This TSI concerns the energy subsystem and covers all fixed installations necessary to achieve interoperability that are required to supply traction energy to a train.

**ESSENTIAL REQUIREMENTS**

- Safety
- Reliability and availability
- Health
- Environmental protection
- Technical compatibility
- Accessibility

**WHAT DOES IT CONCERN TO?**

It applies to high-speed lines, conventional lines (both passenger and freight) and all vehicles likely to travel all or part of the Union’s network (locomotives and passenger rolling stock, freight wagons and special vehicles, such as on-track machines).

It does not apply to metros, trams and light rail vehicles, privately owned railway infrastructure, infrastructure and vehicles reserved for a strictly local, historical or touristic use.

**WHAT DOES IT CONTAIN?**

- Introduction with the technical, risk, and geographical scopes
- Definitions of the subsystem and of the scope
- Essential requirements
- Characteristics of the subsystem, particularly the functional and technical specifications of the subsystem and of the interfaces
- Interoperability constituents
- Assessment of conformity and/or suitability for use of the constituents and verification of the subsystem
- Implementation

The ENE TSI concerns the energy subsystem and part of the maintenance subsystem of the Union rail system.

- Energy subsystem: The electrification system, including overhead lines and the trackside electricity consumption measuring and charging system.
- Maintenance subsystem: The procedures, associated equipment, logistics centres for maintenance work and reserves providing the mandatory corrective and preventive maintenance to ensure the interoperability of the Union rail system and guarantee the performance required.

**TECHNICAL SCOPE**

It shall apply to:

- any new, upgraded or renewed 'energy' subsystem of the rail system in the European Union.
- new railway lines in the European Union, which are placed in service from 1 January 2015.

It shall not apply to existing infrastructure of the rail system in the European Union, which is already placed in service on all or part of the network of any Member State on 1 January 2015, except when it is subject to renewal or upgrading.

**GEOGRAPHICAL SCOPE**

They are divided in 'Permanent' and 'Temporary' cases.

Estonia, France, Italy, Latvia, Lithuania, Poland, Spain, Sweden, UK, Eurotunnel.
Operating rules are developed within the procedures described in the infrastructure manager safety management system. These rules take into account the documentation related to operation, which forms a part of the technical file, as required in Article 15 and as set out in Annex IV of Directive (EU) 2016/797.

In certain situations involving pre-planned works, it may be necessary to temporarily derogate from the specifications of the energy subsystem and its interoperability constituents.

**UPGRADING/RENEWAL OF THE OCL AND/OR THE POWER SUPPLY**

- It is possible to gradually modify all or part of the OCL and/or the power supply system — element by element — over an extended period of time to achieve compliance with the EN TSI.
- The process of upgrading/renewal should take into consideration the need of maintaining compatibility with the existing energy subsystem and other subsystems. For a project including elements not being TSI compliant, the procedures for the assessment of conformity and EC verification to be applied should be agreed with the Member State.

**PARAMETERS RELATED TO MAINTENANCE**

- While maintaining the energy subsystem, formal verifications and authorisations for placing into service are not required. However, maintenance replacements may be undertaken, as far as reasonably practicable, in accordance with the requirements of the EN TSI contributing to the development of interoperability.

**ROUTE COMPATIBILITY CHECKS BEFORE THE USE OF AUTHORISED VEHICLES**

- The procedure to be applied and the parameters of the energy subsystem to be used by the railway undertaking, for the purpose of route compatibility check are described in point 4.2.2.5 and appendix D1 of the Annex to Commission Implementing Regulation (EU) 2019/773.

**IMPLEMENTATION PLAN FOR VoltAGES AND FREQUENCIES**

- The choice of power supply system is a Member State’s competence. The decision should be taken on economic and technical grounds, taking into account at least the following elements:
  - The existing power supply system in the Member State;
  - Any connection to railway line in neighbouring countries with an existing electrical power supply;
  - Power demand.
- New lines with speed greater than 250 km/h shall be supplied with one of the AC systems as defined in point 4.1.1.1.

**IMPLEMENTATION PLAN FOR OCL GEOMETRY**

- Scope of the implementation plan: Member States’ implementation plan shall take into account the following elements:
  - closing gaps between different OCL geometries;
  - any connection to the existing OCL geometries in neighbouring areas;
  - existing certified ICS OCL.
- Implementation rules for 1435 mm track gauge system: The OCL shall be designed taking into account the following rules:
  - New lines with speed greater than 250 km/h shall accommodate both pantographs as specified in the LOC & PAS TSI points 4.2.8.2.9.2.1 (1600 mm) and 4.2.8.2.9.2.2 (1 950 mm).
  - Renewed or upgraded lines with speed equal or greater than 250 km/h shall accommodate at least a pantograph with the head geometry specified in the LOC & PAS TSI point 4.2.8.2.9.2.1 (1600 mm).
  - Other cases: the OCL shall be designed for use by at least one of the pantographs with the head geometry specified in the LOC & PAS TSI points 4.2.8.2.9.2.1 (1600 mm) or 4.2.8.2.9.2.2 (1950 mm).
- Implementation rules for track gauge systems different than 1435 mm: The OCL shall be designed for use by at least one of the pantographs with the head geometry specified in the LOC & PAS TSI point 4.2.8.2.9.2.
- By 1 January 2022, Member States shall ensure that an on-ground energy data collecting system capable to exchange compiled energy billing data in accordance with point 4.1.2.9 of this Guide is implemented.