REAL-LIFE IMPLEMENTATION OF ELECTRICITY PROJECTS OF COMMON INTEREST – BEST PRACTICES

1. INTRODUCTION

BACKGROUND

The Infrastructure Forum had its kickoff meeting in November 2015 in Copenhagen. It is a yearly event and aims at monitoring projects of common interest (PCIs), understanding the reasons for delays, and finding ways to accelerate implementation. The Infrastructure Forum is an excellent occasion for transmission system operators (TSOs) to influence policy makers from the European Commission and member states, regulators, financial institutions, and non-government organisations to get their support and adapt legislation to speed up the process of PCI implementation.

Taking serious action, in a meeting on 3 December 2015, the ENTSO-E System Development Committee (SDC) requested the Working Group (WG) Asset Implementation and Management (AIM) to provide a report on real-life implementation issues of PCI projects, showing best practices and innovative processes to facilitate public acceptance. A first draft was presented to SDC on 19 April 2016.

This work is in line with work stream 2 – Environmental Impact Mitigation, which WG AIM plans to execute under the framework of the ENTSO-E Asset Management Roadmap 2016–2018.

WHAT'S A PCI?

To support the creation of the integrated EU energy market, the European Commission has drawn up a list of 195 key energy infrastructure projects known as projects of common interest (PCIs). These are essential for completing the European internal energy market and for reaching the EU's energy policy objectives of affordable, secure and sustainable energy.

More information: https://ec.europa.eu/energy/en/topics/infrastructure/projects-common-interest

The report is based on expert knowledge, a survey of selected PCI projects that are close to construction or in the permission process, and real-life experiences of TSOs in implementing other transmission projects.

This work also refers to the following existing internal reports, which WG AIM has produced:

- A report on 'Main environmental issues associated with electricity transmission projects', 2014 and
- A report on 'Techniques to mitigate the impact of overhead lines on their environment', 2012.

SPECIFIC OBJECTIVES

- To provide examples of best practices in public consultation and consent for real-life project implementation and
- To summarise key recommendations to the Infrastructure Forum and TSOs.

SCOPE

- Examples of best practices in public consultation, participation, and permission are taken from general projects, including those with PCI status. Aspects of these examples are generally applicable for many projects, but there is no 'one-size-fit-all' solution, as each project has its own unique set of circumstances and issues.

2. MAIN STAGES OF PROJECT IMPLEMENTATION

Before illustrating best practices in public consultation and consent for real-life project implementation, it is necessary to have a common understanding of different stages of project realisation.

The main stages of project implementation, once it has been included in the Ten Year Network Development Plan (TYNDP) or on the PCI list, are the following:

1. Scoping and project development: feasibility studies and public consultation process with different stakeholders,

2. Processing: permission process with public authority and engineering activities,

3. Constructing: physical construction of infrastructure, and

4. Operating: operating transfer and maintenance.

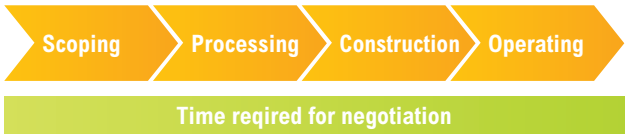


Figure 1: Four main stages to bring a project from plan to operation.

In this report, the two initial stages of scoping and processing are discussed in detail.

Once a decision to implement a project has been made, a multidisciplinary team is formed to examine and determine the best solution. Different tasks and areas are undertaken, including environmental studies, permits, procedures, lines/substation engineering, and stakeholder management.

- During project development, which may include feasibility studies, TSOs must:
  - Demonstrate the need for the project,
  - Examine various feasible technical options,
  - Define the study area, develop route options, and examine environmental constraints,
  - Utilise best practices in the planning and routing of projects,
  - Undertake environmental impact assessments or appraisals on the preferred option,
  - Consider public and stakeholder consultation in the various elements of the 'feasibility' or project stages of development,
  - Consider public opinion and modify project solutions when feasible to do so, and
  - Consider best practice mitigation measures to ameliorate potential effects.

