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Review of existing transmission planning and approval procedures and coordination of infrastructure developments between TSOs

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Abstract

The aim of this deliverable is to review existing approval procedures in a number of European countries and to identify different methods that are adopted to overcome the barriers to transmission system development. Real case studies, based on the experience of TSO partners, are analysed in order to generalise and pin-point the main strengths and weaknesses as well as to select the best practices from the current approaches. Remarks are presented regarding the sources of delay in the approval procedures together with some recommendations on how to remove these obstacles.
D3.7.1 Review of existing transmission planning and approval procedures and coordination of infrastructure developments between TSOs

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ACRONYMS AND DEFINITIONS

AC: Alternating Current
BMU: The German Ministry of Environment
BMWi: The German Ministry of Economy
BW: Netherlands Civil Code
CNDP: French National Public Debate Commission
DC: Direct Current
DUP: French Declaration of Public Interest
EC: European Commission
EIA: Environmental Impact Assessment
EID: Environmental Impact Declaration
EMF: Electromagnetic Fields
EnLAG: The German Transmission Line Expansion Act
EnWG: German Energy Economy Act
EU: European Union
NIMBY: Not in my back yard
OHL: Overhead Line
SEA: Strategic Environmental Assessment
TEN: Trans-European Networks
TEN-E: Trans-European Networks for Electricity
TDP: Transmission Development Plan
TSO: Transmission System Operator
TYNDP: ENTSO-E Ten-Year Network Development Plan
1 EXECUTIVE SUMMARY

The high-voltage transmission grid is the backbone of the electrical power system: it plays a key role in securing the supply of electricity to load centres, in addition to facilitating energy markets and renewable energy integration. Its development contributes to the welfare of a country and of Europe in general. The strategic importance of strengthening cross-border transmission networks in Europe towards achieving the EU energy policy targets of sustainability, competitiveness and security of energy supply has been noted in the EU Guidelines for Trans-European Networks for Electricity (TEN-E). In addition, the European Commission’s Green Paper on Networks has recently outlined that the development of adequate transmission infrastructures in Europe will be key to reach the EU 2020 targets.

One of the most important tasks of transmission system operators (TSOs) is the planning and development of grid infrastructures. In most European countries the determination of required grid expansions is based on technical calculations of transmission system adequacy and security performed by the TSO, usually followed up by a cost-benefit analysis of the proposed reinforcements. Then, the TSO presents its planned projects to decision makers (regulators and/or concerned ministries) for approval, after which the TSO applies for authorisation of the project. This process takes in the average more than 5-10 years, going up to 20 years in some extreme situations.

The major reason for these very long delays mostly lies with local opposition to the realisation of infrastructure developments in general, and power lines in particular. The reduction of the time needed for infrastructure realisation is an objective clearly stated by the Commission: it is worth to remember that the European Commission (EC) envisages that planning and approval procedures for projects of European interest should be completed in a maximum time span of five years.

The aim of this deliverable is to review existing approval procedures in a number of European countries and to identify different methods that are adopted to overcome the barriers to transmission system development. Hence, real case studies, based on the experience of TSO partners, are analysed in order to generalise and pin-point the main strengths and weaknesses and to select the best practices from the current approaches.

After examining the approval procedures in Austria, Italy, France and the Netherlands various obstacles in the process of obtaining authorization for a new transmission line have been identified.

The main problems encountered in all the above mentioned countries are summarised below.

1. The approval procedures are lengthy. This happens for various reasons:
   a. In Austria and Italy, stakeholders can object at any time, bringing complaints that need to be investigated and thus cause delay.
   b. In Austria and Italy the authorization process does not follow the schedule set by law, while in France such a schedule does not exist. Not all the countries have clearly defined time steps for the authorization procedures.
   c. All countries surveyed recognize a failure to meet the schedule for the permitting procedures.
   d. Delays can be encountered also because of interdependencies between the licensing process and the EIA (Environmental Impact Assessment) in Italy and respectively the National Fitting-In Plan in the Netherlands.
2. There is a low social acceptance of new transmission line projects.
   a. Most projects are not recognized by the Local Authorities and by the population as essential.
   b. “Market” has a negative association in the public eye and the public most of the times does not see any benefits coming from the liberalized electricity market.
   c. In France and the Netherlands the population refuses increasingly the “traditional” energy supply model claiming that they prefer distributed generation and local integration of renewables, which should obviate the need for “big” transmission lines.

3. Growing fear for public health because of EMF (electromagnetic field) and other environmental concerns. As there are no standardised EMF limits at European level, the subject of EMF effect on human and animal health is a cause of concern for the population.

4. It is difficult to build new lines in natural protected areas. In countries like France where the Natura2000 protected areas are many in number and big in surface this is indeed a problem.

5. The NIMBY effect is very high.

6. There are lengthy discussions on the use of other transmission technologies such as underground cables in order to avoid OHLs passing through populated areas.

7. All TSOs consider that the differences in regulations and approval procedures between countries constitute a problem when dealing with international projects.

8. Authorities are not suitably prepared for a project involving many parties. It often happens that the manpower is insufficient and the personnel have to work simultaneously on more than one EIA (Environmental Impact Assessment).

9. There is insufficient support from politicians for transmission line projects.

10. Approval procedures have a high planning and permit risk due to legal and bureaucratic issues.

11. Gold-plating and overshooting of European legislation by the national laws can create difficult conditions for the approval procedures by setting unnecessarily high constraints and by giving space and reasons for the population to doubt and complain.

12. The EIA report is usually too detailed and implies high costs (in Austria approx. 40% of the total project cost). Some of the TSOs (in the Netherlands and Italy) complain of extra delays caused by too many detailed optimizations that have to be done during the environmental research.

13. Some TSOs state that there is no appropriate trade-off performed by the authorities between environmental issues and the public interest for security of supply. The public interest of the project is justified at the beginning of the approval procedure and forgotten in the following stages of the approval procedures.

The following recommendations have been elaborated in collaboration with TERNA, TENNET, VERBUND-APG and RTE-I. These try to give solutions to the problems identified in the reviewing process. The possible solutions are listed below.

1. Support and integration:
   a. Support from national and local political bodies for projects of European importance should be mandatory and defined by law.
   b. The priority projects of the European Union should be integrated with the TSOs’ strategic projects and vice-versa.

2. Communication with politicians and the local population should be intensified.
a. To that purpose work-groups with local politicians should be organised. These improvements have been recently adopted by all studied countries and they prove to be successful in reducing the public opposition.
b. Shared solutions should be promoted through dialogue with regional and local stakeholder organizations. In France, Italy and Netherlands this has been introduced.

3. EU and national legislation should be harmonised and overshooting through national laws (gold-plating) should be eliminated.

4. European-wide standards on EMF to define exposure limits should be developed.

5. Approval procedures:
   a. All the steps of the approval procedures including the necessary documents should be clearly defined. There should be only one moment in time when parties can object; the Dutch experience proves this is a good solution. Legal consequences should be defined in case of deliberately obstructing the schedule of the approval procedures.
   b. A simplification of the authorization procedures for projects of high national and international interest should be considered. In such cases the number of authorities in charge of the authorization procedures should be reduced, preferably to the national level. The Dutch and Italian examples prove that such an approach can speed up the approval process.
   c. The process of obtaining licenses should be done after the route for the new line has been approved. In this way delays caused by repeatedly modifying reports and obtaining new licenses can be avoided.

6. The manpower in charge of infrastructure projects at the authorities’ level should be sufficient and knowledgeable. Parallel work on different projects should be avoided in order to speed up the approval procedures.

7. Define good integration and compensation schemes that should envisage:
   a. The improvement of the integration into the landscape of the new line; this is currently adopted in all the four studied countries.
   b. The improvement of the integration into the social environment of the new line by:
      i. compensating the local population for inconveniences
      ii. accompanying local economic development
      (In France and Italy such an approach is already used.)
   c. The compensation for visual and audio pollution and any other important inconvenience caused during the construction work of a new line. This would increase public acceptance and reduce the opposition to other new projects in the long term.

8. Create a legal basis for allowing construction of new transmission lines in natural protected areas provided the environmental effects can be reduced and good compensation measures are taken.

9. Use innovating technologies and optimise the existing grid by extending the lifetime of assets and by using the existing grid to its full potential.

10. The possibility of reserving “infrastructure corridors” for important infrastructure projects should be created. Infrastructure planning should be coordinated. In Italy and Netherlands such corridors already exist.

11. Strategic Environmental Assessment (SEA) can be seen as an opportunity and a tool for preventive discussion with stakeholders for locating new transmission infrastructure. However only some countries perform such an assessment. In Italy it is done explicitly,
while in the Netherlands the SEA is included in the National Zoning Plan for Electricity Supply. Where both a SEA and an EIA are performed it would be important to incorporate the results of the SEA into the EIA.

The case of Germany was also briefly reviewed, notably because since 2009 a new law came into force, namely the EnLAG (Transmission Line Expansion Act). Before this law, administrative procedures were very lengthy, reaching 10-12 years. The EnLAG targets the acceleration of approval procedures for new transmission lines. It makes use of two instruments, namely procedure simplification and innovative technologies for exploiting and expanding the grid. The simplification of procedures refers to aspects like:

- planning of needs by identification of priority projects;
- simplification of legal procedures by applying to only one instance;
- approval of plans for connecting offshore wind power plants by procedures aiming to focus the development in territorial maritime areas.

However, the experience with EnLAG is still too limited in order to notice the decrease in the time needed for approving a project.
2 INTRODUCTION

2.1 Objectives of this deliverable

The high-voltage transmission grid is the backbone of the electrical power system: it plays a key role in securing the supply of electricity to load centres, in addition to facilitating energy markets and renewable energy integration. Its development contributes to the welfare of a country and of Europe in general. The strategic importance of strengthening cross-border transmission networks in Europe towards achieving the EU energy policy targets of sustainability, competitiveness and security of energy supply has been noted in the EU Guidelines for Trans-European Networks for Electricity (TEN-E) [1]. In addition, the European Commission’s Green Paper on Networks has recently outlined that the development of adequate transmission infrastructures in Europe will be key to reach the EU 2020 targets [2].

Transmission planning is a complex task that usually involves the execution of the following steps:
- Development of future scenarios of load and generation
- System adequacy and security calculations
- Cost-benefit analysis for proposed reinforcements
- Presentation of the planning to the decision makers for approval (regulators, ministries)
- Authorization path for single projects

The entire path for the planning and approval procedures should ideally not exceed 5 years (as envisaged by the EC) [3], but actually the reality is still far from achieving this target.

Delays are essentially due to [3]:
- Unharmonized and complex planning procedures with several involved authorities;
- Local opposition of population concerning environmental, visual, and health impacts;
- Lack of incentives for TSOs (Transmission System Operators) to cooperate in international projects, possibly due to conflicting interests or inadequacy of international regulatory frameworks;
- Financing difficulties.

According to the ENTSO-E Ten-Year Network Development Plan (TYNDP) 2010 [5], “besides the complexity of the project itself, the duration and complexity of the authorisation procedures are the main reasons for delays in completing high-priority electricity infrastructure projects across Europe. Frequently, such projects take more than 5-10 years to pass the hurdle of authorisation procedures required by national law” (see also Figure 2-1). If the opposition is too high, authorisation procedures for some projects may take even 20 years before the new line can be finally built [5].
D3.7.1 Review of existing transmission planning and approval procedures and coordination of infrastructure developments between TSOs

In [5] the main difficulties with authorization procedures are investigated and grouped as:
- Legal framework for the permitting procedures – complicated and unharmonised environmental impact assessment procedures in Europe;
- Duration of permitting procedures – lack of reasonable time limits for authorization procedures (e.g. 5-10 years);
- Social acceptance of projects – electricity infrastructure projects are neither felt as necessary nor understood as benefitting the public;
- To balance environmental impacts and important aspects such as the necessity for the project and the public interest of transmission line projects. Too much weight is put on the environmental impact with respect to the other aspects that are advocated only by the TSOs.

The related improvements proposed in [5] are:
1. Address the cultural and political issues – responsibility of all stakeholders to make the public understand the role of electrical infrastructure for large-scale RES integration and their nature as public good;
2. Recognize the importance of infrastructure projects – necessity of clarity of national laws in support of TEN (Trans-European Networks);
3. Clear methods for cost allocation;
4. Improve legal frameworks – create an integrated procedure; simplify the procedures in case of low impact; introduce time-limits; single consultation step;
5. Ensure infrastructure corridors – especially for projects that are part of the TYNDP.

An important observation is that obstacles encountered by trans-national infrastructures are mainly the same ones affecting the construction of national and local projects. In addition, at trans-national level there are also differences in legislative, regulatory and market frameworks.

The TEN-E Guidelines introduced new concepts, like different priority levels for infrastructure projects and also established European Coordinators, for ensuring a better coordination among Member States on transnational corridors.
However, as the recent report on the implementation of the trans-European energy networks in 2007-2009 [4] highlights, among some positive remarks, there are some flaws especially related to lengthy and complex authorisation procedures.

Within the previously presented context, the aim of this deliverable is to review existing approval procedures in Europe and to identify different methods that are adopted to overcome the barriers to transmission system development. Hence, real case studies, based on the experiences of the TSO partners in this project, will be analysed in order to generalise and pin-point the main strengths and weaknesses and to select the best practices from the current approaches.

2.2 Expected outcome

Chapters 2 to 5 revise in detail the authorization procedures of four countries, namely the Netherlands, Austria, Italy and France.

Moreover, in Chapter 6, a short description of the improvements made in Germany in terms of approval procedures for priority transmission projects is made.

The last chapter contains the final comparison of the previously presented cases. The identified causes for delays in approval procedures are illustrated and recommendations for how to overcome them are made based on already existent measures in various European countries and also on the opinion of grid planners at the partner TSOs.

2.3 Approach

The present report aims at reviewing some of the existing transmission planning authorisation procedures in Europe. The different regulatory frameworks in the Netherlands, Austria, Italy and France are presented in detail and compared, in order to highlight similarities and differences, sources of delay in the authorisation procedures, and possibilities to overcome them. To this purpose the four TSOs partners of the REALISEGRID Consortium were interviewed and a lengthy consultation process was initiated with them in order to learn and understand the four different procedures.

