



ELECTRO-MOBILITY:
TOWARDS CLEAN,
ZERO-EMISSION
TRANSPORT



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The EU is committed to reducing greenhouse gas emissions by 80-95% by 2050 compared to 1990 with an intermediate target for 2030 of 40%. Transport represents almost a quarter of Europe's greenhouse gas emissions and is the main cause of reduced air quality in cities, which poses a serious threat to public health. Road transport alone is responsible for almost a fifth of total EU emissions.

To achieve the EU's emissions targets, the transport sector will have to address decarbonisation. This includes switching to sustainably sourced low, or zero, emission alternative energy sources and to ultimately achieve zero-emission transport modes. Electrification is going to play a major role in the decarbonisation of European transport.

An increase in electric mobility and the accompanying charging infrastructure will have a large impact on the medium voltage network. Primarily fast charging infrastructure and ship-to-shore connections will be connected directly to medium voltage networks

ROAD TRANSPORT

Electrification of the road transportation was already addressed by the EU with a specific Directive¹, and its implementation is monitored on a voluntary basis within the National Policy Frameworks. The Directive's aim was to install 800.000 recharging point for eVehicles by 2025, but up to 2018 we managed to install only 100.000 throughout Europe.

Technology has dramatically advanced in these five years, just to mention that in 2014 a charging station with 22 kW was already considered a fast one. Nowadays we talk about 50, 150, 350 for cars and 600 Kw for busses, and this power has to be provided through medium voltage substations, making electric vehicles charging infrastructure very relevant to the T&D industry.

A number of EU Member States have already introduced a ban for new petrol and diesel cars by 2030-2040. The European Parliament has adopted a draft law that proposed setting a higher target for reducing EU fleet-wide emissions for new cars by 20% by 2025 and by 40% by 2030, which is much higher than the previous objective of 30%. As per the new objective, European car manufacturers exceeding the CO2 emissions targets will have to pay a fine to the EU budget.

They will also have to ensure that zero and low emission vehicles (ZLEVs, electric cars or vehicles which emit less than 50g CO2 /km) account for 20% of the market share of sales of new cars and vans by 2025 and 35% by 2030. This move is meant to accelerate the market uptake of electric and other low emission cars. The current price of electric vehicles is higher than the equivalent petrol or diesel ones, but it is expected that prices of electrical vehicles will decrease over time while conventional vehicles could become more expensive through the need of new technologies to improve their efficiency and reduce pollution in accordance to the new emission performance standards.



¹<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0094&from=en>



The projected reduction of electric cars price, the availability of models and the growing network of charging points will result in a sustained growth of electric cars.

When referring to electric vehicles on the road, people normally refer to cars, while a big importance shall be given also to public transportation and to electric trucks.

Running vehicles on electricity instead of fossil fuels shifts energy requirements from petrol stations to power systems. A wide uptake of electric vehicles will increase electricity demand on an electricity network that is already constrained at certain times of the day in certain areas of Europe. The increasing digitalisation of infrastructure already enables smart management of the grid, hence the management of charging points. This makes “smart charging” possible: charging at the most convenient time for the electricity grid and at the lowest cost for the consumer. Moreover, bidirectional charging infrastructure offers the opportunity to use the electric car fleet as a source of grid flexibility during shortages. The directive on common rules for the internal market in electricity, which builds upon provisions of the Energy Efficiency directive, aims to provide a coherent framework for demand response that enables smart charging, gives consumers incentives to charge at off-peak times and gives distribution system operators the ability to actively manage the grid.



Despite these opportunities, analyses also reveal that an increasing electric vehicle penetration heavily affects the operation of the energy sector and integration of electric vehicle demand poses very diverse challenges on the management of power system at local, national and European level depending on the respective status of the energy system.

