

EXECUTIVE SUMMARY

This is the Project Management Plan for the Horizon Europe project SCARLET, contract no. 101075602, with a duration of four and a half years starting on September 1st, 2022. The plan will be used internally for detailed planning of the project activities and for following up progress of the research and the deliverables. The Grant Agreement (GA) sets the frame in terms of deliverables, budget, and structure and organisation of the work.

SCARLET takes the important step of developing superconducting cables, utilizing their benefits by operation under DC conditions, at high currents and medium voltages, perfectly suited for transmission of electric energy from many renewable energy generation sites. A key feature is the medium-voltage operation, enabled by the high-current capability of superconductors, which eliminates costly high-voltage converter stations, thereby allowing for significant overall cost reductions. Additionally, the energy losses, the footprint, and the environmental impact of the cables are much lower than in their conventional counterparts. The SCARLET superconducting cables will be industrially manufactured in processes prepared for multi-kilometre lengths, and will be demonstrated, including undergoing cable type tests.

Two conductor materials are considered for the cable demonstrations: high-temperature superconductors (HTSs) operating in liquid nitrogen (LN₂) at 67 K, and magnesium diboride (MgB₂) operating in liquid hydrogen (LH₂) at 20 K. The cable conductors and their operating temperatures set different requirements on the cable designs, but there are also synergies that will be utilized to reduce the development costs. In addition to the cables themselves, their cooling systems as well as components for cable system protection will be developed, including a high-current superconducting fault current limiter (SFCL) module. Use cases are considered, both onshore and offshore, to determine optimal designs and to assess the superconducting cable systems technically and economically. SCARLET also includes a feasibility study of elpipes, large cross-section metallic pipes proposed for high-power electricity transmission at room temperature.

Work is conducted in seven work packages (WPs 1-7). The technological core of the project lays with the demonstrators and the research leading to them in WPs 2, 4 and 5, and the work on submarine cables in WP3. To both support and to determine the feasibility of the different cable types, economic evaluations and in-field integration studies are conducted in WP1. This WP also contains the studies of elpipe systems. WP6 is dedicated to the exchange with the target groups, including dissemination, exploitation, and standardisation, and WP7 carries the responsibility of the project coordination, including management and contact with the Commission.

This version of the Project Management Plan is written in the first two months of the project as Deliverable 7.1. The plan will be revised at the end of each reporting period, and when needed.