Considering the significant differences in national approval procedures for new transmission lines, a general exposition structure has been applied for each of the four countries: description of the authorisation procedures, a practical case from the TSO’ experience and compensation schemes. Therefore, some recent problems faced by the involved TSOs to have overhead lines (OHLs) authorised are also included and the compensation schemes adopted in each country for obtaining acceptance of new electrical infrastructures are presented.

In addition to the four detailed cases, a short description of the German approval procedures was added, in order to highlight the recent changes in the German legislation. These changes were made with the purpose of accelerating approval procedures.

The final conclusions and recommendations were formulated based on the previously presented information and on the dialogue with the partner TSOs. Hence the main findings regarding the sources of delay in the approval procedures and possible recommendations on how to remove these
obstacles were agreed upon. A final comparison table with the approval procedures in the 5 investigated countries helps the reader have a better overview of the deliverable.
3  THE NETHERLANDS

TenneT, the Dutch TSO, takes care of the national transmission grid. In the Netherlands there are two types of approval procedures for the HV (high voltage) grid and for the EHV (extra high voltage) grid as it follows:

- For the HV grid – 110 kV and 150 kV – there is the so-called “traditional” procedure. Each municipality has a structural vision and decides over the fitting in of the project by making a development plan.
- For the EHV grid – 220 kV and mostly 380 kV – the national government has agreed with the National zoning plan for electricity supply (“Derde Structuurschema elektriciteitsvoorziening”) in September 2009. This National zoning plan for electricity supply will cover a period up to 2020. This documentation has recently been made available only in Dutch [1]. In March 2009 the Electricity Act [8] was renewed with article 20a. This new article stipulates that a new EHV asset that will be part of the national grid will be approved according to article 3.35 of the Spatial Planning Act and according to the National Coordination Regulation. The network owner (namely TenneT TSO) responds directly only to the Ministry of Economic Affairs, not having to deal with the local authorities.

3.1  Authorization procedures

3.1.1  The National Coordination Regulation

The National Coordination Regulation describes how the coordination of
- the decision process of the National fitting-in plan and
- all the licenses needed
is done. This is a task of the National Government, more precisely the Ministry of Economic Affairs.

At present there are four transmission projects (see Figure 3-1) that fall under this regulation, namely: Randstad 380 kV, Noorwest 380 kV, Zuidwest 380 kV, Doetinchem-Wesel 380 kV. Details regarding these projects can be found at [9] and [10].
3.1.1.1 Environmental Impact Assessment (EIA) Procedure

When the length of a new EHV line exceeds 15 km then an Environmental Impact Assessment (EIA) is necessary.

A typical EIA procedure has the following structure:

- The document is initiated
- Consultation of all parties concerned and of the EIA Commission takes place
- The EIA Commission gives its advice
- The EIA report is made
- The EIA report is published
- Consultation of all parties
- Independent opinion by the EIA Commission is expressed
- The final EIA report is presented

The Dutch experience with such procedures showed that it takes too long to make an EIA report (about 1 ½ year), that there are too many details to optimize during the environmental impact assessment. Additionally, an excess of details is provided in the final EIA report. For the Randstad380 kV line for example, it took 18 months to finalize the EIA report.
3.1.1.2 The National Coordination Regulation – procedures post EIA report

After the EIA is completed it is possible to take a decision about the place where to build the new high-voltage grid infrastructure.

From this point two processes start and go on in parallel:

- the elaboration and approval procedures for the National fitting-in plan and
- the process of obtaining licences for building the infrastructure. It is good that the process for “the right of way” also is done during the authorization procedure.

3.1.1.2.1. The National Coordination Regulation for the fitting-in plan

Via the National Coordination Regulation, the Ministry of Economic Affairs (Office Energy Projects) coordinates this process together with the initiator of the project and with other appropriate authorities.

The Office Energy Projects of the Ministry of Economic Affairs makes a planning. Then a draft of the National fitting-in plan (“Rijksinpassingplan”) is made by the Ministry of Economic Affairs. This draft is sent to several municipalities where it can be consulted and written objections can be made. The Ministry of Economic Affairs examines the views and decides if the National fitting-in plan must be changed.

There is a fix amount of time for appeal against the final National fitting-plan: 6 weeks. The National fitting-in plan is sent to the Council of State (Supreme Court) which must give a judgement in 6 months.

3.1.1.2.2. The National Coordination Regulation for the licenses

The Office Energy Projects of the Ministry of Economic Affairs makes a planning. After that the Dutch TSO TenneT sends all the application forms to the involved authorities. Drafts for the licenses are made by the authorities and can be consulted at several municipalities which can object by sending a written view. The authorities examine the views and decide if the licenses must be changed. Similarly to the authorization process, there is a fix time slot of 6 weeks for appeal against the final licenses. After that the licenses are sent to the Council of State that must give a judgment in 6 months.

During this part of the National Coordination Regulation it is also necessary to obtain the right of way-agreements. The process can be done in two ways if agreement is obtained or not:

1. A letter is sent from an agent to the landowner. After that several discussions about the right of way agreement take place and the right of way agreement is agreed upon and created. In this agreement the compensation method or the settlement of damages method are described.
2. A letter is sent from an agent to the landowner. After that several discussions about the right of way agreement take place. The two parts do not agree. Hence a procedure to force the landowner is started and it ends with the expropriation of the concerned land.
3.2 Experience with recent and current main transmission line projects in the Netherlands

Because the process of the National fitting-in plan and the process of all licensing procedures are taking place at the same time and in mutual consultation, there is more visibility for the public than if these processes were performed sequentially. The benefit is that all the draft documents regarding the spatial decision and the draft licenses are published at the same time, this being more synoptic for the parties concerned. Moreover there is only one moment when the parties can object (6 weeks) and the reactions can be expressed. Last but not least there is just one trial at the Council of State which takes place within 6 months after the objection phase is closed. The conclusion can be that the procedure is faster in this way.

However TenneT’s experience has shown that this procedure is faster only on paper. In reality the process goes slower. There is no doubt that the procedure of the National Coordination Regulation has benefits but TenneT’s experience with Randstad 380 kV proved that it is better if the process of the National fitting-in plan is completed before the process of the licenses starts. It was learned that the detailed information needed for the licenses is not known at the beginning of the process. If something is changed in the National fitting-in plan the licences must be changed too, hence all changes made in the National fitting-in plan lead to going back to the licensing procedures.

An example: the whole process for the Randstad 380 kV will take 6½ to 7 years. The building of the Wateringen-Zoetemeer part of Randstad was supposed to start in the beginning of 2009 and end in the 3rd quarter of 2010 but it has not started yet (at the beginning of 2010) and with some luck it will end in the half of 2012. Figure 3-2 illustrates the planning for the procedures and decisions.

![Figure 3-2 Planning for procedures and decisions for the Randstad 380 kV project](image)
3.2.1 International projects

For international projects, each country proceeds separately with its EIA. The first decision made is on the interconnection point at the border and then the approval procedures start in both countries; for the Netherlands this means that the National fitting-in plan and the license procedures start.

3.3 Compensation schemes - the Randstad 380 kV case

This section is a brief summary of the compensation guide created by TenneT for the Randstad 380 kV project [11].

This compensation guide ('guide') sets out the specific policy that TenneT TSO B.V. ('TenneT') will conduct on compensation under the precautionary policy on magnetic fields and on compensation for damage resulting from the construction and operation of the new Randstad 380 kV high-voltage line. The guide was published under TenneT’s initiative.

The guide is targeted for all stakeholders (owners/users) of locations in the immediate vicinity of the high-voltage line as well as their advisers. The guide defines affected parties, the types of compensation they may expect to receive, how the compensation will be determined, who is responsible for dealing with the compensation, and the procedures that must be followed.

Measures during planning

Route: as far as possible, the proposed route avoids cutting across vulnerable nature and scenic areas. In the case of Randstad 380 kV due to the impact on the landscape, it was decided to have the straightest possible line with as little variation as possible. Allowance was also made for other environmental effects. An attempt was also made to avoid as far as possible a situation where sensitive properties like homes, schools, crèches, and day nurseries were located in the magnetic field zone. This approach is in keeping with the advice issued by the State Secretary of VROM on 3 October 2005 (reference SAS/2005183118). The magnetic field zone is the area within which the calculated average annual exposure to magnetic fields (at 1 metre above ground level) exceeds 0.4 microtesla.

New type of pylons: the advice of the State Secretary of VROM dating from 2005, in combination with the limited space available in the Randstad, resulted in a decision to use a new type of high-voltage pylon in the Randstad 380 kV project. For a high-voltage line, this pylon – called Wintrack – produces a magnetic field zone not more than 100 metres wide. The type of pylon normally used in the past would have meant a zone 300 metres wide. The new type of pylon is also suitable for carrying two voltages on one and the same pylon, enabling a 380 kV line to be combined with a 150 kV line. At places in the route where a combined line will be installed, the existing pylons will be replaced by the new type.

Magnetic field zones and precautionary policy

TenneT will offer owners and other parties with property rights (long-term leaseholders, owners of building leases, etc.) of homes they use personally the opportunity to sell their home or property right to TenneT voluntarily in return for compensation determined under expropriation law. People
with personal rights attached to homes (tenants, lessees, etc.) will also get an opportunity to move voluntarily in return for compensation under expropriation law. In principle, landlords will be compensated, assuming they do not sell to TenneT. Their compensation will consist of complete reimbursement for the impaired value of the home and any income damage resulting from loss of rent revenues minus the interest on the amount of the impaired value.

Depending on the specific circumstances, a solution will be sought for business homes and/or official residences, schools, crèches, and day nurseries. This will be based on continuation of the sensitive activity outside the magnetic field zone and complete reimbursement of any damage.

If owners or other parties with property rights do not wish to sell their home to TenneT, or if people with personal rights do not want to move, they will in principle be free to stay where they are. In such situations, TenneT will offer the owners or other parties with property rights complete reimbursement for the impaired value of their home. After agreement has been reached with them, the arrangements will be laid down in an agreement.

As the compensatory principle will apply, the aforementioned compensations will include compensation towards any planning-related damage.

TenneT will keep its offers in place for two years after start-up of the high-voltage line. This offer will apply only to parties who are actually using the property at the time the draft National fitting-in plan is made available for public inspection. If compensation towards planning-related damage is awarded within this period, it will be deducted from the offered compensation.

If agreement cannot be reached about the size of the compensation, three experts will make a binding valuation.

If an entitled party does not wish to avail of any of the aforementioned offers made by TenneT, or does not consent to the valuation from the three experts, he will have to submit – if he wants compensation – an application for compensation towards planning-related damage due to an amendment in the planning regime.

**Causes of damage**

Damage may occur in various ways due to the Randstad 380 kV project.

<table>
<thead>
<tr>
<th>Causes of damage</th>
<th>Who deals with it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishment of a property right</td>
<td>TenneT</td>
</tr>
<tr>
<td>Acquisition of a property</td>
<td>TenneT</td>
</tr>
<tr>
<td>Amendment of planning regime</td>
<td>Ministry of EZ</td>
</tr>
<tr>
<td>Performance of work for construction and operation</td>
<td>TenneT</td>
</tr>
</tbody>
</table>

- Establishment of a property right

To construct and operate the 380 kV high-voltage line, TenneT must be able to use (or continue using) a strip of land around the high-voltage line. This strip (called the property right strip) has been defined based on the amount of space required for construction and operation. For this, safety
requirements were taken into account.

For the use or continued use of the land in this strip, TenneT will conclude a property right agreement (including a user's agreement) with the owner, any other parties with property rights (long-term leaseholders, owners of building leases, etc.), and any private individuals with personal rights (tenants, lessees, etc.). In these agreements, the arrangements agreed for the use of the land, the compensation, and the rights for future compensation the entitled party will receive from TenneT will be laid down. A property right is a right to a building; it is an independent right that encroaches upon the exclusive usage right of the owner and other parties with property rights.

- **Acquisition of a property**

If essential use of the land for construction and operation of the high-voltage line encroaches upon the exclusive usage right in a way that fundamentally affects the functionality of the property for its current usage, the establishment of a property right as described above will not suffice. In such a situation, the interests of an entitled party reasonably require the expropriation of the property concerned. Therefore, TenneT will wish to acquire the property in such cases.

Under the magnetic field precautionary policy, TenneT will further offer owners and other parties with property rights who personally use the homes an opportunity to sell the property to TenneT voluntarily.

- **Amendment of planning regime**

To construct and operate a 380kV high-voltage line, it is almost always necessary to amend the land use plan and accompanying regulations.

These amendments will be laid down in the National fitting-in plan and may result in damage being incurred by stakeholders (owners, other parties with property rights, and people with personal rights) in the proximity of the high-voltage line. This kind of damage is called planning-related damage.

- **Performance of work**

The construction (including preparatory studies and activities) and operation of the high-voltage line may occasionally cause material damage, despite precautionary measures being taken to prevent such damage to the fullest possible extent. This kind of damage is called work-related damage.

**Setting of compensation**

This chapter explains each type of damage that will qualify for compensation in the Randstad 380 kV project and how the level of compensation will be determined.

The general principle (in the Netherlands) is that everybody bears his own damage, unless Dutch law provides for compensation for it. Furthermore, compensation is always based on an authorized party acting fairly in fulfilling its duty to limit damage as far as is possible. Finally, it must be noted
that only damage assessable in money will be compensated. In principle, this will be done by paying out a cash amount.

- Establishment of property right

When establishing a property right, TenneT applies the principle of providing full compensation as provided for under the Public Works (Removal of Impediments in Private Law) Act (BELWP). Full compensation means that the entitled parties must be in an equivalent capital and income position before and after establishment of the property right. In principle, compensation is provided whenever damage occurs. However, the damage must be a direct and essential consequence of establishing the property right.

Main damage components when establishing a property right
- Capital damage on conclusion of a property right agreement
- Annual income damage
- Additional damage on conclusion of the property right agreement
- Damage that on conclusion of the property right agreement, is unforeseeable and/or indeterminable (future damage)

Besides the above compensation, the entitled parties will receive from TenneT reimbursement of the fees payable for conclusion of a property right agreement. This reimbursement will consist of a flat rate amount plus an amount linked to the percentage of the parcel of land that falls within the property right strip.

- Acquisition of property

As with the establishment of a property right, TenneT applies the principle of providing full compensation when acquiring a property. In that case, the damage must obviously be a direct and essential consequence of acquisition of the property. The difference compared with establishment of a property right is that compensation occurs once only at the time the property is acquired.

