draws up a plan on

[4] A figure illustrating the different pillars of this evaluation scheme can be found in the second part of the Annex.

when and with whom Swissgrid will communicate proactively. This is done in close cooperation with the communication department. Certain milestones of the project and a comprehensive stakeholder mapping form the basis for this plan. The mapping includes e.g. information on previous objections during other infrastructure projects.
Since Swissgrid has only taken over the electricity grid at the beginning of 2013, none of the projects are being started from scratch. In fact, stakeholders and the public already know about the projects. Thus, Swissgrid is currently mostly talking to people directly affected by the new line (e.g. house owners) and to municipalities.
Swissgrid's goal is an early involvement of all participants: authorities, municipalities, associations and all those affected are involved from an early stage and are given the opportunity to raise objections as early as the sectoral planning process.

3.2.3. Permitting

A plan approval procedure follows the sectorial plan procedure. At the end of this procedure, the federal government decides on the exact route of the new power line. During this procedure, security requirements are analysed and it is evaluated whether the project is in line with environmental legislation.
The Federal Inspectorate for Heavy Current Installations (ESTI) is the competent permitting authority. However, if the number and quality of objections is too intense, ESTI can transfer the task to the SFOE.

At the beginning, the project promoter hands in a request for plan approval. After the ESTI has checked the documents for completion, it publishes them and consults regions and other government authorities. Within a period of 30 days, the public can hand in objections against the project. Afterwards, the ESTI initiates negotiations and seeks to find a compromise. If agreements can be achieved, the plan is approved and necessary permits are issued. Afterwards, every citizen has the right to appeal this decision. There are several instances of appeal until the decision is final.

Box 5: Market place style information event

This summer, Swissgrid organized the first information events concerning the first expansion project with partial cabling of 380 kV in Switzerland. On the line between Beznau and Birr, four of the five segments have already been approved and completed for 2x380 kilovolts. The present project only deals with one segment, for which, according to a Federal Supreme Court decision, partial underground cabling applies to a small section. So the plan submitted by Swissgrid represents a project modification to the planning submission of 2004. There will be 1.2 km of partial underground cabling in the Bözberg area. The connections at both ends of the partial cabling will be upgraded to 2x380 kilovolts.
In collaboration with all the partners of the project, Swissgrid presented the details of the project to local, regional and national authorities, stakeholders, the media and the local population. The approx. 100 participants seized the opportunity to receive comprehensive information on the project and the subject of underground cabling. They could pose their questions directly to the people responsible for the planning and implementation of the line. Different stands were spread throughout the venue that displayed information on

various topics. The discussions were lively and the feedback was very positive.

3.2.4. Underground cabling and electromagnetic fields

Box 6: Underground cabling: meta study from Swissgrid
In 2011 Swissgrid commissioned a meta-study, which aimed at examining and summarising current findings on 'characteristics of over head lines and underground cabling'. This was a first step towards creating a scientifically sound basis which reflects state-of-the-art science and technology and which allows for an overview at a factually neutral level. The Technical University of Ilmenau conducted the study. In addition, Swissgrid set up an Advisory Study Council representing all stakeholder groups in Switzerland. The Council evaluated the study findings, and confirmed their comprehensiveness.

Box 7: Augmented reality app
Swissgrid developed an augmented reality app, which addresses recent discussions about overhead lines or underground cabling in the transmission grid. Animated, three-dimensional graphics present both technologies and their individual effects on the environment in a virtual landscape.

Box 8: EMF – High threshold values and information material
The threshold values for electromagnetic fields in Switzerland are relatively high. In general, there is an emission value of 100 microtesla, which may not be exceeded. However, the value for areas with sensitive usage is much lower and cannot exceed 1 microtesla. This applies to areas where people are subject to radiation for a longer period, e.g. in living and bedrooms or places that children often frequent (kindergartens etc.).
In order to inform people about the impacts EMF can have on one's health, Swissgrid developed a brochure explaining electric and magnetic fields, giving insight into research on this topic, and including an FAQ section.