- How can a TSO achieve this?
  - Scoping process and 'public participation process': for getting stakeholders' opinions and engagement.
    - Scoping is a regulated process.
    - The public participation process must be defined. According to PCI guidance, each country is developing a process (brochures, web pages, technical workshops, public meetings, etc.).
  - The opinions obtained must be considered in the project definition through the Technical Documents and the Environmental Impact Study.

When the initial stage is well developed, TSOs will face fewer problems during the permit process and reduce procedure delays, which is one of the main goals of the PCI process.

3. MAIN MILESTONES TO FINALISE FEASIBILITY STUDY AND PUBLIC CONSULTATION

MAIN ACTIVITIES

- Communicate the project,
- Explain its necessity, and
- Engage stakeholders from the start, in the early stages of the project.

MAJOR CHALLENGES

Effective measures and best practices to gain public acceptance are an ongoing topic and are still under discussion. One main principle of PCI regulation 347/2013 is to implement a pre-application procedure, covering the period between the start of the permit granting process and the acceptance of the submitted application file by the competent authority, which shall take place within an indicative period of two years. The idea behind this approach is that, if stakeholders are extensively informed and consulted at an early stage, the specific permit procedure will be less controversial and therefore faster.

Challenges in relation to landowners and citizens living in the vicinity of the project, the wider general public, and various associations, organisations, or groups include the following:

General acceptance of the need for grids
Doubts regarding the necessity of specific grid projects are often widespread, and the benefits from new lines or underground cables are not seen. Landowners and citizens living in the vicinity of the project may feel that they are disproportionally affected, while others benefit economically. On a local level, the PCI label sometimes facilitates the impression that only other European countries are benefitting. This can result in strong local opposition to projects.

Acceptance of a specific project
The necessity of a specific project is often not seen. House owners, for example, sometimes think a specific project is even contrary to their efforts for decentralised energy production, when they have already installed photovoltaic panels on their roofs. Security of supply is often not accepted as an argument because blackouts are very rare.

Environmental effects including nature conservation, visual effects, audible noise, and electromagnetic fields (EMFs)
Nature conservation has become increasingly important for all stakeholders. Regarding transmission infrastructures, the EU Habitats and Birds Directives can bring additional complexity to the planning processes, but stakeholders also acknowledge this effort. However, concerns still remain regarding other environmental aspects, such as landscape, tourism, and health, including possible effects of electromagnetic fields (EMFs). The issue of land and property depreciation is also a significant concern. In general, underground cabling is accepted more readily by the public than overhead lines.

4. MAIN MILESTONES TO ACHIEVE CONSENT

MAIN ACTIVITIES

Transmission system projects are multidisciplinary engineering procedures that involve complex tasks that are directly related to the legal and regulatory framework of each country. The project engineering stages are more or less the same in most European countries; however, time schedules and specific details may vary greatly.

Generally, each project begins with the identification of the required need and a preliminary study that includes the main technical parameters that justify the requirement and the benefits of the proposed solution under reasonable costs. Among these benefits are the increased transmission capacity, the reduction in electricity generation cost, the reduction of transmission energy losses, and the contribution to achieve the EU energy targets of 2030 and 2050. During this study, any specific hurdles that involve decision making are dealt with by providing indicative alternative scenarios of possible solutions, while the final decision will be made in the later stage of the final technical study.

This preliminary study is submitted to the authorities of strategic investments in each country to be examined and temporarily accepted at this preliminary stage. Then, the main technical study phase begins, which involves several parallel study tasks, such as:

- Technical specifications of the engineering project (overhead line, submarine/underground cable, and substation), design, and simulations.
- Environmental impact study.
- Study of access roads and construction details of building the project and maintaining its operation after commissioning.