**Main damage components in the case of acquisition**
- Capital damage
- Capitalised annual income damage
- Additional damage

The scale of the damage components will be determined by means of an expert valuation.

- Amendment of planning regime

The basis for providing compensation towards plan-related damage is Section 6.1 of the WRO. This kind of compensation occurs only if damage is in the form of a loss of income or impairment of the value of property because of a change to the planning regime that causes a planning-related disadvantage to a party concerned. Incidentally, not every planning disadvantage results in damage.

Compensation is only awarded insofar as the damage should not reasonably remain for the account...
of the applicant and insofar as the compensation is not sufficiently ensured in some other way. The latter will be the case, for example, on the establishment of a property right, acquisition of properties, and compensations under the magnetic field precautionary policy. In these cases, there will be complete compensation for damage, including compensation towards damage caused through planning decisions.

If compensation is awarded, the costs reasonably incurred for legal assistance and other expert assistance will be reimbursed, as will the statutory interest from the date of receipt of the application.

Assessment of the planning-related disadvantage arising from the Randstad 380 kV project necessitates a comparison between the maximum possibilities of the old planning regime – the existing land use plan (BP) – and the maximum possibilities of the new planning regime – the National fitting-in plan. It is not about what is actually present, but about the maximum that is or was permissible in a planning sense.

The WRO provides for compensation towards planning-related damage and not complete reimbursement for such damage. The basic principle is that damage that falls within the normal public risk will remain for the account of the party concerned. If the damage is in the form of loss of income, a fixed part will in any event remain for the account of the party concerned. This concerns 2% of the income immediately before occurrence of the damage. For damage in the form of the impaired value of real estate, 2% of the property value immediately before occurrence of the damage will in any event be for the account of the party concerned. Incidentally, the fixed percentage does not apply if the impaired value results from a disadvantageous amendment to the land-use plan of the real estate or its associated regulations.

Finally, determination of the compensation towards planning-related damage must take into account the active and passive acceptance of risks as well as the settling-up of the benefits.

The size of the compensation towards planning-related damage will be determined by an expert valuation.

- Performance of work

The basis for providing compensation for any work-related damage is a property right agreement or Article 6:162 of the Netherlands Civil Code (BW) that concerns a wrongful act.

Work-related damage consists of damage caused by construction work or damage to crops. This might include the unusability of parts of parcels of land for a prolonged period of time and damage to the soil structure due to the presence of building sites, removal of fencing, and very occasionally cracks in buildings or other structures caused by pile-driving, or the drying up of crops because of a drop in the groundwater level.

This damage is not confined to the property right strip, but may also concern properties in the immediate vicinity of the work. The compensation will go to the party that incurred damage at the time of occurrence of the event that caused the damage.
To determine the work-related damage, there will first be an examination of the existence of a causal relationship between the damage and the performed work. If a causal relationship is found to exist, there will then be a determination of the scale of the damage caused by construction work based on an expert estimate of the costs required to restore the damaged property to a condition equivalent to the one that existed prior to the work. The scale of crop damage will be determined based on the widely known and accepted 'Gasunie rates'.

Procedures

The procedures for establishing a property right, acquiring a property, dealing with an application for compensation towards planning-related damage and handling work-related damage are illustrated in Table 3-1.

Table 3-1 Procedure for establishing a property right and acquiring a property

<table>
<thead>
<tr>
<th>Identification and notification of owners/property rights owners by TenneT</th>
<th>↓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visit and explanation by land agent/real estate agent</td>
<td>↓</td>
</tr>
<tr>
<td>Visual survey and inventory of individuals with personal rights by land agent/real estate agent</td>
<td>↓</td>
</tr>
<tr>
<td>Assessment of compensation by land agent/real estate agent</td>
<td>↓</td>
</tr>
<tr>
<td>Making of offer by land agent/real estate agent</td>
<td>↓</td>
</tr>
<tr>
<td>Binding valuation by three experts, if applicable</td>
<td>↓</td>
</tr>
<tr>
<td>Property right agreement or duty of acquiescence under the Public Works (Removal of Impediments in Private Law) Act (BELWP)</td>
<td>Purchase agreement or expropriation (if property is required)</td>
</tr>
</tbody>
</table>
4 AUSTRIA

Verbund - APG is the biggest TSO in Austria. It operates only the 220 kV – 380 kV voltage levels. This grid is not as meshed as in other countries and it is desired to close the EHV circle in order to increase the security of supply. To this purpose, two lines are currently under development of 100 and 50 km length respectively (Figure 4-1).

4.1 Authorization procedures

4.1.1 Environmental Impact Assessment (EIA) procedures

The Environmental Impact Assessment (EIA) for overhead lines is compulsory when exceeding 15 km route length and starting from 220 kV. This procedure takes an enormous time and effort in order to be completed. As duration, the report should take app. 1 year. The costs implied by the EIA are very high, at present app. 40% of the whole project’s costs.

4.1.1.1 EIA Contents

The steps in the realization of the EIA are:

A. Application
B. Technical description and plans
C. Environmental Impact Declaration (EID)

The EIA must present a synopsis and the contributions of the project. These contributions are illustrated in Figure 4-2. The need for building a new line including the option of no new line must be explained in the EIA. Important attention is given to electromagnetic fields and human health as people seem to be concerned with these issues. It can be concluded that the EIA procedures are very complex and include many topics.
4.1.1.2 Authorization process
In Austria there is only one authority supervising the authorization and license processes. The first instance is the local government and the second instance is represented by the National Court. In theory the 1st and the 2nd instances should take together app. 18 months. The Austrian Environmental Impact ordinance defines the procedure as: 9 month 1st instance + 6 months 2nd instance = 15 months. Adding the time for postal services and for appeals this makes a total of app. 17.5 months (Figure 4-3).

It should be noted that every party has the right to present new facts any time. Therefore, in practice unfortunately it takes much longer as the official timetable is not kept (Figure 4-7).

The stakeholders involved in the Austrian EIA procedures are illustrated in Figure 4-4.
4.1.1.3 Some obstacles during the EIA procedure

It is a well known fact that the construction of transmission lines lags behind changes on production side or market changes due to unreasonable duration of permitting procedures. During these procedures several obstacles that cause major delays can be encountered:

- Social acceptance: Transmission lines are not considered as necessary - the public interest of security of supply is only promoted by TSO
- No clear limit values: e.g. for EMF
- Lengthy discussions on the use of other transmission technologies (e.g. cables)
- No possibility to favour high-priority-projects (e.g. TEN-projects) in national authorization procedures
- Lack of land use regulation regarding infrastructure projects
- High planning and permit risk in procedures
- Gold plating (special term that states that the Austrian law has a higher standard than the one requested by the EU)

4.1.1.3.1. Opposition from local population – refusal of land owners

The strongest opposition is usually the one of local population. Local communities are dominated by a strong regional thinking and they do not accept inter-regional energy trade. Instead of additional 380 kV they demand local power generation by renewable energy.

Moreover, the public is not keen on the liberalized market as it does not see any benefits coming from that. People consider that “Market” is strongly related to “Transit” and therefore it only brings profit to producers, traders and grid operators and nothing good to themselves. Hence there is a negative association between “market → transit → transmission line”. In addition to that, opponents and land owners fear import or transit of nuclear energy.
4.1.1.3.2. Objections to Electromagnetic Fields (EMF)

Although the International Commission on Non-Ionizing Radiation Protection (ICNIRP) recommends 100 µT as an exposure limit for EMF, in Austria no binding values exist. This is also available at European level where no legislation regarding the EMF limits is available.

Hence, as a result of the EIA, APG is forced to keep 1µT for sensitive areas (Figure 4-5). Moreover, there are some “so-called experts” who take the authorization procedure as their personal stage creating a postulation of extremely low values for magnetic fields – 0.05 µT.

![Figure 4-5 EMF limits used for the EIA in Austria](image)

4.1.1.4 Legislation and the authorization process

Austrian legislation very often overshoots the European legislative. The Austrian Environmental Impact Ordinance requires an “Environmental Impact Expertise (EIE)”, which should cover all areas of protective goods. The preparation of the EIE is enormously time consuming and causes a massive delay in the authorization process.

Unfortunately, there is no appropriate evaluation of values between environmental issues and the public interest for security of supply. In addition, new expertise can be presented at any time from all parties, leading to an endless “ping pong” between experts.

Another problem that causes delay is that authorities are not suitably prepared for a project of 100 km length and with 1,500 concerned parties the manpower being insufficient. Because of that it is not surprising to see staff working in parallel on different EIA projects.

In Austria, European thinking is very often hampered by national restrictive measures - “National and regional Screening Layer”. There is insufficient support from politicians for transmission line projects and the duration of authorization does not follow the schedule set by law.
4.2 Experience with recent and current main transmission line projects in Austria

As already mentioned before, there is a need to close the Austrian EHV circle in order to increase the reliability of the transmission grid, the sustainability of the power system and the security of supply. To this purpose, two important transmission projects were proposed [12] (Steiermarkleitung and Salzburgleitung) and they are illustrated in Figure 4-6. In this section the Austrian experience with these projects will be presented.

Salzburgleitung 1:

- 1. Instance 100% OHL (Regional Body)
- 2. Instance 100% OHL (Environmental Senate)
- No suspensive effect
- Construction started E 2009

Salzburgleitung 2

No application for EIA yet

Steiermarkleitung:

- 100% OHL
- In construction since 2007
- Commissioning: Summer 2009
- In Operation

Figure 4-6 Status of the main transmission line projects of Verbund APG

4.2.1 The Steiermarkleitung line

In Figure 4-7 an overview of the timetable to-date for the authorisation process of the Steiermarkleitung line is illustrated. It can be seen that the time for this project (status early Feb. 2007) is 2.1 times longer than the procedure foreseen in the statute (17.5 months). This line has been inaugurated in September 2009. The construction of the Steiermarkleitung line lasted from October 2007 to May 2009. Hence the overall approval procedures, EIA and Supreme Court, lasted around 45 - 46 months, meaning less than 4 years. This overhead line of approx. 97.80 km is very important as it closes the gap in the south-eastern high-voltage ring and secures the power supply in southern Austria. It is important to mention that this project was of high importance for the European Union being one of the Trans-European energy networks financed projects.
4.2.2 380 kV Salzburgleitung

The 380 kV Salzburg line [13] is one of the most important infrastructure projects of the present. It replaces the 220 kV line from St. Peter am Hart (Upper Austria) at the substation Tauern Kaprun (Salzburg).

The powerful Austrian transmission grid is characterized by its circular arrangement, this making possible supplying power from both sides. By constructing the Salzburg line, the Austrian 380 kV ring – the backbone of the domestic supply – will be finally closed in western Austria.

This is a TEN-project, but not cross-border, which connects pumped storage plants to the rest of European grid. It is formed by two parts, Salzburgleitung 1 and Salzburgleitung 2.

EIA in Austria has higher standards than in the rest of EU. As an example stands the Salzburg region, which has their own local legislation for cabling requirements $\geq 220$ kV under special conditions, such as a minimum 200 m from single housing.

Due to recent changes in the regional electricity law in Salzburg that were adopted on the 17th of December 2008 by the Salzburg parliament, the requirements for building new transmission lines have been made more strict and new obstacles in the approval procedures for Salzburgleitung 2 have appeared.

Article § 54a of this law contains the following crucial points:

- Power lines have to be erected using underground cables when the following preconditions and boundary conditions are fulfilled (par. 2):
  1. Nominal voltage $> 110$ kV
  2. In “sensitive areas on technically and economically efficient sections”
  3. If an existing line has to be moved more than 10m
  4. When the transmission capacity is increased

- “Sensitive areas” apply to the following areas:
  - Less than 400 m distance between a power line and “land allotted to urban development”
  - Less than 200 m distance between a power line and “single placed houses”.

This part of the Salzburg’s electricity law was copied from German laws without reasoning about the difference between the Salzburg area and the respective German regions. As Salzburg is a
mountain region it is exaggerate to put such restrictions on new OHL and to force the usage of underground cables.

4.2.2.1 380 kV line project: Salzburgleitung 1

The project has an entire length of approx. 46 km and required the dismantling of approx. 64 km of 220/110-kV-lines.

Fortunately the authorization procedures for this segment of the Salzburg 380 kV line were not influenced very much by the changes in the local legislation. Therefore the construction of Salzburgleitung 1 was approved as completely overhead line and it started at the end of 2009.

4.2.2.2 380 kV line project: Salzburgleitung 2

This project has an entire length of approx. 133 km and required the dismantling of approx. 235 km of 220/110 kV lines.

At present no application for the EIA of this line has been made. There was an intensive discussion on the comparison between OHL and underground cables. Consequently several studies were carried out by Prof. Oswald from KEMA and APG replied based in this research. However the enforcement of the electrotechnical law (LEG) by the regional government of Salzburg gives more weight to the underground cable variant and adds more delays in the process of selecting the corridor for Salzburgleitung 2.

As this project is of European interest, the EU Coordinator Georg Wilhelm Adamowitsch is supervising the whole process and tries to help in accelerating the authorization procedures. In order to reach consensus on the building of Salzburgleitung 2, working groups between APG and the local governments have been created and the communication with the population has been intensified.

Figure 4-8 illustrates an application of the new local electrotechnical law at “Salzburgleitung 2 – route”. The original OHL route has been modified with minimum cabling based on the LEG.

The final line corridor is still under discussion and in case of a possible conflict with national law, this whole process may end up may end up at the Supreme Court.
4.2.3 Improvements to speed up projects

In order to speed up the authorization procedures for important transmission projects, improvements should be made in the regulatory regime. Support from national and regional political bodies for projects of European importance (TEN-projects) is mandatory.

Moreover an appropriate evaluation of values between environmental issues and the public interest should be clearly made within the EIA.

A solution would be also to adopt a coordinated planning approach by establishing corridors specially designated for infrastructure facilities (electricity, gas, oil, highways, etc).

Harmonization between the EU-legislation and the national legislation is needed. There should not be any overshooting of European requirements through national laws. To that purpose also European wide standards on EMF are needed in order to clearly define the exposure limits.

Communication and information for population should be intensified and workgroups with local politicians should be organized. The purpose is to create a better understanding of the need to build new transmission infrastructure and to reduce the opposition and reach consensus on the corridor for the new line.
5  ITALY

TERNA is the Italian TSO and owns more than 98% of the national transmission grid. The national transmission grid is formed by three separate meshed systems which are interconnected, each one having a different voltage (132/150, 220 and 380 kV).