3.3. Nature Conservation and Environment

3.3.1. Environmental Impact Assessment

The Environmental Impact Assessment is an integral part of the permitting procedure. The scoping already takes place during the spatial planning and is influenced by the recommendations of the advisory group. During the plan approval procedure, the Federal Office for the Environment (or commissioned consultants) conducts the necessary studies and develops the environmental report.

3.3.2. Collaboration with environmental NGOs

Swissgrid cooperates with NGOs on several occasions. First of all, there is a continuous dialogue with NGOs at project level since NGOs are normally part of the advisory group that is set up during the spatial planning phase. Secondly, there are overarching activities, for which the input of NGOs is also sought out. For instance, NGOs were part of the Advisory Study Council that was established during the development of the meta-study on underground cabling (see above). Thirdly, Swissgrid

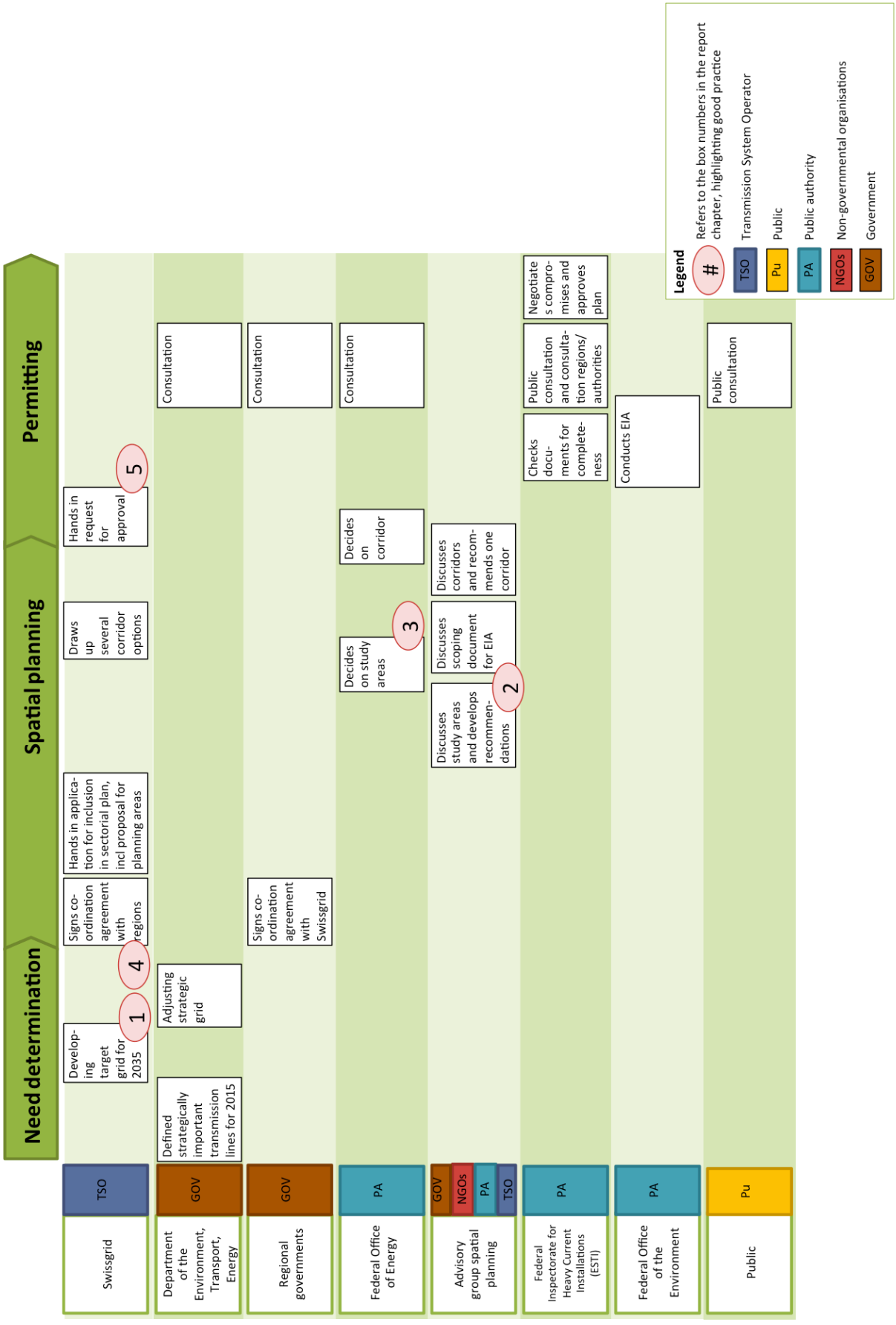
has tried to initiate a rather general dialogue with NGOs last year.