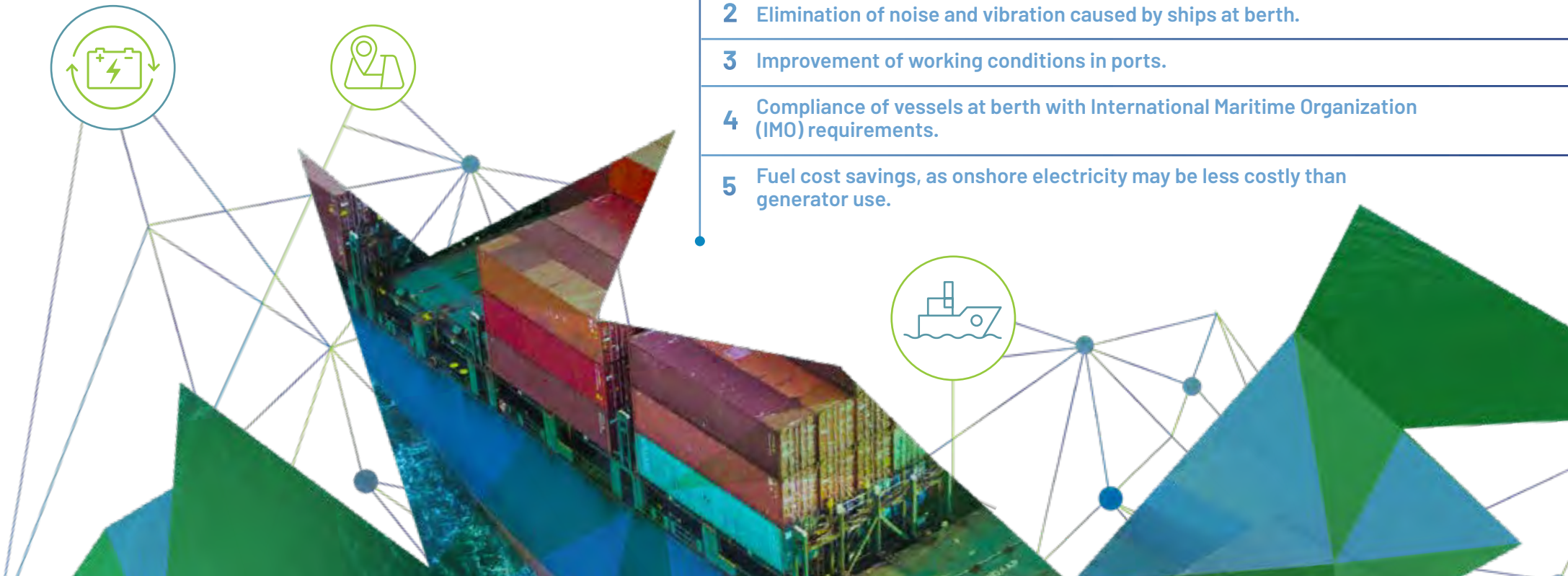
Up to 2030 only local grid congestions due to peak loading of the grid need to be considered. Due to energy efficiency gains, electricity consumption in the EU is likely decreasing faster than the rate of electrification. Therefore, the start-off for electric vehicles market introduction seems to be practically feasible. However, for specific areas with fast charging infrastructure, high concentrations of electric vehicles like city centres or pollution regulated city districts a grid re-enforcement needs to be taken into account.

SHIP-TO-SHORE

Next to road transport, emissions from shipping can also be reduced by using charging infrastructure. Ships are an increasing source of both climate pollution and other air pollutants. Fine particulate matter (PM 2.5) from shipping has been linked to an estimated 60,000 premature deaths worldwide annually. Emissions from ships staying at ports can be drastically reduced by eliminating the need for the ship's diesel generators with shore-to-ship power.

Ship-to-shore power delivers a number of benefits, including :

- 1 Elimination of ship engine emissions in port areas (particulate matter, nitrogen oxides, sulphur oxides, carbon oxides, and volatile organic compounds.**
- 2 Elimination of noise and vibration caused by ships at berth.**
- 3 Improvement of working conditions in ports.**
- 4 Compliance of vessels at berth with International Maritime Organization (IMO) requirements.**
- 5 Fuel cost savings, as onshore electricity may be less costly than generator use.**





The European Union should continue to play a pro-active role in promoting the uptake of electric mobility. T&D Europe calls for the following points to be part of the upcoming review of the directive on the deployment of alternative fuels infrastructure:

- ▶ Include mandatory targets in the DAFI like:

14% electric road mobility by 2030 in the DAFI.
800.000 charging points in Europe by 2030.

- ▶ Focus the DAFI not only on Particle Matter emissions, but also include targets for CO2 emissions. Alternative fuels should have net-zero carbon emissions from the vehicle or vessel. LNG and CNG are not eligible because of the accompanying CO2 emission.
- ▶ Create an European Mobility Fund to support the investments in electric mobility infrastructure. T&D Europe estimates that investments of more than 22 billion euros are required in charging infrastructure up to 2030. An European investment fund is required to guarantee these investments.
- ▶ Reserve a portion of this mobility fund for 'Green ports' projects. When a grid connection for ship-to-shore connections is created, a window of opportunity opens for further electrification of the harbour area. Shore-side-electricity can and should be combined with electrification of local infrastructure and inland transportation.
- ▶ Overall, a grid development strategy needs to be launched in close cooperation of city planners, grid operators, utilities and municipalities, car manufacturers and T&D equipment manufacturers to outline a roadmap for charging infrastructure development.
- ▶ Create a level playing field for ship-to-shore connections by removing energy taxes for ship-to-shore connections. Marine fuels are not taxed and therefore the business case for ship-to-shore connections suffer from energy taxation.

- ▶ Include electrification of a vehicle fleet into ISO14001 to further promote the adoption of electric vehicles.

The electrification of the transport sector brings significant benefits in terms of greenhouse gas emissions reductions and local air quality improvements. The shift from petrol and diesel of electricity will increase the demands placed on the electricity system. The roll-out of electric vehicles in the EU is practically feasible. However, for specific areas with fast charging infrastructure, high concentrations of electric vehicles like city centres or pollution regulated city districts a grid re-enforcement may have to be considered. Up to 2030 only certain local grids are expected to be faced with congestions due to peak loading. of the grid need to be considered. Due to energy efficiency gains, electricity consumption in the EU is likely decreasing faster than the rate of electrification.

The technology and the network to enable the electrification are already available. Policy-makers hold the key to the success of the transition to low-carbon mobility. By setting the right policy framework and incentivising key players, such as car manufacturers and system operators, they are able to create the environment for the shift to e-mobility.





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