e-Highway2050 conference Unveiling the Electricity Highways Project Results:

"Europe's Future Secure and Sustainable Electricity Infrastructure"

DAY 1 Highlights – Tuesday 3 November 2015

Welcome and introduction

How to gain public support for more infrastructures was one of the key questions at the heart of the first day of the conference. At the moment, 50% of the projects labelled by the European Commission as Projects of Common Interest are delayed due to public resistance. There was much discussion of how best to change this situation – is it through more undergrounding? More solutions closer to the consumers? Greater transparency? More economic argumentation? Or rather stronger and sustained stakeholder and public engagement and co-ownership?

In his opening remark, **Jean Verseille, Member of the Board,** ENTSO-E spoke about the e-Highway2050's work on R&D and modular plan for the development of the European transmission grid. Acknowledging the project's success, he hoped that the project will be able to open the door for further studies to ensure that the transmission system is in line with long-term decarbonisation.

Keynote address

In her keynote address, **Marie Donnelly**, Director New and renewable sources of energy, energy efficiency and innovation of the European Commission insisted that the EU power system was no longer supply but service driven. Consumers must be at the heart of the system and receive the information they need to control their consumption. She talked about removing the artificial barrier between distribution and transmission. If the required investment in transmission adds up to hundreds of billions of euros, twice the amount would be needed in distribution. She talked about a modern and robust grid where renewables will no longer be curtailed.

The conclusions of the e-Highway2050 that no new layer of grid was needed to support Europe's decarbonisation was fully acknowledged by the Commission. The EC also clarified that its 15% interconnection target would be informed by regional specificities and identified bottlenecks – leading to higher or lower targets depending on the border.

Session I: The concept of Electricity Highway – Key benefits from a European perspective

The conference's first session addressed the concept of electricity highways, transmission infrastructure grids and the results of the e-Highway2050 project. Panellists from the European Commission, ENTSO-E and the e-Highway project attended.

Kurt Glaeser, Deputy Head of Unit, Networks and regional initiatives of the European Commission's DG Energy started by highlighting the importance of infrastructure in achieving the goals of the Energy Union for security of supply, sustainability and competitiveness.

Robert Schroeder, Manager System Development of ENTSO-E talked about the complementary between the e-Highway2050 project and ways to improve ENTSO-E ten-year network development plan (TYNDP). ENTSO-E will work with e-Highway2050 in the future on methodologies and scenario building.

Gerald Sanchis, e-Highway2050 Coordinator presented the key findings of the project. First, it developed new methodologies for the development of the European transmission grid that will enable to address long-term horizons, cover the whole Europe and cope with the European low carbon objectives. Second, the benefits of the transmission requirements identified for the European system largely exceed their costs. Third, results show that there is no need for a separate "layer" within the existing transmission network.

Session II: The concept of Electricity Highway – Key benefits from a European perspective

Sebastian Lepy, Chairman of ENTSO-E System Development Committee, highlighted that the concrete outcomes of the-Highway2050 project could most certainly improve ENTSO-E´s TYNDP work in the future. While ENTSO-E is still discussing exactly how to use lessons from the e-Highway 2050 project in the TYNDP process, the following list illustrates the areas that ENTSO-E is considering: (1) Methodologies to consider top down scenarios, including stakeholder involvement; (2) Gathering expertise in the development of wind and solar power to complement the expertise of ENTSO-E; and (3) Whether using some of the e-Highway 2050 models, notably the 100 node model and the combination of market and grid simulations to refocus the work of TYNDP.

All scenarios tested by the e-Highway project show a set of no-regret options in terms of future grid infrastructure. "Renewable decentralised generation can be compared to scattered rainfall that in the end build up into a large river for which you need large infrastructure", pointed out Sébastien Lepy. Responding to the fact that there are other solutions to envisage than to build additional grids, he insisted that transmission system operators' core responsibility is to respond to EU citizens' request for a steady and reliable supply of electric power, whatever the circumstances behind the switch. Building new infrastructure is the last resort when all other options fall short, he said.

Gerhard Seyrling, President of T&D Europe, stressed that the e-Highway2050 is an outstanding project illustrating the importance of electrical grids in and for Europe. Europe needs a strong grid, which the T&D industry is willing to deliver. The industry is committed to bring cost reduction through innovation, technical knowhow to assist regulatory bodies, and R&D to overcome the technical challenges identified by the scenarios of the report. In short, the T&D industry is ready to prepare all technical solutions for the futures explored in the e-Highway 2050 project.

Raul Gil, Chairman of the Europacable Utilities Board, noted that today, we describe 2050 as "long term" planning – but it is actually a much shorter time horizon than we believe. He gave the example of the France Spain interconnector (INELFE), which took 30 years to plan and 4 years to build. The main barrier delaying implementation of new transmission links is public opposition. Underground cables are a technical solution to address this barrier. Mr. Gil questioned how we can create a sense of urgency in the public and political debates that by not building Europe´s power lines, we are preventing the reduction of CO2 emissions in Europe? Like T&D Europe, Europacable

are global technology leaders in their fields and ready to deliver Europe´s transmission highways. All the industry needs is stability of the regulations, clarity on the targets, and a legal framework that does not provide barriers.