Box 9: General meeting with NGOs
As an element of transparent and open communication, Swissgrid invited representatives of the most important Swiss NGOs to participate in general discussions on grid development. One aim of this meeting was to evaluate possible future collaborations. Greenpeace, WWF, Pro Natura and the Swiss Energy Foundation attended the meeting, during which Swissgrid presented not only future challenges as owners of the transmission system, but also the commitment within the framework of RGI's European Grid Declaration.

3.4. Change Process and Internal Structures

Similar to other TSOs, Swissgrid considers the coordination between the asset management department and the communication department of the company, to be challenging. With continuous efforts in the context of specific projects, the coordination is being optimised and the learning is high. The task of the communication department is to translate the technical language of other departments and be the first point of contact for external stakeholders. Moreover, they develop language regimes for certain topics.
In order to enhance internal communication, several project meetings take place on a regular basis, in order to maintain a consistent exchange of information and to plan future external activities.

3.5. Planning and Permitting Procedure: Overview



4 Update from Belgium

4.1. Legislative background

There have not been any changes in the legislation on grid expansion within the last year.

4.2. Good practices developed since 2012

Interdepartmental guidance group

An interdepartmental guidance group had been expressly established for the Stevin project. During the current project phase (permitting), bilateral contacts have replaced the group. However, the guidance group has proven to be a very useful means in the early stages of the project, since different members could learn why they don't all agree with each other.

The benefit of such a group has recently been underlined by the Flemish government, which has introduced a new legislation that prescribes a comprehensive project meeting at the beginning stages of a new project, including all government representatives that are affected by this project and involved in the planning and permitting.

Availability and quality of cartographic data

Due to reaching much more detailed stages of the Stevin project, Elia faced the need for further information. Thus, they have done a new field inventory.

For example, project planners found out that they needed permits for almost every tree they wanted to cut – amounting to about 900. They developed an inventory of different types of trees. Adding to the complications was the fact that in Flanders, a building consent is needed to cut down trees of a certain size whereas a nature permit is needed in special regions like nature reserves yet for some, no permit is needed – this means that depending on the size and location of different trees, different types of permits are required.

5 Update from Germany

5.1. Legislative Background

In 2011, the permitting regime for German projects of national significance had been changed substantially. The current legislation is on the verge of being implemented for the first grid development projects, offering new opportunities but also bearing its own challenges. The new legislative package consists of two main parts: one focusing on the need definition, the other on the permitting of grid projects. While the need definition has been completed for the first time in 2013, the new permitting process is currently being prepared for first projects.

The first procedure to determine the need of new electricity lines in Germany, which has been initiated in the fall of 2011, has been finalised by law in summer 2013. There have been three consultation rounds on the scenario: on the first draft of the grid development plan put together by the German TSOs, and on the updated version as well as the Strategic Environmental Assessment (SEA) from the regulator. Afterwards, the parliament adopted a law (Federal Requirement Act) that determines the need for 36 electricity projects.

Aside from this, the Federal Emission Control Act, the law determining the threshold values of electro- and magnetic fields, has been amended. It now includes rules for HVDC electricity grids (which have not been previously put in place), rules on precautionary health security – new grids may no longer span residential buildings – and rules to minimise EMF as much as possible when building new grids.