Alongside the technical study, a detailed plan for project public engagement and consultation is devised. This plan should include actions to inform society on the project and its benefits. It should collect feedback on their opinion, and mitigate objections by providing substantial answers, corrective actions in project design, and possible incentives. This is implemented in most cases with a transparent public consultation process, which is verified by the authorities and organised by the TSO. After the completion of the public consultation process and the final technical study, the full dossier of the project studies, as described above, is submitted to the authorities for permission.

MAJOR CHALLENGES

Transmission system projects are not very popular with local communities. In many cases, the permit procedures are very strict regarding the potential environmental effects of transmission projects.

During the technical studies, the selected areas for routing of infrastructure are influenced by environmental social and physical constraints. This includes ensuring that infrastructure routes are located as far as possible from densely populated areas and avoid land characterised for its natural beauty or wildlife where feasible. Furthermore, existing roads are used to the greatest extent possible to minimise the need for new roads for construction and maintenance.

Generally, five main issues are considered of significance regarding the environmental effects of transmission projects:

- Visual aspects, for example, effects on landscape,
- EMF (human and animal health),
- Audible noise,
- Biodiversity, and
- Electrical losses (indirect effect on environment).

These aspects are generally the most discussed during contact with stakeholders for new transmission projects – and in relation to existing transmission lines.

It can be a challenge for TSOs to develop techniques to mitigate these effects and to improve public acceptance of their grid development projects. While other criteria have to be taken into account (technical feasibility, costs, authorisation, etc.), no project can be realised without public acceptance.

Specific measures can be taken to mitigate the environmental effects. There are many examples of best practices in this area. Mitigation measures tailored to the local area may include management of ground material after excavations (i.e., reuse to fill in the ground in the end of the work where this is possible), cooperation with the local wildlife authorities to protect animal and bird life, habitat remediation, and measures to mitigate the noise of the construction machinery. Technical mitigation measures to reduce the electrical noise of the installation (i.e., the Corona effect[1]) and EMFs should be considered where feasible.

The development of mitigation measures for transmission infrastructure is a challenging issue for all TSOs. The WG AIM's report 'Techniques to mitigate the impact of overhead lines on their environment' provides examples of current best practices with specific case studies. The effectiveness of mitigation measures should also be considered through monitoring programmes and utilising evidence-based data.

5. TSO EXPERIENCES AND BEST PRACTICES

The PCI regulation was designed to facilitate the permit procedures for transmission infrastructure all over Europe. All stakeholders, including European, federal, and regional authorities should bear this in mind. Current discussions about the PCI requirements of the public consultation phases show a risk of evolving into a more complex and less legally solid framework. In addition, the public does not really distinguish between a PCI and another infrastructure project. Their concerns are local and concrete, regardless of the legal status (PCI or not) of a project.

MAIN ISSUES:

- Increased public reluctance to accept power lines locally,
- Public opposition increases because the need for new power lines is questioned,
- Projects bring nuisances to local populations without any directly perceptible benefits, and
- Compliance across all areas (regulation, environment, social acceptance, and need for new infrastructure) is an increasing challenge.

However, TSOs have taken many initiatives to gain public buy-in and obtain permission to build infrastructures. Some examples of best practices are listed as follows:

- Reduce environmental effects,
- Develop new designs and technologies,
- Use information and communications technology (ICT) tools and geographical information systems (GIS),
- Reduce or substitute existing grids,
- Involve citizens and the local population in the project and plan citizen conferences. Facilitate dialogue and proposals of local elected representatives, NGOs, socioeconomic actors, citizens, and state/departmental/regional representatives,
- Identify acceptance conditions and build shared solutions, and
- Develop local employment opportunities during and after the construction, thus maximising local benefit and 'money back'.

5.1 REDUCE ENVIRONMENTAL IMPACT

Environmental studies undertaken by experts as part of the impact assessment are an essential component in determining the possible effects of a project. For biodiversity issues, multiple years of targeted surveys may be required to determine bird movements, for example. Detailed studies and assessments of landscape, cultural heritage, natural habitats, flora and fauna, soils, and water define the environmental baseline and facilitate the development of evidence-based solutions for possible effects.