On a yearly basis TERNA draws up and submits for approval of the Ministry a Grid Development Plan, setting the internal and interconnection lines, differentiated between works related to extensions of the existing national grid and new interventions to be realized on a short medium term (within 5 years) and long term period (more than 5 years). The criteria for the development of the grid are defined in the Grid Code and the Regulator verifies the compatibility of the Grid Development Plan with the criteria set into the Grid Code. The EC Directive 2001 was adapted in the national law.

The Ministerial Decree from 20.04.2005 stipulates that the following requirements are fulfilled on the planning horizon of the Transmission Development Plan:

- Ensuring security, reliability and continuity of the electricity service
- Responding to the growth of electricity consumption
- Enabling new power plants to access the grid
- Overcoming transmission capability limits between various areas
- Increasing interconnections with foreign countries

5.1  Authorization procedures

In Italy the authorization procedure is done, as a first step, for the whole development plan at once. The process is illustrated in Figure 5-1.
After consulting the stakeholders and after approval of Transmission Development Plan (TDP) by Terna’s Board of Directors, the Strategic Environmental Assessment (SEA) Procedure is started. Clear time steps are defined for this procedure. The Preliminary Report should be developed in 90 days. After that, the Public Consultation is the moment when every party can comment and it lasts 60 days. When the SEA is finished a preliminary advice by the ministry is given and then the approval and final decision regarding the TDP have to be made in 60 days.

Every 2 months there is a meeting with the consulting committee, preliminary, not binding. The timeline in Figure 5-1 is fixed by law. However, in practice project time plans are forwarded to the ministry for the next year before current one is accepted. The transmission plan for 2009 was only authorized on 20 January 2010. Hence the 2010 plan was approved internally before having the authorization for 2009 complete.

In the next section the SEA procedure [14] will be further explained.

**5.1.1 Strategic Environmental Assessment of the development plan**

Terna as the National TSO applies on its own TDP the Strategic Environmental Assessment procedure (SEA) as stipulated by the Directive 2001/42/EC and by the Part II of the D.Lgs. 152/2006 as it was modified by the D.Lgs. 4/2008. Hence the SEA objective is the “integration of environmental considerations into the preparation and adoption of plans and programs which are likely to have significant effects on the environment”.

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**Figure 5-1 Approval procedure for the Transmission Development Plan in Italy**
The SEA represents for TERNA an instrument able to promote a sustainable and environmental friendly development of the transmission grid, shared with the Regions and the Local Authorities through the instrument of Consultation. To this purpose TERNA has created from the end of 2005 a National SEA Coordination Committee between Ministers, Regions and TERNA.

Discussion can promote environmental and territorial protection, facilitating authorization procedures for the planned interventions and their well-timed implementation.

The SEA process of the Development Plan is divided into the stages represented in Figure 5-2.

The SEA is an evaluation process integrated with the planning process, and having its own vision: in the Environmental Report it is explained how the environmental dimension is integrated in the plan, also with the purpose of creating conditions for environmental experts and for the interested public to express their opinions and to propose contributions. The Environmental Report is the key document of the SEA process. The content requested by the legislation regards the significant impacts that the implementation of the plan could have on the environment and on the cultural heritage.

The Development Plan tries to achieve sustainability by considering, relating and evaluating stakeholder’s different needs with respect to the electrical need, namely environmental, territorial, technical, social and economic. The process for identifying location for new power lines evolves through the years, based on proposing, assessing and sharing alternative solutions with stakeholders at different levels (Figure 5-3).
In line with the Directive 2001/42/EC on the coordination with the Environmental Authorities, TERNA launches a series of institutional agreements prior the consultation phase, on the location of the electrical infrastructure in the TDP. The regions and provinces sign the SEA Protocol with TERNA before the authorization procedure begins in order to reduce delays due to objections of local population.

5.1.2 Italian Legislative Framework of the Authorization Procedure

Apart being put inside the Transmission Development Plan, every project of development is then subjected to a complex authorization procedure. Anyway, over the last years the procedures for building new lines have been reviewed in order to speed up the administrative process to get all the authorizations and permissions needed for the construction of the new transmission facilities. Indeed, since the year 2002 the Authorization procedures were reviewed as provided into the:

- national Law n. 443/2001 concerning the strategic infrastructures in Italy (so called "Legge Obiettivo") as well as the following Legislative Decree n. 190/02, introducing a simplified authorization for the strategic infrastructures, outlined by the national Government and listed in the national law;
- national Law n. 239/2004, containing the reform of the energy sector, providing one single authorization procedure and one single consultation process and public debate for the requested formal advices of all the concerned authorities affected by the new transmission line.

The main aims of the new legislative framework are:

- to conclude the authorisation process within 6 months;
- in case of projects for which EIA is requested, to include the positive EIA into the framework of the Simplified Authorization procedure or in the Single Authorization Procedure.
to include a Declaration of Public Utility into the Authorization Decree aimed at giving the proof that the infrastructure is urgent and cannot be delayed as well as the tools to make any necessary compulsory purchase to build the line.

5.1.2.1 Description of the Authorization Decision Making Process

1st step: the Preliminary Project in consultation with the local Authorities

This activity is not foreseen into the law but it is carried out as an effective measure to speed up the following steps of the authorization procedure. Moreover it is in accordance with the SEA procedure. It consists of making technical and environmental preliminary feasibility studies and identifying the areas potentially involved by the lines (called "corridors") on the basis of the existing constraints (such as landscape, protected and urban areas and so on) and preferential routes for the new transmission lines.

The preliminary study is submitted to the Region and local Authorities for any observation in order to previously agree with them the location of the line.

2nd step: the request for the Authorization (including EIA)

One of the most critical elements of the Authorization Procedure is to get the EIA.

The EIA is carried out both at National (by the Ministry of Environment) and Regional level (competent regional authority), depending on the voltage level and on the length of the infrastructure.

Transmission lines are subjected to:

- National EIA, issued by the Ministry of Environment, for **overhead lines**, if the length of the lines is **higher than 15 km**, for **cables**, if the length of the lines is **higher than 40 km**;
- Regional EIA, issued by the competent regional Authority if the length of the lines is **less than 15 km** and stands on particular protected areas.

The output of EIA is granted in the framework of the Authorization process.

The Authorization process starts with:

- the submission by TERNA of the request for the Authorization together with the technical project (including the list of the interventions to be realized) to the Ministry of Infrastructures, to the Ministry of Productive Activities, to the Ministry of Environment and to all the concerned Regions together with the EIA study as well as to the local Authorities;
- the registration of the technical plan and the EIA study in order to inform the local communities of the starting of the Authorization procedure and to allow all the concerned parties to express opposition, if any;
- within 6 months from the request of Authorization, public hearing (called: "Conferenza dei Servizi") is carried out with all the concerned Authorities in order to get the advice and
observations by all the parties involved. In the meantime the EIA is granted by the Ministry and the Regions;
- in case the public hearing ends with a positive opinion of the Region and of the majority of the concerned Authorities, the Authorization is granted and made public through the publication in the Official Journal.

Real times are indeed longer than the ones indicated, a procedure not requiring EIA takes usually more than 12 months to obtain the authorization; procedures requiring EIA take usually more than 2 years to obtain the authorization (for instance Benevento-Foggia 380 kV single-circuit is under authorization procedure since more than 3 years).

5.1.2.2 Standards, procedures and practice regarding EMF exposure

Among the environmental problems, particular attention is nowadays given to EMF exposures and strong opposition to building of new lines arise from population due to EMF, though the respect of national limits which are more precautionary than the ones prescribed by European Union.

Clause 3 of Italian Law 36/2001 defines with reference to plants with frequency of exercise between 0 Hz and 300 GHz (included power-lines and radio electric plants):

- **Exposure limits**: values of electric, magnetic and electromagnetic field, as assessed to protect human health from acute effects, which shall never be exceeded in every exposure conditions;
- **Attention values**: values of electric, magnetic and electromagnetic field which shall never be exceeded in houses, schools, and places assigned to a long human presence (where people are staying for 4 hours or more per day);
- **Quality objectives**: values of electric, magnetic and electromagnetic field in order to gradually minimize the exposure to the electromagnetic fields in houses, schools, and places assigned to a long human presence (where people are staying for 4 hours or more per day).

Moreover the Law introduces the concept of **respect widths** for power-lines as the space where the presence of any building where people are staying for 4 hours or more per day is forbidden.

The following D.P.C.M. 08/07/2003 sets for power lines (50 Hz):

- **exposure limits** at 100 μT for magnetic induction and 5 kV/m for electric field;
- **attention value** at 10 μT for magnetic induction;
- **quality objective** at 3 μT for magnetic induction.

The same D.P.C.M. explains that respect widths refer to **quality objective** and are calculated with the maximum continuous operation current (ref. § 2.6 Italian Technical Standard CEI 11-60) and that **quality objectives** must be respected:

- by new lines towards existing buildings (areas where there’s the possibility of daily exposure of population not less than four hours)
• by new buildings (areas where there’s the possibility of daily exposure of population not less than four hours) towards existing lines;

Attention values and quality objectives must be considered as the median of the values on the 24 hours of the day in normal operation conditions.

Exposure limits, attention values and quality objectives are valid for the whole country, though some Regions defined, in some case, more restrictive limits; indeed these different values introduced by Regions were judged illegitimate (judgement of the Constitutional Court, n. 307 of 7.10.2003).

As already mentioned, through the respect of national limits, population is scared by overhead power lines for the effects of EMF. That’s why TERNA receives continuous requests of burial of power lines and finds a strong opposition in particular against construction of new overhead power lines.

(For more information on the Italian legislative framework and methodology for calculations see the paper “Italian legislative framework on EMF: quality objectives and respect width. Study of mutual influence of parallel overhead lines in dimension of respect width” of M. Rebolini, P. Paternò, A. Guarneri, S. Barnaba, S. Madonna - CIGRE’ Session Sarajevo 2009).

5.1.2.3 Refitting, upgrading or rebuilding

Refitting, upgrading or rebuilding was until now subjected to the same procedures as new lines. A simplification was introduced recently (Law 99 of July 2009 and Law 41 of March 2010) in order to introduce simple communications in case of short modifications (till 1500 m of length and maximum shifting of 40 m from the original route) if similar characteristics of the components are maintained and the chance of upgrade until 380 kV the existing tie-lines between Italy and neighboring countries using simple communications, in the respect of all environmental laws.

5.2 Compensation schemes used by TERNA

Compensations are all the measures/actions to reduce the impact of new infrastructures that may be linked to a specific development project of the National Transmission Grid (NTG).

The “electrical measures”, beyond those already included in the Transmission Development Plan, are not “compensation”, although aimed at increasing environmental compatibility. These can be arranged with the local authorities involved.

The electrical measures - already defined in the preliminary phase - are:
- Rationalization (dismantling of part of line, reducing right of way, ..);
- Using technology more environmentally friendly (special pylon, ...);
- Optimization of the route of the new and existing lines;
- Adoption of techniques for reducing electromagnetic field (EMF) (eg optimization phases, raising pylon, etc.);
Compensatory measures include the following types of requalification, provided as compensation for the impacts of the new infrastructures, could be

- environmental requalification;
- urban requalification;
- EMF Monitoring Systems.

In particular, the environmental requalification is:

- vegetation interventions (planting);
- devices for the birds monitoring;
- extraordinary maintenance of rural road;
- funding for monitoring the environmental impacts (relatively EMF);
- recovery and restoration of ex-quarry;
- interventions to mitigate the effects of road infrastructure;
- accommodation of the woods
- restoring forest tracks;
- etc.

the Urban requalification is

- accommodations and road works (maintenance, foundations, sidewalks, road signs);
- urban requalification of the historic center;
- requalification municipal park;
- installation photovoltaic plants
- etc.

The maximum cost for compensation is defined for each intervention as 6% of capital expenditure (CAPEX) of the new development project included in Transmission Development Plan. This rate corresponds to the maximum approved by Italian Regulator, Resolution December 29, 2007, n. 348.

5.3 Experience with recent and current main transmission line projects in Italy

Example of the new Turbigo-Rho 380 kV transmission line

The need of the interconnection

The need of a 380 kV transmission line between the power plant of Turbigo, near Milan, and the substations at Ospiate and Bovisi was highlighted since the ‘90s. The absolute importance of the project was then confirmed by GRTN (now TERNA), that included it in the National Development Plan in 2001 as a top priority project, key to guarantee the required reliability and availability to the transmission network.

The expected advantages from the interconnection mainly consist of:

- overcoming of generation limits in the Lombardy region that are presently caused by transmission power limits in the local national transmission network
- Increasing the flexibility of the transmission system
- Reduction of transmission losses with consequent advantages from environmental and economical point of view
- Avoiding congestions consequent to the high power transiting in the area, partly due to the power imported from Swiss and France, thus increasing the power availability to better cover consumption needs
- Reinforcing the West-East transmission axis in the North of Italy

**A difficult route**

The new power connection runs for about 28 km in total, in the west suburbs of Milan, across a highly populated area and where environmental important parks and protected areas are present.

Main design criteria adopted for choice of the route for the overhead line is to avoid or to minimize the crossings of protected areas (environmental constraints, landscape issues, etc.), urbanized areas (even where residential buildings are planned for the near future), and those zones presenting soil instabilities (flooding mud, erosion, overflowing).

A further critical issue that had to be considered was the limit imposed to EMF by the Italian law: 5 kV/m for electric fields and 3 microT for magnetic fields at sensible receivers (i.e. where people live or work).

Considering all the mentioned restrictions the ambient conditions of the suburbs nearby Milan, finding a suitable corridor for a 380 kV class overhead line was quite difficult.

**The approval process**

The approval process for the realization of an overhead transmission line was started by ENEL in 1994. In 1996 the confirmation of the environmental compatibility was obtained, subject to few modification of the proposed design. However, in year 2000 the approval process was definitely stopped due to the opposition of the local communities involved.

In consideration to the strategic importance of the interconnection, TERNA evaluated alternative solutions, including possibility of undergrounding part of the interconnection.

Consequently, in 2003 the project was reviewed with the following modifications:

- Proposing use of underground cables in the most urbanized area, between Pogliano Milanese and Rho.
- Modifying route and proposing new design solution for the overhead portion of the line, to overcome previous opposition from the local communities involved.