Finally, a new compensation regulation has been adopted. It introduces in Germany a nationwide list of rules on how to compensate for impacts on nature. Generally speaking, the act prescribes that impacts on nature should be avoided. If this is not possible, the impacts must be assessed. If a biotope or other conservation areas are impacted substantially, compensation is mandatory. The compensation measure and its related costs are determined with the help of a biotope measurement procedure. Impacts caused by pylons higher than 20 metres will have to be compensated in any case – the magnitude is dependent on the height of the pylons and the landscape in which they are being built.

5.2. Good practices developed since 2012

Multi-stakeholder working groups

To solve some of these challenges that arise with the new legislation, different working groups have been established. First of all, there is an overarching communication group at federal level, which consists of all four TSOs plus the regulator/permitting authority. In addition, groups for specific projects have been formed, comprising of state governments, the regulator/permitting authority and the project promoter. In these groups, project plans are being discussed and possible difficulties addressed. While TSOs and the permitting authority agree that informal measures of information and participation have to permanently accompany the formal procedure, there are different views about the timing and the goal of these measures. The groups allow for good opportunities to align these different perspectives. They meet approximately every third month.

Expert workshops on scenarios and sensitivities of grid development planning

During the discussions on the German national grid development plan, TSOs have initiated a continuous dialogue with expert stakeholders, such as NGOs. So far, discussions have focused, among other things, on the analysis of sensitivities in order to get a better understanding about the impact of a certain parameter (e.g. capping some renewable production peaks) on the grid development need. During these discussions, NGOs and TSOs got a better understanding of different triggers of grid development, which fostered the dialogue in society on the future paths of the energy transition. TSOs also learned a lot about NGO concerns and contemplated new options, which they had previously not considered.

50Hertz: Newspaper supplement

In the past year, 50Hertz has had good experiences with their information flyers that they had inserted into local newspapers. These flyers are meant to introduce specific aspects of grid projects and provide the public with topical information. Different surveys commissioned by 50Hertz have shown that people living in areas where new power lines are being planned, receive their major source of information from local newspapers. This information tool, that they have designed to meet this information need, normally consists of a variety of newspaper inserts, each one covering one aspect of the project, that are dispersed over the course of a few weeks, before the application documents for the new line are being displayed to the public for their consultation. The 4-page brochures include some general information on the project, but also details on the technology, health issues, environmental aspects or route design. They also provide contact details for further information.

A poll conducted after dissemination showed that many people had learned about the project via these brochures or articles in the local newspaper.

50Hertz: computer game - how to balance out different interests
50Hertz developed a computer game that makes the difficulties of finding the best route for a new power line more tangible. Players need to identify a possible option for building a new power line while considering impacts on costs, social compatibility, nature and landscape. Only if all of these impacts are considered in an acceptable manner, the player can hand in the application for the line and "win the game".

50Hertz: cooperation agreement with the federal state Brandenburg
The state of Brandenburg in North-Eastern Germany has signed a cooperation agreement with 50Hertz for greater transparency surrounding grid expansion projects. It was signed within the context of an expert forum with participants from citizen action groups, environmental NGOs, industry, authorities and municipal associations. 50Hertz and the state government aim at complementing current planning legislation by way of regular informal dialogue formats. In the next few months, criteria for public participation and cooperation shall be jointly determined.

50Hertz: information and learning exhibitions in schools: learning about the energy transition
Together with the Independent Institute for Environmental Issues, 50Hertz organises educational events at primary schools every year. Pupils and their parents are informed on the energy transition, for example, and can discuss this topic with representatives from politics, authorities, and industry.
In an interactive exhibition that was designed for children to join in and gain their own experience, pupils can change the energy landscape themselves on the "Energy Transition Carpet". They discover various aspects of the energy transition and discuss its various aspects in five related learning stations.

50Hertz: cooperation with school on nature trail: engaging youngsters
On his own initiative, a teacher had contacted 50Hertz with regards to a nature trail that is located near a power line, for which the TSO had some compensation measures planned. Subsequently, 50Hertz entered into a dialogue with the school on the subject of the nature trail, discussing different measures that could be useful and which of those the school itself could implement.