By utilising innovative solutions and tools for avoiding harmful effects, TSOs can demonstrate commitments to preserving the environment, and this can assist in public acceptance. An example of a direct drill cable installation under a protected lake feature is shown in Figure 2.

Increasingly, stakeholders are looking for more than just mitigating effects. Positive interventions to ensure no net loss of biodiversity, for example, are becoming more common. An excellent example of this is the Life Elia RTE project, which aims at creating green corridors under overhead lines through modifications of maintenance programmes and biodiversity enhancement (http://www.life-elia.eu/en/).

1) A **corona discharge** is an electrical discharge brought on by the ionization of a fluid surrounding a conductor that is electrically charged.

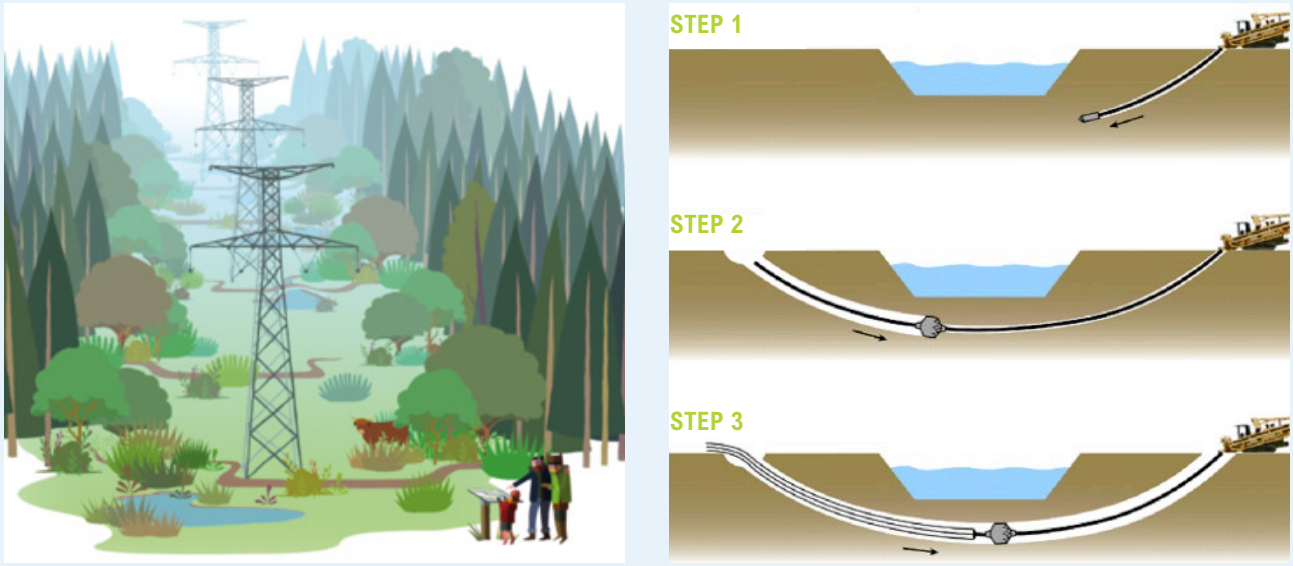


Figure 2: Taking care of biodiversity with green corridor (left) and cable via a reserved lake (right)

5.2 DEVELOP NEW DESIGNS AND TECHNOLOGIES

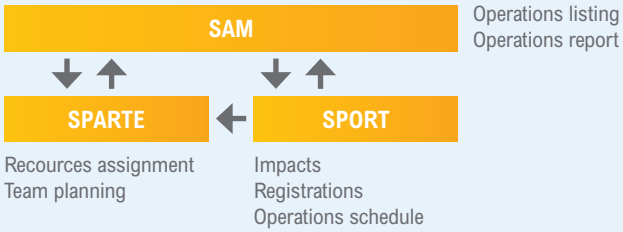
Figure 3: New designs of substations and towers to assist in improving public acceptance

5.3 USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) TOOLS AND GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

The ICT tools and GIS for utilities can greatly support transmission project design and implementation. The great potential of ICT tools and GIS for utilities has been discussed in the latest workshop on ICT tools organised by WG AIM with top stakeholders in the area.