The fact that the realization was included in the strategically important items related to the national transmission network had permitted to adopt a simplified authorization process, according to the Italian legislation that was in the meantime issued (known as “Legge Obiettivo”).

Following the presentation to the Authorities of the revised project, including a new Environmental Impact Assessment, mainly relevant to the variations proposed as above described, the obstacles to the realization of the projects and the opposition from the local communities were overcome.

The final approval was obtained in September 2004; the final decision was supported by the proposal of financing a socio-economical and environmental plan in the area.
The adopted solution

Meshed line

The final solution for the new 380 kV connection “Turbigo - (Rho) - Bovisio” is a meshed system, including overhead lines and underground cables, as follows (see Figure 5-4):

- A 20 km long segment of single-line overhead between Turbigo Power Station and the town called Pogliano Milanese, replacing the existing 220 kV connection “Turbigo - Ospiate”, which will be dismantled;
- A transition compound between OHL and underground cables, in Pogliano Milanese;
- A cable section 8.4 km long between Pogliano Milanese and Rho, consisting on two three-phase circuits in parallel;
- A transition compound between underground cables and OHL, in Rho;
- Use of an existing 380 kV OHL which is linking Rho and Bovisio (currently a double-line 380 kV overhead is in operation, connecting Baggio and Bovisio, forming the links “Baggio - Bovisio” and “Baggio - Ospiate - Bovisio”).

![Figure 5-4 The principle scheme of the new 380 kV meshed line](image)

One of the main goals during the design stage has been to maximize the power carrying capacity of the entire connection. For the OHL, the reference standard in this case has been the three-wire conductor (31.5 mm diameter, 585 mm² cross section) widely used in Italy for the 380 kV network.

The adoption of the described meshed solution, including a 8.4 km long double circuit underground cable section, is possible also because the local power network is well interlocked and the short circuit power is sufficiently high to allow the cable section (a highly capacitive component for the system) not to introduce any possible disturbances and any consequent additional works for a reliable voltage control.

Circuit route

A scheme of the entire route is shown in following Figure 5-5.
The overhead section is about 20 km long with a single circuit on delta-type poles (in accordance with TERNA’s standards).

The underground section between the transition stations is mainly running along roads owned by local authorities (Province of Milan, municipalities) with many crossings (roads, rivers, gas pipes, MV cables, railways, etc.).
RTE is the French operator of the public electricity transmission system and it is responsible for managing, operating and developing the French power grid. Hence RTE clearly has a territorial planning role, which requires the company to work closely with the wider community when implementing its projects, especially when it is looking to establish and integrate its installations.

The issue of network development is actually closely linked to that of public environmental concerns. Consequently, a number of local players (elected representatives, Government departments, socio-economic players, associations, etc.) all have their own part to play, right from the early stages where potential problems facing the network and the electric solutions likely to resolve them are identified, through to the consultations regarding specific network development projects. A specific consultation process takes place, during which the construction of these installations and their integration into the surrounding environment are discussed. It is conducted under the aegis of the local prefect (an administrative Government official local representative), along with elected representatives, socio-economic players, Government departments, environmental protection agencies and local residents.

Increasing public concern over environmental issues has led to calls for greater transparency in planning for new installations, and a bigger role for elected representatives, socio-economic players, associations and the general public in the decision-making process.

Discussions between all the parties concerned by a project and the company actually responsible for it are a chance to highlight collective and individual expectations, particularly as regards the environment and living conditions. They are also a response to increasing demands by the public and local authorities to play an active role in the decisions that affect them. The company responsible for any project must therefore meet two requirements. Firstly, it must be able to show that a project is going to be of benefit to the public, by explaining how it is justified, both technically and economically. Secondly, it must demonstrate both its capacity to take account of the specific requirements of the local area when designing its projects, and also its expertise in integrating installations into the surrounding landscape to reduce their impact.

RTE has sought to demonstrate its constant quest to balance the general interest inherent to a power infrastructure with the need to take account of social and environmental concerns, as well as its commitment to having a consistent nationwide framework. For this reason, back in 1992 the operator joined with the Government to sign an agreement on "Power Networks and the Environment", covering network developments. Over the last 12 years, the agreement has been periodically renewed, and RTE's commitments are now incorporated into the "Public Service Contract".

RTE is also trying to reduce the environmental impact of the public transmission system. It also attaches great importance to strengthening and extending the consultation process to cover every stage of a project, with the aim of finding shared solutions with local players, and is committed to implementing a "Project Support Programme" for every overhead line project. The PSP is designed and managed regionally, so that in addition to RTE's own efforts to integrate its installations into the environment, the company also works with local players to identify various support measures for boosting the local economy.

**The strengthening of regional and local dialogue** has been one of RTE’s commitment with the French State since 1992, which has been renewed in 1997, 2001 and 2005 in order to give a
response to a strong environmental and social requirement of public, associations, local economics and policies actors and elected representatives. Increasingly, local and regional actors seek to influence decisions as earlier as possible in the land planning process.

The concertation – leaded by the regional government’s representative (Préfet) – allows to:
- Submit the transmission line project to the local actors,
- Identify the specific environmental features and cultural identity of the region,
- Define with the local actors the best route environmentally speaking for the new transmission line, so that it fits perfectly in the landscape,
- Define mitigation measures with regards to the new constraints brought by the project in order to reach an environmental well-balanced route,
- Build step by step the “environmental impact assessment ” which will be submitted to the “public administrative inquiry”

6.1 Authorization procedures

The steps of a project [15] are illustrated in Figure 6-1. These steps will be further explained.

![Figure 6-1 The steps of a project](image)

6.1.1 The technical-economic justification

The whole project is submitted to different authorities before being accepted.

For each project proposed by RTE, the regulator must make sure that the works meet the criteria of general interest, particularly regarding the service rendered, how the environmental issues are considered and cost. To this end, RTE submits to the regulator a record of technical-economic justification which illustrates the advantages and disadvantages of each studied solution and explains its choice.

For rail projects and 225 - 400 kV lines this record is verified by the Directorate of Demand and Energy Market (DIDEME), Ministry of Industry, whereas for the line projects of 63 and 90 kV and locations of all substations it is checked by the concerned Regional Directorate for Industry, Research and Environment (DRIRE).
This file allows the regulator to verify that the project is consistent, especially with the projected long-term trend of electricity consumption and with the data from the development scheme.

If the regulator finds this case admissible, RTE provides a presentation file in which he suggested the search of a site (for substations) or of a path (for lines), called “area of study. If this file is accepted also by the administrative authority, it shall support the consultation which can then be initiated.

6.1.2  The consultation - dialogue

Depending on the project’s size, the concerned citizens can intervene through public debate. The public debate is a procedure established by the legislature, allowing the public to be involved in upstream decisions, development projects with high socio-economic issues or having a significant impact on the environment or on spatial planning. The public may comment on the appropriateness of the project.

The intervention of the CNDP

Under the "Barnier Law" on environmental conservation, which came into force on 2 February 1995, a wide public consultation can be organised to discuss the opportunity, objectives and principal features of major planning operations deemed to be in the national interest. This consultation takes place at the design stage, well before any construction work begins.

The Law of 27 February 2002 on “Démocratie de proximité” and the Decree of 22 October 2002 on the organisation of public debates and the National Public Debate Commission (CNDP), independent administrative authority, give the general public the chance to exert a much greater influence on major planning or construction projects, well before any actual decisions are made. Composed of 21 members (politicians, judges, representatives of civil society and qualified individuals), it is the critical point of the public debate.

The French regulatory provisions are based on the Aarhus convention, on public access to information, public participation in decision-making and access to justice in environmental matters. The convention was adopted in 1998 and has been formally ratified by France.

Under the Law and the accompanying Decree, the CNDP can decide to organise public debates concerning plans to build 400 kV overhead power lines longer than 10 km1 and 200 kV overhead power lines longer than 15 km, for which RTE is required to refer to the CNDP.

Currently 3 projects of RTE as been concerned (400 kV France Espagne, 225 kV Lyon Chambéry, 400 kV EPR Cotentin Maine)

The regulatory process is made up of six separate phases:

- The referral dossier, a document drafted by RTE which summarises the project's objectives, main features, socio-economic importance and environmental impact,
- The CNDP's decision on whether or not to organise a public debate,
- Preparation of the public debate dossier by RTE,

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1 This criterion seems more stringent than that imposed on motorways or railway lines, for which public debates can only be organised for projects longer than 40 km or exceeding €300 M.
- Organisation of the public debate (led by a “Particular Commission for Public Debate” which depend on CNDP or by RTE) about the objectives and the main characteristics of the project.
- The debate report and results,
- RTE's final decision on the principle and conditions for continuing with the project, in the light of the debate's conclusions.

### 6.1.3 The declaration of Public Interest

At the heart of the administrative application procedure is the "Declaration of Public Interest" (known in French as a "DUP"). The purpose of the DUP is to confirm that the new infrastructure will be of benefit to the general public. The DUP acquired by RTE as part of its public service mission is issued by the administrative authorities. Specifically, it enables RTE to obtain the easements needed for building a new power line or expropriation for new substations, although it does not allow the company to begin work. These procedures can only intervene when, despite attempts by mediators of RTE, the concerned owners refuse to authorize the installation of transmission grid parts on their land.

Infrastructures can be officially designated as being "of public interest", where the specific benefits of the project itself are combined with other public or private benefits (cultural and natural heritage, agriculture, industry, urbanism, planning and national and regional development, etc.). A DUP is granted at the culmination of an administrative procedure, which is itself preceded by a wide consultation and followed by a series of administrative authorisations, corresponding to the technical, environmental and planning rules in force at the time.

Once the project impact study is completed, RTE can apply:
- to the Minister responsible for electricity, requesting a "declaration of public interest" for its planned new 400 or 225 kV line.
- to the regional government representative requesting a "declaration of public interest" for its planned new 63 / 90 kV line or electric substations.

When an environmental protected area is affected the Environment minister’s agreement is required. The DUP request involves consultation with mayors or local authorities affected by the project and with State services to enable them to assert their remarks. It also includes a public inquiry. Hence, the phases of the DUP procedure are:

i. Consultation of mayors and departments

All mayors whose territory is concerned by the planned line are consulted. The same is true for the various departments and services concerned (Government departments, concession-holders, etc.). This phase gives them the opportunity to comment on the project, as set down by an official Decree. It is overseen by a prefect responsible for co-ordinating the project. The mayors' and departments' observations are then sent to RTE. They may result in certain changes being made to the project, without affecting the overall budget.

ii. The public inquiry
The purpose of the inquiry is to inform the general public about the planned new infrastructure, and to enable them to play a part in the project before construction work begins. The environmental impact assessment is the keystone of the public inquiry, which is organised according to rules set down in the "Boucharadeau Law" of 12 July 1983. The prefect is responsible for organising the inquiry, which must cover at least all the municipalities concerned by the new infrastructure. The inquiry is carried out by a commissioner or commission appointed by the President of the Administrative Court.

During 1 month the public can take knowledge of the project and the “impact study”, in the town halls concerned. The “inquiry commissioner” or “inquiry committee” gathers and analyses observations from the public about the project, his impacts and mitigation measures which are proposed. RTE has to bring formal answers or propositions to the questions from the public.

At the end of this administrative process the inquiry commissioner or inquiry committee sends to the regional government representative (Préfet) a report presenting the inquiry process, and gives a reasoned opinion on the project. The drafting of the report and conclusions may take up to several months.

iii. Compatibility with planning documents

In some cases, the project may prove to be incompatible with the planning documents that define and prescribe the use of land (habitats, agriculture, industrial zones, infrastructures, etc.) in the areas concerned by the operation. If so, the planning code includes the provisions for a procedure to bring the project into line with these planning documents.

iv. Obtaining the "declaration of public interest" (DUP)

The prefect in charge of co-ordinating the project draws up a brief report summarising the results of the administrative consultation and the public inquiry. He or she also examines the responses provided by RTE, and then submits his or her opinion to the Minister responsible for electricity.

The DUP for 400 kV lines is then officially granted by the Minister, and co-signed by the Minister for Planning and Amenities, if the project needs to be brought into line with the requirements of planning documents.

This entire phase, which is part of the process of determining the new power line’s general route, usually takes between 30 and 42 months.

By using the “DUP” RTE is allowed to:
- Build towers and electric substations in private property if an out of court agreement hadn’t be found,
- Ask the mayors to carry out the compatibility of the town planning documents

6.1.4 The detailed project

Once the DUP is granted, RTE draws up a detailed project in order to determine all the technical aspects of the new infrastructure and its precise location on the land it is due to cross (pylon sites for overhead lines, exact site for substations). This phase is carried out in collaboration with the mayors of the municipalities crossed by the infrastructure, the concerned landowners, local farmers and Chamber of Agriculture, etc.
In addition to meeting environmental requirements, the detailed line route must also comply with technical regulations and planning rules. Consequently, RTE employs the following two procedures:

i. Approval of technical drawings

This procedure is governed by a Decree, and enables the authorities to obtain the agreement of the concerned departments and mayors, regarding the technical conditions in which the planned new infrastructures are to be built. It also provides an opportunity to check that the infrastructures meet the requirements of the Technical Decree currently in force (a Decree setting down the technical conditions to be met by electrical energy distribution systems: mechanical resistance, geometric distances, etc.). Once the procedure has been completed satisfactorily, the prefect concerned issues official authorisation to carry out the works.

ii. Planning permission

This procedure is designed to ensure that the project meets planning rules. 400 kV transmission lines are built according to the provisions of the planning code, and in particular those dealing with authorisation for pruning, tree felling and land clearance. Where this kind of authorisation is required, it must be obtained before any application for planning permission is submitted. The planning permission application process allows the authorities to check two things: first, that the project meets regulatory provisions on the sitting, height and nature of new constructions; and secondly, that the project is adequately integrated into the surrounding environment, with an acceptable visual impact, and that the immediately vicinity is properly organised.

6.1.5 Amicable agreements and easements

RTE can obtain authorisation for its line to cross a given plot of land by reaching an amicable agreement with the concerned landowners. In this case, RTE offers to sign a way leave agreement, which includes compensation for any damage or inconvenience caused by the presence of the infrastructure. In addition, landowners have a right to direct compensation.