TenneT: continuous stakeholder dialogue for project Wahle-Mecklar
For the project "Wahle-Mecklar", TenneT has organised a multitude of events and meetings before the official permitting procedure, totalling more than 150 events. In addition, working groups meant to accompany the planning have been established. These groups are compiled of representatives from nature conservation authorities, districts, citizen action groups, forest authorities and the like. During the project's progress, the working groups were being continuously

informed. In addition, they were able to make their own suggestions or point out major concerns that should be taken into account when designing the route of the new power line. Even though the dialogue process prolonged TenneT's pre-application planning process, they consider it a successful tool when it comes to handing in a profound and well-rounded application. However, whether or not this will, generally speaking, lead to an accelerated permitting procedure remains to be seen.

50Hertz internal communication: guidance documents

For internal communication purposes, 50Hertz is currently developing two different pieces of work aimed at supporting the staff's approach towards more public information and participation. Firstly, an internal guideline for grid development projects is being realised for project managers, which includes a section on guidance for project communication, which is an integral part of each substantial grid project. Secondly, an internal presentation, which includes the overall project communication approach, responsibilities and costs, is geared at all departments involved in grid development projects.

TenneT: "Citizens' bonds" ("Bürgeranleihe")

In the summer of 2013, TenneT has realized the first pilot project for financial participation of affected citizens of a transmission line in the region Schleswig-Holstein, in the Northern part of Germany. 15 per cent of the investment sum of the "West-coast line" was made available for investment via so-called citizens' bonds ("Bürgeranleihe"). People living within a radius of 5 kilometres of the new power line would be treated preferentially when issuing up to 10,000 Euros. More than 100 households signed up for the bond. Currently, TenneT is evaluating the project and will draw conclusions for further projects of financial participation.

Internal change TenneT: restructuring

During the past year, TenneT has restructured its entire department for onshore projects. This process included an expansion of resources for stakeholder dialogue. TenneT has divided its grid operation territory into four clusters and has dedicated two so-called 'citizen officers' to each region. Spread out in different regions, they serve as TenneT's main contact points and work on communication and participation strategies for each of the clusters. They cooperate closely with the communication department of TenneT's German headquarters in Bayreuth.

6 Update from the Netherlands

6.1. Legislative background

There have not been any changes in the legislation on grid expansion within the last year. However, the Dutch government is currently working on a revision of the spatial planning act. TenneT is taking part in consultations.

6.2. Good practices developed since 2012

3D Virtual Reality used before court

TenneT has developed a 3D virtual reality (3D VR) animation for the Randstad380 project. This animation has not only served its purpose in providing stakeholders and the public with information but it has also been proved useful before court. The 3D VR has helped people that had raised objections to the project by giving them the opportunity to show the court exactly where, in their opinion, problems would arise. Moreover, TenneT also used the 3D VR to illustrate all the details that need to be taken into account when planning the line and to explain why a certain route has been chosen over another. The animation has been used during court sessions, upon the court's request.

Independent feasibility studies for underground cables

At a cross-border project between the Netherlands and Germany, people kept asking to explore the possibility of building the new power line underground. When they understood that an underground AC cable would not be possible, they focused their demands on a DC cable. A previously conducted study on the technical feasibility of undergrounding in the Netherlands came to the conclusion that no more than 20km of underground AC cables would be feasible in the Dutch system. However, since the new line is an interconnector to Germany and DC connectors are being realised elsewhere in Europe, a new study was conducted that took the DC question into account. In the end, the result was the same: an underground option in DC was not feasible mostly due to the necessity of building two converter stations and the substantial energy loss resulting from converting DC to AC (and vice versa). However, it was useful that the government commissioned a second study specifically for this case, concerning the Dutch-German interconnector.