Visual tools can be highly effective in showing the main regions where a project supplies electricity, as illustrated in Figure 5.

Figure 4: Corridor effect of an overhead line



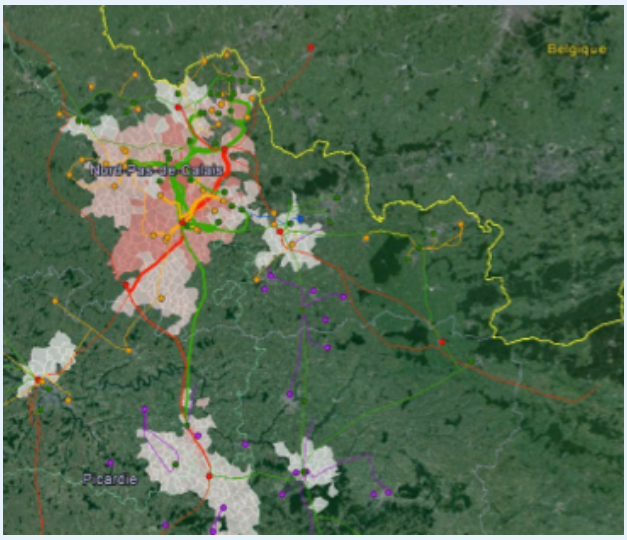


Figure 5: Geographic coverage of a project

5.4 REDUCE OR SUBSTITUTE EXISTING GRID

The overall effects of the transmission network on the environment are reduced using existing infrastructure corridors. Rationalising lower voltage circuits can assist in facilitating project acceptance. By removing lower voltage lines, the overall wire-scape can be reduced. An example of this is provided in the example from project Haute Durance in France.

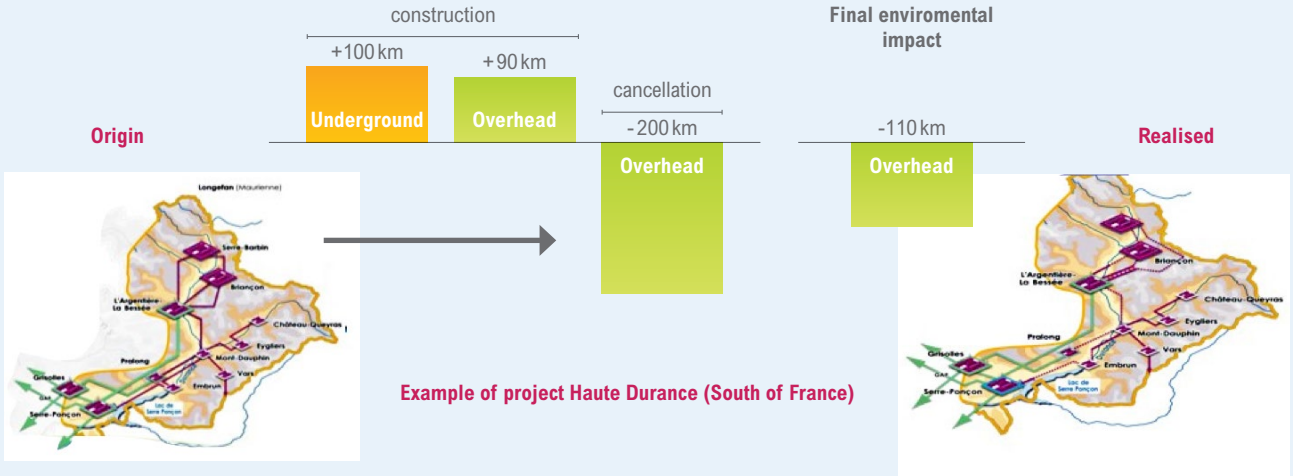


Figure 6: Using existing corridors and upgrading to higher voltage to gain higher capacity