Kristian Ruby, Chief Policy Officer at EWEA, takes 3 main messages from the e-Highway2050 project. The first one is that investments in grid infrastructures come with a societal business case. Benefits from the necessary upgrades to the European energy infrastructure (€14-55bn) clearly outweigh their costs (€10-20bn). Second, the investments needed to deliver an energy infrastructure for a decarbonised Europe are surmountable, although significant (and definitely comparable with fossil fuels imports). Finally, what the TSOs and the Ten-Year Network Development Plan (TYNDP) are doing today is fully consistent with what we need to deliver a grid infrastructure for the future.

In addition to the good news, he identified key messages to policy makers: 1) Social acceptance can be achieved, for instance, by systematically including citizens in the planning process, ensuring participation through public meetings and by building co-ownership. 2) What is currently foreseen with the TYNDP is not enough to deliver the grid infrastructure to support a decarbonised European energy sector – additional investments will be needed. 3) A robust governance system for the Energy Union is in the interest of the wind industry to enable planning and provide pipeline visibility after 2020. But it is also in the interest of TSOs. Without a clear overview over major upcoming variable renewables projects, it will be difficult for TSOs to make the right investment decisions.

Gian Carlo Scarsi, head of the DSO Unit at EURELECTRIC, highlighted the need to balance the need for grid investment with the development of market-based solutions. The question is not only about whether one wants to go for more transmission lines, but also the extent to which alternative solutions are to be modelled and assessed, since there is no demonstrably superior technology in the price/quality space and a number of technologies are currently competing against each other, including smarter distribution networks as an alternative to high-voltage lines and stronger market-based mechanisms. Some expansion of the transmission grid at crucially congested high-voltage junctions (both within and between member states) may still be unavoidable, but we do not need it everywhere.

What is most important, at the end of the day, is to look at what customers want. We should let them choose: customers needs to be made aware of what sits in their bill and how the energy bill is split into different components covering transmission, distribution, energy costs and of course levies, taxes, and surcharges. Customers must be able to realise the trade-off between higher transmission investment (leading to higher transmission charges in the final bill) and alternative solutions such as local generation, distribution network ('smart') upgrades, and even (in the limit) the opportunity cost/benefit of going off-grid.

Hannes Seidl, Head of Division Energy Systems and Energy Services of German Energy Agency (dena), mentioned that there is a need to connect the potential of renewable energy throughout Member States. He also stated that it will be difficult to integrate RES in the electricity system which cannot be done without the increase of energy efficiency in Europe. On the other hand, grid expansion for RES integration is very important for various flexibility options that must take into account network development plans. He highlighted that we are talking about the evolution of the transmission grid and not the revolution, which should help with the highlighted challenges of public acceptance. However, grid expansion will face various challenges. One of the main remaining

questions is how to balance the national perspectives of member states with the objectives of the Energy Union objectives, in particular to how best to ensure fair allocation of costs across Europe

Christophe Gence-Creux, Head of ACER's Electricity Department mentioned that there are two broad consensuses in regards to the results of the project. First, there is a common agreement that we need more transmission infrastructure but the critical issue is how much do we need, when and where. Second, there is an overall concern about the lack of public acceptance which cannot be solved with regulatory solutions or policy initiatives like the PCIs. As a solution, he proposed more transparency and a better communication regarding the added-value of the investment. He raised concerns that loop flows resulting from internal congestion mean that tradable cross-border capacity is only around half of the physical capacity between European markets. These issues need to be solved in order to gain public trust, as well as providing market-based incentives for investment in cross-border transmission. He concluded that ACER is fully committed to address all these issues.

Panel debate

The moderator **Sonja van Renssen** summarised the main highlights of the session. All parties agreed that the achievement of a near, complete decarbonisation of Europe's economy will not be possible without new investments in transmission grid but it is important to consider which network options do we need to build and where. The development of the analysis supporting the investment is an important issue but even more important is the way in which investments needs are communicated and presented. This could also help to avoid public acceptances issues usually associated with the building of new transmission lines. The technology options are available and there is no single solution to grid development. Total costs of €400bn are surmountable, and are similar to the annual spend on imported fossil fuels in Europe. Regarding policy, if we take a European approach then we would need a CBA.

Another issue is that the existing cross-border capacity is not fully utilised to link markets, with only half of the existing capacity currently being available to the market. The role of the TSO is not only to build new grids but to make sure the lights are kept on. Therefore, the discussions also covered the role of flexibility options in future grids, including demand side and storage solutions. As a final conclusion, all panellists agreed that nevertheless the customer will be the one that decides what technology options are implemented.