New method to calculate EMF zones

In the coming years, TenneT will have to build several new power lines next to already existing lines in order to increase the overall capacity. By bundling the two lines in one corridor, the impact on the landscape will be lessened. The previous method in calculating the magnitude of electromagnetic fields would not sufficiently take into account the cumulative impact of two parallel lines. This is why the National Institute for Public Health and the Environment revised the method. In the Netherlands, the threshold value of 0.4 microtesla may not be exceeded around "sensitive objects" (homes, schools etc.). With the new method, the 0.4 microtesla zone of bundled and combined lines (two lines next to each other or in one pylon) might be broader than before. A future side effect is that it will be more difficult for TenneT to find a route, which avoids homes or other sensitive objects.

7 Lessons Learned

In 2013, TSOs have gained new experience concerning stakeholder engagement and environmental protection. While, in general, the lessons shared in the European Grid Report 2012 still hold true, a number of additional factors for successful stakeholder involvement as well as the effective consideration of impacts on the environment could be identified.

7.1. Planning and Approval Process and Interaction with Stakeholders

Early engagement

Generally, TSOs found that it is beneficial for them to provide affected citizens and local authorities with answers proactively before a permitting procedure starts. It can be helpful to answer concerns beforehand because otherwise it is very likely that people will state their concerns later during the permitting procedure.

It is still challenging to define the best point in time to inform the greater public about a project. Even if the matter is vague and it is difficult for people to grasp the urgency from the very beginning, some aspects, such as the general grid need, potential project options, the permitting procedure and the possibilities to participate, should not be addressed too late. Alternative routes and the criteria and methodology in determining the best possible corridor is best discussed with an expert stakeholder group at an early stage. However, the majority of citizens become willing and eager to engage upon realising that a line that will be built close to their neighbourhood will directly affect them.

Stakeholder analysis

Many TSOs stress that a stakeholder mapping and analysis at the beginning of each project is key for effective, early and continuous engagement.

On the basis of this analysis, stakeholders should be approached at a very early stage and throughout the different phases of planning, building preparations and the actual building itself.

It is indispensible to have a clear and transparent set of rules in place for any kind of participation and to manage expectations carefully. This can also mean that you have to point out limits of participation as well as decisions that have to be taken.

Informing the public

One of the lessons learned throughout the past year regards the advantage of stronger multiplier involvement, such as the media or

local politicians. TSOs have learned that it is easier to target their messages through people that already have established channels and access to citizens.

Benefit sharing and compensation

Some TSOs have had the experience that, once a project has reached the more detailed permitting stages at which the exact routing is known, and it is possible to personally engage with everyone who is directly affected, many people seem to be satisfied with compensation approaches, especially if they are specifically tailored to a certain project. However, problems can arise in dealing with people who live just outside the compensation zone.

7.2. Nature Conservation and Environment

Strategic Environmental Assessments (EIAs)

Experience has taught TSOs that it can make sense to do an EIA even if it is not mandatory for a specific project. This can be the case e.g. for small-scale projects. The benefit of such an approach is that challenges concerning the environment can be captured early on. Furthermore, the grid developer has a good chance of obviating complaints that environmental issues did not play an important enough role in the planning process. It is also a practice that is well received by authorities.

8 Conclusion

The project on best practices in 2013 has shown that RGI's TSO partners continuously follow the principles of both parts of the European Grid Declaration.[5] Many new experiences have been gained throughout the year, and approaches to reducing impacts on the environment and engaging external stakeholders have been adjusted based on lessons learned in the first projects. The introduction of new legal frameworks in some countries opens up new opportunities, but their initial implementation bears its own challenges.

The need for, and the value of, further exchange of knowledge are still evident. RGI will continue its effort with further updates of the collected findings.

Moreover, RGI is participating in the project BESTGRID – testing better practices, funded by the European Commission. An integral part of this project is the exchange of best practices and lessons learned (more information: www.bestgrid.eu).

All showcased examples are also part of RGI's best practice database - the filter function eases your search. Organisations who want to participate in RGI's exchange of best practices are very welcome to contact us by emailing theresa@renewables-grid.eu

[5] European Grid Declaration on Electricity Network Development and Nature Conservation in Europe and European Grid Declaration On Transparency and Public Participation, available here: http://renewables-grid.eu/activities/european-grid-declaration.html

9 Annex

Sample questionnaire

Organisation:	
Date:	

I. Legal procedures

1. Have new regulations concerning grid expansion planning and permitting procedures (including need definition, spatial planning and permitting) been introduced in your country during the past year (last status: August 2012)?