In areas where RTE is unable to obtain all the necessary authorisations via amicable agreements, legal easement proceedings are launched. The DUP (declaration of public interest) is used to implement what are known as "public authority prerogatives", which in this case consist of easements issued under the Law of 15 June 1906. Each landowner concerned by the project is informed individually that an eight-day inquiry is to be opened, to determine exactly which plots or parcels of land are to be expropriated. This inquiry is overseen by the prefect. When it is completed, the prefect issues an official decision granting the necessary easements. If no amicable agreement can be reached with the landowner on the proposed compensation, the amount is determined by the expropriations judge.

This entire phase, which is part of the process of determining the new power line’s exact route, generally takes between 12 and 18 months.

Once the above procedures are completed, construction work can begin. The time taken for the work varies depending on the length of the EHV line, and is usually between 12 and 24 months.

The overall planning application process described above applies in the case of interconnection line between France and another Member State. However, RTE’s experience shows that in such cases, administrative procedures are more complex.
The building permit is granted only after double checking conducted under the authority of the prefect. RTE prepares the draft of the detailed work, particularly in conjunction with government departments, concerned municipalities and the chambers of agriculture. RTE engages itself in dialogs with the owners and farmers for identifying, wherever possible, consensus on the detailed trajectory of the lines and the exact positions of the electrical substations.

Under the auspices of the prefect, a double check on the implementation of the works takes place regarding the compliance with technical regulations and the compliance with zoning regulations (for the permits). The building permit is signed by an official delegated by the prefect. Under these procedures, mayors and state services are again consulted.

6.1.6 The works
The construction of a work requires clearances and advance agreements. Only after all these steps, obtaining the declaration of public utility, building permit, authorization, execution, settlement agreements with the owners or the development easements, that RTE will begin construction of the new infrastructure. RTE provides information to the public affected by the construction work (municipalities, farming, owners, local residents) throughout the whole construction period.

6.2 Particularities of the French system and compensation schemes
6.2.1 “The Public Service Contract”

Under the terms of the contract, RTE undertakes "to extend the working life of existing installations to avoid the creation of new ones", "not to increase the total length of overhead infrastructures", and "to improve the integration of installations into the surrounding environment".

6.2.1.1 Optimising the existing network
One of the most important demands concerning the development of installations involves recognising the value of existing assets and using them to their full potential. By "optimising the existing network", RTE means extending the working life of infrastructures and associated equipment, making the best possible use of the existing network and stabilising its total length.

- Extending the working life of networks and associated equipment

Based on reports on the performance of network equipment installed in the field, RTE has identified the essential components that need to be replaced in order to significantly increase the working life of installations, without needing to modify their structures.

To deal with the gradual ageing of installations and particularly overhead lines, whilst acknowledging the need to keep down transmission costs, RTE systematically seeks to rehabilitate installations rather than renew them. Although renewal is still necessary in some cases, rehabilitation can postpone the need for major investments by significantly extending the working life of installations, whilst complying with current standards and regulations.
Using the existing network to its full potential

Before it considers building new lines, RTE attempts to meet transmission requirements and the increasing demands of power system safety, using the existing network.

Following initial tests, network studies take account of systems used to control the current flowing through power lines, so as to be able to make optimum use of existing line transmission capacities. The aim is to avoid overloading on certain lines in the event of an incident occurring, by optimising the way flows are distributed across the remaining lines.

In this field RTE has launched actions ranging from research & development to installation on the grid of new equipment such as development of conductors with improved performance, implementation of power electronics devices to avoid network reinforcement (static compensators and reactive power), of phase-shifting transformers, capacitor banks …

Stabilising the length of the overhead network

The public service contract includes national objectives for reducing the overall length of overhead power transmission lines and installing a certain proportion of new circuits underground. The figures are global, and do not apply on a project by project basis:

**Commitment 1:** Removing a total length of overhead lines equivalent to that of new or rebuilt overhead lines

**Commitment 2:** Undergrounding at least 30% of the total length of new or rebuilt 63 and 90 kV circuits (compared with 25% under the previous agreement).

In July 2005, RTE handed the Government its report on the "Power Networks and the Environment" agreement. Table 6-1 and Table 6-2 show the results.

### Table 6-1"Power Networks and the Environment" agreement - progress

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<tbody>
<tr>
<td>Line removal ratio - all voltages*</td>
<td>100%</td>
<td>102.1%</td>
<td>112.6%</td>
<td>138.2%</td>
<td>118.6%</td>
</tr>
<tr>
<td>Undergrounding ratio for 90/63 kV**</td>
<td>25%</td>
<td>25.7%</td>
<td>22.9%</td>
<td>39.1%</td>
<td>28.5%</td>
</tr>
</tbody>
</table>

* Length of tower rows removed compared with the length built
** Length of underground circuits/Total length of circuits installed during the year

Source: CIREF (French Power Network Information Centre)

### Table 6-2 Length of overhead lines in km of operational tower rows

<table>
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</thead>
<tbody>
<tr>
<td>Total length of the overhead network owned by RTE</td>
<td>79,715</td>
<td>79,596</td>
<td>79,457</td>
<td>79,217</td>
<td></td>
</tr>
<tr>
<td>Change in the length of the overhead network</td>
<td>-119</td>
<td>-139</td>
<td>-254</td>
<td>-512</td>
<td>+14*</td>
</tr>
</tbody>
</table>

* Over the course of 2004, the length of the overhead network rose by 14 km. This increase is due to RTE's acquisition of an existing 63 kV network. Discounting this acquisition, the length of the overhead network would have fallen by 51 km.

Source: CIREF (French Power Network Information Centre)
Consequently, over the period covered by the "Power Networks and the Environment" agreement (2001-2003), although the amount of energy transmitted rose by 5% (24,465 GWh), the overhead network was shortened by 512 km. In addition, over the same period, the overall undergrounding rate was 28.5%, and the rate of replacement and removal was 118.6%.

6.2.1.2 Improving the integration of installations

- Improving the integration of installations into the landscape

RTE will keep the impact of new overhead lines to a minimum, by systematically looking to group together infrastructures, either with other installations, or in existing line corridors. More generally, integrating an overhead line means identifying the best possible route, taking into account factors such as geography, residential areas, the natural environment, zones of economic activity (agriculture, existing infrastructures), landscapes and sites. RTE draws on all its expertise to successfully integrate its installations into the surrounding landscape, whilst taking account of all these factors.

During the consultation process, 3-D simulation techniques are used to identify the "route of least impact" for installations at the design stage. This enables each party involved in the consultation to visualise the different possibilities for camouflaging towers offered by the surrounding terrain, and thereby to choose the most suitable location, as far as possible from residential zones. The digital simulation provides a precise depiction of the local geography and terrain, so that each party is able to gauge the actual impact of the line on its environment, accurately and in complete transparency.

Current technology is now able to digitise the topography of potential line sites with a very high degree of accuracy. A digital model of the terrain is created based on aerial shots. It takes account of every feature of the existing terrain: roads, bridges, water courses, and so on. The model can then be used to simulate various installations, which are subsequently compared to determine which of them is most appropriate for the local landscape. Technicians can alter the type, height or layout of towers in the scenarios, to display the set-up that best suits the terrain.

The model is dynamic, allowing a true and accurate depiction. It is intended to help with discussions and decisions during consultation meetings. As a result, every party to the consultation plays a part in deciding where and how the towers are going to be positioned, and can therefore gain an accurate idea of what impact the line is likely to have on its immediate environment.

Natural environments are also taken into account when looking for a route, and when selecting tower types and installing special systems to protect bird life. In particular, RTE pays careful attention to the following points:

- Natura 2000 sites, for which RTE carries out impact studies as part of its development projects,
- protecting bird life - RTE may decide to incorporate a range of measures intended to warn (spirals) or scare away wildlife (dummy birds of prey), to prevent birds from flying into cables,
- "green dossiers", which are used to keep track of the environmental commitments adopted as part of network development projects,
• wooded or forest areas, where RTE may selectively fell or prune trees depending on the species located beneath power lines, and may conduct a vegetation management programme.

RTE is determined to respect the natural environment, when designing installations, and to adopt the most effective measures for reducing their environmental impact; these measures should be the ones that which best meet the requirements expressed during the consultation process. Moreover, for improving the electrical networks integration, RTE makes an environmental plan for each project.

- Improving the integration of installations into the social environment

To meet these undertakings RTE strength the link between the concertation on the network development scheme driven at a regional level and the local dialogue on each project. The “network development scheme” identifies for each region the weak electrical areas. It is renewed every two years by RTE and locals representatives and then submitted to the Government’s approval.

Support network development projects by taking into account what the inhabitants really expect in terms of territorial planning, economic development and environmental protection. Allow the building of shared solutions with regional and local actors and create a regulating tool which upholds high environmental, social and economic requirements, in an adequate economic framework.

However, in addition to this, RTE indemnise the visual impact of new overhead lines for 225 kV et 400 kV is also committed to providing compensation for any inconvenience caused by newly built lines to those most directly concerned.

Since 2001, RTE has financed "Project Support Programmes". The "PSP" offers the local authorities the chance to decide for themselves which support measures should accompany projects. It also gives RTE's overhead line projects a real "planning and amenity" dimension.

6.2.2 The “Project Support Program”

6.2.2.1 Origins of the “PSP”

When building new infrastructure, RTE seeks to reduce as much as possible the environmental impacts. Nevertheless, keeping in mind that all the impacts can’t be avoided, RTE created an original financial support tool when building a new line. Hence, the 1992 protocol set up the Network Planning Fund (also known by the French initials "FAR"). Under it, RTE paid 5% of the cost of work for high and extra high voltage lines. In 1997, an amendment to the protocol made improvements to all these provisions. It set up the "Local Programme for the Environment and Employment" (PLEE). Under the authority of the local prefect, this PLEE is intended to support the construction of new 400,000 volt lines. RTE pays into the programme between 4 and 6% of the investment cost of the new installation.

The thinking behind these two schemes was very different. The FAR was intended to resolve difficulties associated with existing networks, and was used to co-finance measures aimed at improving the integration of existing networks in the project area. However, it proved difficult to implement, since municipalities often lacked the financial resources to contribute to undergrounding projects for distribution networks (financing by local authorities will drop from 50% to 25% of the
cost of the work to improve this scheme). The way the scheme was applied was actually determined by the permanent regional consultation bodies, which are not active in every region. Conversely, the PLEEs proved highly successful, since the 1997 text left the public authorities, RTE and local players considerable room for manoeuvre. Consequently, it fell to elected representatives, companies and professionals in the municipalities concerned to make proposals and decisions, with the help and under the authority of the prefects, and with assistance from RTE.

The “Power Networks and the Environment” agreement for 2001-2003, which has been extended, includes provision for a system referred to as the "Project Support Programme" (PSP). It replaces and extends both the previous support schemes. All "new overhead" lines with a voltage level of 63 kV or higher give rise to a PSP. This commitment is repeated in the current public service contract.

6.2.2.2 The "PSP" budget and beneficiaries
The amount of the PSP is 10% for new 400 kV lines and 8% for other voltage levels, of the expected cost of the overhead part of the corresponding installation.

The prefect is responsible for organising consultation for the RTE project. The consultation body set up defines a list of eligibility criteria for project support measures and examines all of the proposals it receives. Decisions must be made in complete transparency. At least half of the fund is used to finance measures concerning the municipalities crossed by the installation. The remainder can be used for other municipalities, provided the local authorities concerned contribute 50%. The definitive fund budget allocated to the programme is determined when the installation is declared to be a Public Utility. The programme may remain in place for up to two years after the installation enters service, with the exception of measures to restructure the public power transmission system. These types of measures require a substantial amount of time.

6.2.2.3 Scope of the "PSP" and financing decisions:
The PSP may be used to finance:

- aesthetic measures to improve the integration of the new installation (specially designed towers that meet local requirements, additional undergrounding, etc.),
- compensation measures affecting other installations and intended to improve their integration into the landscape (especially camouflaging or moving existing power networks of any voltage level) or ensure greater respect for natural environments (bird life, etc.),

but also much more generally, sustainable development measures.

The "Project Support Programme" is designed via the local consultation process. The various players involved in the consultation decide which measures are to be financed, whilst complying with regulations and the "Power Networks and the Environment" agreement. The projects to be financed under the project support programme will be selected according to the rules set down by the consultation body. At the request of those involved in the local consultation, RTE may provide the benefit of its expertise, for studying the feasibility and costs of the actions proposed and any actions relating to power networks. In addition, RTE can provide logistical assistance such as record keeping and administrative tasks for the consultation body.

These environmental compensation and local development measures are implemented during the course of the work.
6.3 Experience with recent and current main transmission line projects in France

The proposed interconnection line between France and Spain has a long history. In 2003, the proposal of the Roussillon overhead EHV line has been the subject of public debate. The project was strongly opposed during the debate, and hence, the Minister of Industry has asked RTE to explore other alternatives. Faced with difficulties in identifying a solution that would satisfy both countries and that is accepted locally, France and Spain decided to ask for a European coordinator to facilitate the implementation of the project: Mario Monti was named in September 2007 by the EC.

At the end of the process of meetings and discussions led by Mr Monti from September 2007 to June 2008 (enriched by the expert reports of the Cabinet CESI - Centro Sperimentale Italiano Elettrotecnico) and on the basis of its findings, France and Spain ratified in Zaragoza, June 27, 2008, an intergovernmental agreement that specifies the characteristics and modalities of implementation of the new interconnection transmission line.

Under the terms of this agreement, the electrical connection as decided to be:

- Totally underground from substation Baixas (near Perpignan) to substation Santa Llogaia (near Figueras in Spain)
- With an overhead route, relying as much as possible on existing infrastructure (highways, roads...).

**Key points of the project:**

- A completely underground DC link, between substations Baixas (near Perpignan) and Santa Llogaia (near Figueres, Spain), whose route is based as much as possible on existing infrastructures.
- A line segment of about 60 km, out of which 35 km in France in the Pyrenees-Orientales.
- A project preserving the landscape and passing through the massive Albères via a dedicated tunnel.
- The creation of an AC / DC converter station at each end (in France in the region of Baixas) to connect to the AC grid.
- The choice of the latest technology VSC (Voltage Source Converter) for the converter stations and cables.
- A route along of existing infrastructure: the electrical connection between groundwater Baixas and the Soler, and then the LGV Pepignan-Figueras.
- A tunnel through the Albères a total length of 8 km, 7 km on the French side.
- Estimated cost: € 700 million from Santa Llogaia to Baixas (converter stations included). Financing: 50% TEN - 50% EAR, through their joint INEFE. European funding is under the European Commission decision. It could reach € 225 million.