5.5 INVOLVE CITIZENS AND THE LOCAL POPULATION

It is important to involve citizens and the local population in the project and to plan citizen conferences. Dedicated locations for dialogue and proposals should be set up for all stakeholders, including local elected representatives, NGOs, socioeconomic actors, citizens, and state/departmental/regional representatives.

Therefore, the following examples are useful:

i. Communication provision accompanying pilot underground cable route in Raesfeld:

- Underground cable exhibition with several thousand visitors,
- Construction site 'open day' in September 2014,
- Politician visits at the construction site, and
- Extensive press reporting.

Figure 7: Cable project Raesfeld (left) and visitors' exhibition (right)

ii. Ultranet converter case study: The project launched a transparent process for finding a location and intensified communications. This makes the discussion more factually objective. The project made good progress.

Figure 8: Ultranet: proactive project communication for finding the best area to erect a converter

iii. Garenfeld mediation process:

- Objective: developing a variant for the erection of a 380 kV substation taking stakeholders' interests into account as best as possible;
- Participants: citizens' initiative, mayor of the district, and mediators;
- During the process, 15 planning variants were developed and evaluated;
- A preferred variant was jointly developed as a result of the mediation;
- December 2014: The citizens assembly in Garenfeld granted approval (unanimously);
- January 2015: The signing of an **official contract** between the citizen initiative and project team.

Figure 9: Visualisation of Garenfeld substation

iv. Set up a representative panel regarding the socio-environmental profile of the territories concerned by the project and find the best solution by cooperation with stakeholders.