2. If a new regulation has been introduced, does it cover one of the following themes?
   - ☐ Need discussion
   - ☐ Early and continuous involvement of stakeholders
   - ☐ Transparent process and decision
   - ☐ Provision of credible and understandable information

   Please describe the changes in more detail:

3. Have new environmental regulations concerning grid expansion been introduced in your country during the past year? Do they contribute to minimising negative impacts on the environment? How?

II. Challenges

4. The European Grid Report 2012 identified the following themes as key challenges to be dealt with during need definition, spatial planning, permitting:
   - The need for new power-lines e.g.
     - Doubts about the necessity of a new line
     - Doubts about the source of electricity transmitted
     - Political uncertainty about future energy policy and consequences for infrastructure
   - Early and continuous engagement of stakeholders e.g.
     - Lack of political backing
     - Lack of capacity in authorities

  - Missing interest of public early in the project if consequences are not visible yet
- Transparent process and decisions e.g.
  - Stakeholders lack knowledge on legal procedures
  - Decision-making mechanisms (including on technology options and spatial decisions) from TSOs and authorities are hard to understand
- Providing credible and understandable information
  - Stakeholders don't trust information sources from TSOs
  - Images bear high potential for misunderstandings
- Environmental assessments and reducing impacts on the environment
  - Data not available or bad quality
  - Lack of capacity in environmental authorities
- Continuous cooperation with environmental NGOs
  - Lack of capacity in NGOs
  - Complex internal structures in NGOs and TSOs (e.g. national and regional) make structures cooperation complicated
  - Perceived independence and credibility of NGOs can be at stake

Please comment if the challenges you face are still the same or if and what has changed. Please add potential new challenges to the list and comment if some of the challenges of the past are being better solved from today's perspective (new approaches to solve these challenges can be described in more detail later in this questionnaire).

5. Which points do you consider most urgent to be dealt with?

6. Which new topics came up in grid discussions during the last 6 months?

7. What are key barriers for the involvement of external stakeholders (e.g. affected citizens and NGOs) during grid expansion projects? At which process step do they occur (need definition, spatial planning or permitting procedure)?

III. Good practice

8. These are the examples concerning your country collected in the European Grid Report (for more information see attachment). Please describe the changes since August 2012.

	Changes since August 2012
Example 1	
Example 2	
Example 3	

Example n	

9. Have you changed your planning approach or behaviour towards NGOs recently? How?

10. Why did you decide to change the approach?

11. Were there any reactions from NGOs (positive or negative)?

12. Have you changed your planning approach or behaviour towards affected citizens recently? How?

13. Why did you decide to change the approach?

14. Were there any reactions from citizens (positive or negative)?

15. Have you changed your planning approach or behaviour towards authorities recently?

16. Can you think of other good ideas and practices concerning the involvement of stakeholders during the past 6 months? Please consider these themes:
    - Need discussion
    - Early and continuous engagement of stakeholders
    - Transparent process and decision
    - Provision of credible and understandable information
    - Minimising environmental impacts
    - Environmental assessments

17. Have you recently started a common project with an NGO?

18. Is there an institutionalised cooperation between NGO and TSO (e.g. regular meetings, joint committees)?

IV. Internal structures

19. Have there been changes in the internal company structure recently in order to deal with the aforementioned challenges in a better way? Which one?

20. Has new staff been hired or new positions established in the last months to deal with the aforementioned challenges in a better way?

21. Have new training sessions or internal communication mechanisms been established recently to prepare employees for new planning approaches?

V. Lessons Learned

22. What do you consider are key success factors for an efficient, environmentally sound and socially acceptable grid expansion?

23. Have you learned new lessons concerning grid planning procedures during the past year?

24. Other comments:

Figure illustrating the different pillars of the Swiss evaluation scheme for underground cables vs. overhead lines