**The consultation on the project:**

- Public debate on the previous project (overhead line) in 2003.
More than five years have elapsed since the previous debate, and the new project differs substantially from the previous (DC and underground line instead of an AC overhead line), the developer has contacted CNDP again in October 2008. It decided that there was no need to make a new public debate, but a specific and individual consultation was necessary. CNDP recommended the project to the contracting authority and appointed an actor to ensure that the general principles of public debate would be applied to this consultation. The stakeholders, although they would have preferred a new public debate, agreed to participate in this dialogue for exercising vigilance vis-à-vis the implementation of the new project.

Four territorial workshops

The “territorial workshops”, four in number, were defined in terms of technical characteristics and topography of the project on the entire time with the least impact.

These workshops bring together representatives appointed by all the participants of the first phase and the mayors of the sector concerned. Each workshop is chaired by the mayors of a sector that was willing to accept this mission.

Workshop Programme

Each workshop will analyze the route possibilities for its area in order to prefigure the course of the underground dc link within the zone of least impact. The issues common to all workshops (technical aspects, the magnetic field environment ...) are part of this work.

The ideas are to be built on the following studies:
- Topographic studies, flora, fauna, 2000 area,
- Geological and hydrogeological studies,
- Crossing issues (eg, crossing railroads, roads, rivers ...)
- Location of cables and impact on the magnetic field.

Each workshop meeting will be a verbatim (full transcript of the exchanges) and a report published on the website of the consultation: www.liaison-France-espagne.org.

Interventions of experts nominated by the associations were decided by the guarantor and put in charge of INELFE. They cover the following issues: hydrogeology, magnetic field, flora and fauna.

The tools of information and expression of public

Throughout the second phase of consultation, information resources are available to the public:
- The website of the consultation: www.liaison-France-espagne.org: to learn all about the consultation and ask questions.
- In the councils of Commons of time with the least impact and the Prefecture of the Pyrenees-Orientales: the information panels, letter of consultation containing a ballot for questioning.
- A summary of studies is performed by the contracting authority and is provided for each workshop; the integrity of this work may be verified by making a request to the following email address: concertation@31eme.com.
- In the press: entry forms for questioning will be regularly published in The Independent and Midi Libre.

The mayors of the zone with the least impact are part of the consultation. They are available and responsive to residents.
7 GERMANY

7.1 Initial situation

The development needs of the German transmission grid are mainly driven by three main issues:

- New construction of fossil fuel power plants in the coastal areas of northern Germany (about 19 stations planned - so far 3 stations under construction and 4 stations with approved access)
- Increasing wind energy in the North; until 2020, wind power development
  Onshore: 27 000-30 000 MW
  Offshore: 10 000 MW
- Nuclear generation dismantling is foreseen for the future (however, the lifetime of nuclear power plants was recently prolonged).
- Increasing activity of the electricity market in Europe

The first DENA study over the grids (Netzstudie I) [16] found that the transmission system on land should be reinforced and extended. Until 2015, an additional 850 km of extra high voltage lines should be built, and another 400 km should be upgraded. 6 new routes connecting the North with the South should be built. Moreover the provisions of the study also suggest that 2000 km of additional 380 kV lines will be probably needed by 2020. In addition, it was also found that the 110 kV distribution grid will need new lines. However, since 2005 no substantial progress has been made with building the needed infrastructure. The new DENA II study is partly published and states that 3500 km of EHV lines will be needed.

At European level, the TEN-E guidelines issued a project for the proper functioning of the internal energy market with plans for Germany.

The current status of the network development is not positive. This is due to the long time needed for building new high voltage overhead lines, the periods of realization extending partly over 10 years. The reasons for this delay are mainly the lack of acceptance by the local population; objections at the local level, i.e. d. from local councils, regional and district as well as citizens; initiatives, lengthy approval procedures, planning, approval of plan and long litigation; the work contractors facing planning delays.

In addition to all the above mentioned, the future of networks and balancing zones is uncertain. The interests of the different German regions are divergent and there are risks in the different tariff zones.

By and large, under the current circumstances, the development of networks is not guaranteed until 2015. This fact brings many risks such as failing to achieve the climate protection objectives, facing a decrease of the grid’s stability, meeting delays in the construction of new power plants, and continuing to impose restrictions on the electricity market.

The public/legal approval procedures for building of new transmission lines in Germany are summarized in Figure 7-1, Figure 7-2 and Figure 7-3.
D3.7.1 Review of existing transmission planning and approval procedures and coordination of infrastructure developments between TSOs

Fig. 7-1 Public/legal approval procedures for HV transmission lines (§43 EnWG [power industry law])

Firstly it is determined whether EIA is or not necessary. If it is necessary the approval procedures will be applied for the individual project (Figure 7-2). In the case EIA is not needed then there are two ways according to how the involved stakeholders react. If they agree to the project then the project falls under a case of minor relevance and the procedures are the ones illustrated in Figure 7-3. If they do not agree - which is most likely to happen - then the project is processed through centralised approval procedures as shown in Figure 7-2 and written down in in § 43 b No. 2 EnWG (EnWG); additionally § 74 VI VwVfG applies.

The project approval procedure starts with a request with project documents such as explanation report, maps and other technical documents. Then all these documents are published and forwarded to all involved authorities. Objections from stakeholders are received and discussed. To this purpose, meetings with private land owners, public bodies and public authorities are organised. After all the matters of discussion are solved the official approval is granted. If agreement with private land owners can’t be reached the expropriation phase starts. In the end after all property issues are solved the construction of the new line can begin.

The centralised approval procedure also starts with a request with project documents that are forwarded to the involved authorities. After receiving objections the approval is given without any discussions with the stakeholders. Then it is tried to obtain agreement with the private land owners and if this does not succeed, the expropriation phase begins. After these are solved too, the new line can be built.
D3.7.1 Review of existing transmission planning and approval procedures and coordination of infrastructure developments between TSOs

The experience with such approval procedures in Germany showed that the estimated durations for the five different steps are as illustrated in Table 7-1, summing up to a total a estimated duration of up to 10-12 years.

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Figure 7-2 Public/legal approval procedures for HV transmission lines (§43 EnWG [power industry law]): project and centralized approval procedures

<table>
<thead>
<tr>
<th>Planfeststellungsverfahren [project approval procedure]</th>
<th>Plangenehmigungsverfahren [centralized approval procedure]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Request with project documents (explanation report, maps, technical documents)</td>
<td>Request with project documents (explanation report, maps, technical documents)</td>
</tr>
<tr>
<td>publication and forwarding of the project documents (incl. impact assessment of EU Natura 2000 and Important Bird areas, if necessary)</td>
<td>forwarding of the project documents (incl. impact assessment of EU Natura 2000 and Important Bird areas, if necessary)</td>
</tr>
<tr>
<td>Statements</td>
<td>Statements</td>
</tr>
<tr>
<td>discussion of the objections (meeting with private land owners, public bodies and public authorities)</td>
<td></td>
</tr>
<tr>
<td>official approval</td>
<td>approval</td>
</tr>
<tr>
<td>agreement with private land owners</td>
<td>agreement with private land owners</td>
</tr>
<tr>
<td>not possible</td>
<td>possible</td>
</tr>
<tr>
<td>expropriation</td>
<td>expropriation</td>
</tr>
<tr>
<td>construction of high-voltage transmission line</td>
<td></td>
</tr>
</tbody>
</table>

Figure 7-3 Public/legal approval procedures for HV transmission lines (§43 EnWG [power industry law]): cases of low relevance - very unlikely to happen for HV lines

Fall unwesentlicher Bedeutung [Case of low relevance]

- collecting the essential contracts, permissions and approvals by the applicant:
  - agreements with land owners (easements)
  - permissions or contracts with different public bodies (railway company, public utilities, etc.)
  - single approvals from different authorities based on national nature conservation law, forestry law, water law, highway law, immission law (audible noise and EMF), etc.
- request to the relevant authority with a short description of the project and copies of the contracts, permissions and approvals
- notification by the relevant authority further approval procedure in accordance with § 11a EnWG is not necessary
- construction of high-voltage transmission line
Table 7-1 Public/legal approval procedures for HV transmission lines - estimated duration

<table>
<thead>
<tr>
<th>Step no.</th>
<th>Step name</th>
<th>Estimated duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Feasibility study</td>
<td>App. 0.5 years</td>
</tr>
<tr>
<td>2</td>
<td>Area planning procedure</td>
<td>Preparation 1.5 years; procedure 1 year</td>
</tr>
<tr>
<td>3</td>
<td>Project approval procedure</td>
<td>Preparation 1.5 years; procedure 1.5 years</td>
</tr>
<tr>
<td>4</td>
<td>Expropriation procedure</td>
<td>App. 1.5 years</td>
</tr>
<tr>
<td>5</td>
<td>Lawsuits</td>
<td>Up to 5 years</td>
</tr>
</tbody>
</table>

The feasibility study includes the discussions with the administration about the content of the project documents and the documentation of these processes.

After that, the area planning procedures has two phases: preparation and the procedure itself. In the first phase the project’s documents are prepared, including monitoring of vegetation periods and bird migration. The regional planning procedure phase assumes the deciding the general route of the overhead line and includes the environmental impact assessment and public debate.

The project approval procedure step has also a preliminary phase of discussing with the administration and preparation of the project’s documents for the next phase of the procedure. This second phase is concerned with determining the precise route of the overhead line and includes the public debate and review of the compliance of the project with EU-directives such as the directive for the conservation of wild birds and the directive for the conservation of natural habitats and of wild flora and fauna.

In case no amicable agreement can be reached the expropriation procedure is performed which is followed by a long period of lawsuits.

The EnWG 2005 (= Energy Economy Act) foresees no explicit rules for underground and sea cable. Hence, it is not necessary to carry out an environment impact assessment ("Umweltverträglichkeitsprüfung") and there is a large number of different permissions necessary, as far as there is no special course of project approval ("Planfeststellungs-verfahren") with a concentration effect. In addition, different licensing authorities exist for each field of law.

Several reasons that cause these lengthy approval procedures are [20]:
- Public debate, whether a special overhead line is necessary,
- Public debate, whether a cable is an acceptable alternative,
- Multiple examination of the same approval criteria in the regional planning procedure and the project approval procedure,
- Discussions with the administration about the content of the procedure documents,
- A lot of objections against a project,
- Lawsuits.
7.2 Gesetz zur Beschleunigung des Ausbaus der Höchstspannungsnetze - New legal framework since May/June 2009 - EnLAG [17].

This law originates from more aspects:
- Firstly, the Meseberg meeting held in August 2007 stated the main points of an integrated energy-climate programme. The first cycle of decisions was ready in December 2007 and targeted key aspects of climate policy, while the second decision cycle from June 2008 presented the resolutions over a law project.
- The Lower Saxony Act on underground cables: requirement for laying underground lines within a radius of 200 m in areas of landscape protection and 400 m in the subdivision. The Ministry of Environment (BMU) has made these demands in negotiations with the Ministry of Economy (BMWi) and the Parliamentary Groups.
- Another requirement issued by BMU: construction of at least two HVDC cable lines 500 km long on the north-south direction.
- For reasons of cost, underground lines were initially denied by the Ministry of Economy (BMWi), a compromise was however found.

The structure of the law:
- Art. 1: Transmission Line Expansion Act (EnergieleitungsausbauG)
- Art. 2: Changes of the law of energy conservation (savings) (EnWG)
- Art. 3: Changes of the code of administrative procedures (VwGO)
- Art. 4: Amendment of the Decree on the incentives regulation (ARegV)

The target of the new law is acceleration of approval procedures for new transmission lines and it makes use of two instruments, namely procedures’ simplification and usage of innovative technologies for exploiting and expanding the grid. The simplification of procedures refers to two aspects:
- planning of needs by identification of priority projects and simplification of legal procedures to only one instance;
- approval of plans for connecting offshore wind power plants by procedures aiming to focus the development in territorial maritime areas.

The usage of innovative technology in the field of network exploitation assumes:
- that priority is given to optimization in the field of network exploitation by
  - increasing in the short-term the capacity through the usage of modern network technologies and by minimizing the need for grid expansion (e.g. by using overhead line surveillance and high temperature cables)
  - respecting the network operators obligations as stipulated in (article 11 para. 1, article 12 para. 3a of the EnWG Act)
- pilot projects for the use of underground cables in sensitive areas on 4 defined pilot 380kV routes and with acceleration by increasing the local acceptance of the projects. The main criteria for this are the distance to single houses (200m) and villages (400m), economic and technical efficiency by using cables parts with a minimum length of 3 km and by considering the particularities of each geographical area. This regulation causes a lot of problems, because it is not stating that TSOs must use a underground cable in case the respective are fulfilled but can – the interpretation of the word “can” causes conflicts.
because the land owners do prefer underground cables but the TSOs have also to comply with the idea of cost effectiveness (underground cables are much more expensive than overhead lines)

110 kV underground cables shall be generally used in 20 km wide coastal zones, but also in the interior of the country if the additional cost coefficient doesn't exceed a value of 1.6 and in cases where the clauses of low voltage regulation in the Act for underground cables are not met.

The usage of innovative technology in the field of network expansion refers to ([17]-[18]):
- using HVDC lines also for lines connecting the offshore grid to the onshore one in the closest point from both technical and economical aspects;
- making it possible to apply the ARegV Decree on the HVDC lines;
- transporting energy over long distances without significant losses;
- considering an underground DC “overlay” grid as recommended by the second DENA study on the grids;
- increasing acceptance of new transmission project, hence accelerating.

7.2.1 First BVerwG Ruling Regarding EnLAG Electricity Grid Modernization

The following information was taken from [19].

On 22 July 2010 the Federal Administrative Court (Bundesverwaltungsgericht – BVerwG) handed down its first substantial ruling regarding grid modernization pursuant to the Transmission Line Expansion Act (Gesetz zum Ausbau von Energieleitungen – Energieleitungsausbaugesetz – EnLAG). The court dismissed a petition seeking injunctive relief against a plan determination procedure (Planfeststellungsverfahren) regarding a new 380 kV extra high voltage line. The new line was intended to basically replace an older 220 kV line. As with some other high priority infrastructure projects, the Federal Administrative Court is the first and (except for exceptional constitutional complaints) only court instance with jurisdiction for law suits against projects covered by the EnLAG.