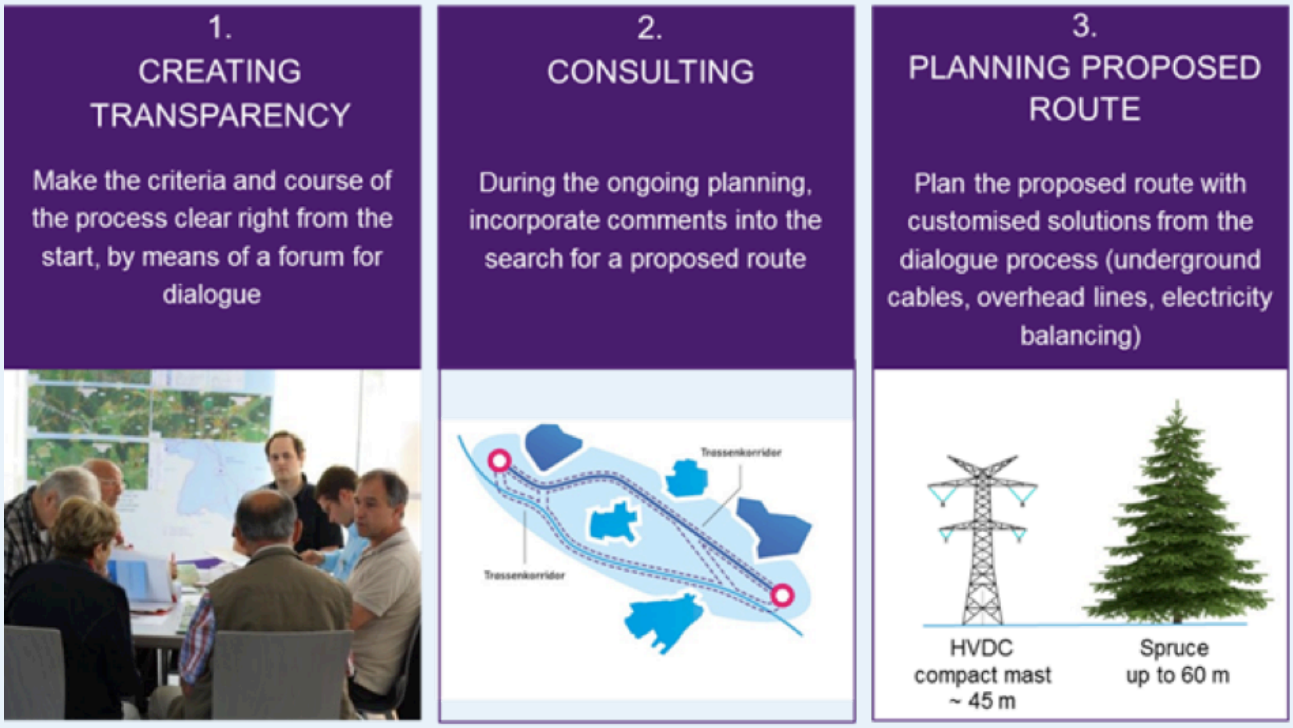


Figure 10: Idea of a 'glass planning office'

v. The development of a defined process for project development and public consultation can greatly assist in the first stage of a project.

An example is provided from EirGrid, the Irish TSO (Figure 11). The project development and public consultation roadmap has been utilised for transmission projects (non-PCI). The roadmap is currently under review, taking into account lessons learned from its utilisation. It is likely that public and stakeholder consultation may commence once the need for a project arises (i.e., in advance of consultation on the study area).

Figure 11. EirGrid's project development and consultation roadmap (in review 2016)

5.6 BETTER IDENTIFY ACCEPTANCE CONDITIONS AND BUILD SHARED SOLUTIONS

Residents are involved in the project design.

Figure 12. Citizen involvement in a project during the public consultation

5.7 DEVELOP LOCAL EMPLOYMENT DURING AND AFTER THE CONSTRUCTION, MAXIMISING LOCAL BENEFIT AND 'MONEY BACK'

» Maximise local benefits for the territory,

» Local benefits provide more acceptance, and

» Developing local employment may constitute a powerful way to make local actors and authorities support grid projects.

An example of financial compensation and community funding is being piloted by EirGrid on one 110 kV transmission line. Payments are made to communities where new overhead transmission lines and new rural transmission stations are being constructed. Monies will directly relate to the length and voltage of the new overhead transmission line or new rural transmission stations.

Proximity payments are also to be implemented, including a one-off payment to owners of occupied residential properties (or those with full planning permission) within 200 metres from the closest point of the property to the centre of new 400 kV lines or within 200 metres from a new rural station or converter station.

6. RECOMMENDATIONS

» Explain the necessity for new projects in a clear and simple language to accommodate the public,

» Ensure transparent information and a participatory and fair dialogue process,

» Offer financial compensation for landowners and local community funding,

» Develop information sharing on best practices in infrastructure implementation, and

» Develop documentation concerning reasons and consequences for project delays.

7. CONCLUSIONS

Europe needs additional grid infrastructures to assist in the fight against global warming by connecting more and more renewable energy sources and to facilitate electricity trading. However, public perception is not always in line with European or national policy and climate goals. Moreover, TSOs are facing strong opposition when building transmission infrastructure, in addition to the extra burdens of achieving planning consent.

The PCI regulation was designed to facilitate the permit procedures for transmission infrastructure all over Europe. However, experience to date has shown that the public does not really distinguish between a PCI and another infrastructure project. Their concerns are generally rooted in local concerns regardless of the legal status (e.g., PCI) of a project.

As project developers, TSOs are innovative and have been implementing different technical solutions, reducing environmental effects, and engaging more meaningfully with the public. By doing so and by demonstrating change, TSOs are gaining more constructive engagement on their projects with stakeholders, including local populations and public and state authorities.

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