In its summary review in the preliminary injunction proceedings, the court held that even though a legal action brought against plan determination procedures regarding high voltage lines does not have the normal suspensive effect under the German Energy Act (Gesetz über die Elektrizitäts- und Gasversorgung – Energiewirtschaftsgesetz – EnWG), this did not mean that the interest to carry on with the project necessarily takes priority. Moreover, BVerwG ruled that affected land owners are entitled to have the plan determination procedure fully reviewed by the competent court, as they can be expropriated if necessary for projects for which the plan determination procedure has been carried out.

The court held that the fact that a 380 kV (or higher) transmission line expansion project has been included in the list of EnLAG projects sufficiently justifies commencing a plan determination procedure. Often the EMF limits pursuant to the 26th Ordinance that supplements the Federal

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2 BVerWG, 22.7.2010, 7 VR 4/10
Emission Control Act (26. BImSchV) are challenged in legal proceedings concerning power lines. BVerwG clearly stated that there is no legal basis to question those limits. As long as the limits are not exceeded, power line projects, respectively the necessary plan determination procedures, are not in danger of being reversed. With certain limited exceptions, BVerwG declared individual plan determination procedures for individual segments of longer power lines to be admissible.

The court also stated that previous impacts (Vorbelastungen) of property in an area required for the construction of power lines limited the necessary degree of protection under the law. In the present case, a 220-kV power line was already located on the property of the petitioners. In addition, two of the three petitioners had built their home right under the then existing power line.

The underlying main case remains to be decided by the court.
8 CONCLUSIONS AND RECOMMENDATIONS

Even though the approval procedures for building new transmission infrastructure cover more or less the same aspects in all countries analyzed, the procedures themselves vary between EU countries. This report, as other previous studies [20]-[21], shows that the approval procedures and regulations existent in EU countries are varied.

Generally speaking, as also observed in [21], the approval procedures cover the following stages:

- The transmission system operator (TSO) is the initiator of the project and conducts a feasibility study. The purpose of this study is to plan a route or more route options for building a new high voltage (HV) line. These options should be feasible from all aspects, namely technical, administrative, and environmental. The planning authorities are involved in this process – formally or informally – with regard to spatial planning, environmental aspects etc. This study phase is concluded by requesting the respective authority to permit construction of the HV line along one of the proposed routes that proves to be optimal.

- At the centre of this application is the environmental impact assessment (EIA), which has to be performed according to EU and national laws in all member states. In some countries a strategic environmental assessment (SEA) is also performed beforehand at national level for potential new infrastructures, but its results are not used in the EIA. With respect to national environmental legislation, local authorities will be involved. In addition, a public debate is compulsory and each stakeholder has a right to express their opinion.

- Finally, all other national legal requirements (concerning water rights, building law, environmental protection etc.) will have to be met. Only then will the approval be given by the authority in charge.

- For building a new line, licenses also have to be obtained, and this process is done after or simultaneously with the authorization procedures. The expropriation phase is effected in the end via either amicable agreements or legal easements.

- When all approvals are granted, the construction process can begin.

- International projects follow the same steps described above, but these steps are done for each of the involved countries according to their own national procedures. It is important to first decide on a physical interconnection point at the border, before starting the rest of the procedures. If for one country the authorization process is lengthier, the whole project suffers from it.

A summary of the steps in the approval procedures in the five studied countries is provided in Table 8-1.
Table 8-1 Approval procedure steps per country

<table>
<thead>
<tr>
<th>Country</th>
<th>Approval procedure steps</th>
<th>Involved authorities</th>
<th>Observations</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>0. Conception phase</td>
<td>The Ministry of Economy coordinates the process. Federal Environmental Office; Federal ministry of agriculture, forestry, environment and water management; Environmental counsel; Water resource management; Municipalities and neighbouring municipalities; Provincial governments and their surveyor</td>
<td>o Only for OHL ≥ 220 kV o The technical description contains the chosen solution by the TSO and also the option of not building a new line.</td>
<td>3-4 years</td>
</tr>
<tr>
<td></td>
<td>1. Development of EIA:</td>
<td>The Ministry of Economy coordinates the process.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Application</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Technical description and plans</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Environmental Impact Declaration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Approval of EIA:</td>
<td>Local government, National Court</td>
<td>One authority supervising the authorization process.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o First Instance = local government</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Second Instance = National Court</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Supreme Court</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Works</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>1. Technical-economical justification</td>
<td>o Directorate of Demand and Energy Market (DIDEME) o Ministry of Industry</td>
<td>Project’s technical-economic value submitted by RTE to Administration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. The consultation-dialogue</td>
<td>a Directorate of Demand and Energy Market (DIDEME); Ministry of Industry b National Public Debate Commission</td>
<td></td>
<td>a 2 years b 18-24 months</td>
</tr>
<tr>
<td></td>
<td>a Prior consultation:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a.1 Choice of study area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a.2 Route of least impact</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b Public Debate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Declaration of Public Interest</td>
<td>Ministry responsible for electricity; Minister of Environment (for</td>
<td></td>
<td>30-42 months</td>
</tr>
</tbody>
</table>
### Approval procedure steps

<table>
<thead>
<tr>
<th>Step</th>
<th>Involved authorities</th>
<th>Observations</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>TDP submitted to the consulting committee of TERNA for approval</td>
<td>National SEA Coordination Committee between Ministers, Regions and TERNA</td>
<td>These are done every year.</td>
</tr>
</tbody>
</table>
| 2.   | SEA procedure:  
   a) Preliminary Report  
   b) Public Consultation  
   c) Preliminary Advice | | a) 90 days  
   b) 60 days  
   c) 90 days (in theory) | |  |
| 3.   | TDP Approval | Approval and Final Decision | 60 days (in theory). | |  |

#### I. Procedures for the whole Transmission Development Plan (TDP) at once

<table>
<thead>
<tr>
<th>Step</th>
<th>Involved authorities</th>
<th>Observations</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>TDP submitted to the consulting committee of TERNA for approval</td>
<td>National SEA Coordination Committee between Ministers, Regions and TERNA</td>
<td>These are done every year.</td>
</tr>
</tbody>
</table>
| 2.   | SEA procedure:  
   a) Preliminary Report  
   b) Public Consultation  
   c) Preliminary Advice | | a) 90 days  
   b) 60 days  
   c) 90 days (in theory) | |  |
| 3.   | TDP Approval | Approval and Final Decision | 60 days (in theory). | |  |

#### II. Individual project authorization procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Involved authorities</th>
<th>Observations</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Preliminary Project</td>
<td>Local authorities</td>
<td>Done in consultation with local authorities</td>
</tr>
</tbody>
</table>
| 2.   | Request for Authorization (including EIA) | Ministry of Infrastructures, Minister of Economic Development (former Ministry of Productive Activities), Ministry of Environment, all concerned Regions and local Authorities | o National EIA:  
   o Cable L>40 km  
   o OHL L>15 km  
   o Regional EIA: L<15 km and stands on particular protected areas Carried out by: Ministry of Environment at |  |
<table>
<thead>
<tr>
<th>Country</th>
<th>Approval procedure steps</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Step</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>1. Development of EIA</td>
</tr>
<tr>
<td></td>
<td>In parallel 2 and 3:</td>
</tr>
<tr>
<td></td>
<td>2. Elaboration and approval procedure for the National Fitting-In Plan</td>
</tr>
<tr>
<td></td>
<td>3. The process of obtaining licences for building the new line</td>
</tr>
<tr>
<td></td>
<td>4. Works</td>
</tr>
<tr>
<td>Germany (before EnLAG)</td>
<td>1. Feasibility study</td>
</tr>
<tr>
<td></td>
<td>2. Area planning procedure</td>
</tr>
<tr>
<td></td>
<td>a Preparation</td>
</tr>
<tr>
<td></td>
<td>b Procedure (EIA + public debate)</td>
</tr>
<tr>
<td></td>
<td>3. Project approval procedure</td>
</tr>
<tr>
<td></td>
<td>a Preparation</td>
</tr>
<tr>
<td></td>
<td>b Procedure</td>
</tr>
<tr>
<td></td>
<td>4. Expropriation procedure</td>
</tr>
<tr>
<td></td>
<td>5. Lawsuits</td>
</tr>
</tbody>
</table>

In the case of Germany, since 2009 a new law came into force, namely the EnLAG (Transmission Line Expansion Act). Before this law administrative procedures were very lengthy (see Table 8-1).

The EnLAG targets the acceleration of approval procedures for new transmission lines and it makes use of two instruments, namely procedure simplification and use of innovative technologies for exploiting and expanding the grid. The simplification of procedures refers to two aspects:

- planning of needs by identification of priority projects
- simplification of legal procedures by applying to only one instance;
- approval of plans for connecting offshore wind power plants by procedures aiming to focus the development in territorial maritime areas
However, the experience after EnLAG is still too small in order to notice the decrease in the time needed for approving a project.

After examining the approval procedures in Austria, Italy, France and the Netherlands, various obstacles in the process of obtaining authorization for a new transmission line have been identified.
8.1 The main problems

The main problems encountered in all the above mentioned countries will be summarised.

1. The approval procedures are lengthy. This happens for various reasons:
   a. In Austria and Italy, stakeholders can object at any time, bringing complaints that need to be investigated and thus cause delay.
   b. In Austria and Italy the authorization process does not follow the schedule set by law, while in France such a schedule does not exist. Not all the countries have clearly defined time steps for the authorization procedures.
   c. All countries surveyed recognize a failure to meet the schedule for the permitting procedures.
   d. Delays can be encountered also because of interdependencies between the licensing process and the EIA in Italy and respectively the National Fitting-In Plan in the Netherlands.

2. There is a low social acceptance of new transmission line projects.
   a. Projects are not recognized by the Local Authorities and the population as essential.
   b. “Market” has a negative association in the public eye and the public most of the times does not see any benefits coming from the liberalized electricity market.
   c. In France and the Netherlands the population refuses increasingly the “traditional” energy supply model claiming that they prefer distributed generation and local integration of renewables, which should obviate the need for “big” transmission lines.

3. Growing fear for public health because of EMF (electromagnetic field) and other environmental concerns. As there are no standardised EMF limits at European level, the subject of EMF effect on human and animal health is a cause of concern for the population.

4. It is difficult to build new lines in natural protected areas. In countries like France where the Natura2000 protected areas are many in number and big in surface this is indeed a problem.

5. The NIMBY effect is very high

6. There are lengthy discussions on the use of other transmission technologies such as underground cables in order to avoid OHLs passing through populated areas.

7. All TSOs consider that the differences in regulations and approval procedures between countries constitute a problem when dealing with international projects.

8. Authorities are not suitably prepared for a project involving many parties. It often happens that the manpower is insufficient and the personnel have to work simultaneously on more than one EIA (Environmental Impact Assessment).

9. There is insufficient support from politicians for transmission line projects.

10. Approval procedures have a high planning and permit risk due to legal and bureaucratic issues.

11. Gold-plating and overshooting of European legislation by the national laws can create difficult conditions for the approval procedures by setting unreasonably high constraints and by giving space and reasons for the population to doubt and complain.

12. The EIA report is usually too detailed and implies high costs (in Austria aprox. 40% of the total project cost). Some of the TSOs (in the Netherlands and Italy) complain of extra delays caused by too many detailed optimizations that have to be done during the environmental research.

13. Some TSOs state that there is no appropriate trade-off performed by the authorities between environmental issues and the public interest for security of supply. The public interest of the
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Project is justified at the beginning of the approval procedure and forgotten in the following stages of the approval procedures.

8.2 Recommendations for solutions

The following recommendations have been elaborated in collaboration with TERNA, TENNET, VERBUND-APG and RTE-I. These try to give solutions to the problems identified in the reviewing process. The possible solutions are listed below.

1. Support and integration:
   a. Support from national and local political bodies for projects of European importance should be mandatory and defined by law.
   b. The priority projects of the European Union should be integrated with the TSOs’ strategic projects and vice-versa.

2. Communication with politicians and the local population should be intensified.
   a. To that purpose work-groups with local politicians should be organised. These improvements have been recently adopted by all studied countries and they prove to be successful in reducing the public opposition.
   b. Shared solutions should be promoted through dialogue with regional and local stakeholder organizations. In France, Italy and Netherlands this has been introduced.

3. EU and national legislation should be harmonised and overshooting through national laws (gold-plating) should be eliminated.

4. European-wide standards on EMF to define exposure limits should be developed.

5. Approval procedures:
   a. All the steps of the approval procedures including the necessary documents should be clearly defined. There should be only one moment in time when parties can object; the Dutch experience proves this is a good solution. Legal consequences should be defined in case of deliberately obstructing the schedule of the approval procedures.
   b. A simplification of the authorization procedures for projects of high national and international interest should be considered. In such cases the number of authorities in charge of the authorization procedures should be reduced, preferably to the national level. The Dutch and Italian examples prove that such an approach can speed up the approval process.
   c. The process of obtaining licenses should be done after the route for the new line has been approved. In this way delays caused by repeatedly modifying reports and obtaining new licenses, can be avoided.

6. The manpower in charge of infrastructure projects at the authorities’ level should be sufficient and knowledgeable. Parallel work on different projects should be avoided in order to speed up the approval procedures.

7. Define good integration and compensation schemes that should envisage:
   a. The improvement of the integration into the landscape of the new line; this is currently adopted in all the four studied countries.
   b. The improvement of the integration into the social environment of the new line by:
      i. compensating the local population for inconveniences
      ii. accompanying local economic development
         (In France and Italy such an approach is already used.)
   c. The compensation for visual and audio pollution and any other important inconvenience caused during the construction work of a new line. This would
increase public acceptance and reduce the opposition to other new projects in the long term.

8. Create a legal basis for allowing construction of new transmission lines in natural protected areas provided the environmental effects can be reduced and good compensation measures are taken.

9. Use innovating technologies and optimise the existing grid by extending the lifetime of assets and by using the existing grid to its full potential.

10. The possibility of reserving “infrastructure corridors” for important infrastructure projects should be created. Infrastructure planning should be coordinated. In Italy and Netherlands such corridors already exist.

11. Strategic Environmental Assessment (SEA) can be seen as an opportunity and a tool for preventive discussion with stakeholders for locating new transmission infrastructure. However only some countries perform such an assessment. In Italy it is done explicitly, while in the Netherlands the SEA is included in the National Zoning Plan for Electricity Supply. Where both a SEA and an EIA are performed it would be important to incorporate the results of the SEA into the EIA.
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