

The most accurate million-volt measurement carried out in High Voltage Laboratory

8 July 2013



Researchers have developed a mobile million-volt DC voltage divider, coordinated by the Finnish centre for metrology and accreditation, MIKES.

The million-volt DC voltage divider enables accurate calibration of voltage sensors used for [high voltage](#) direct current (HVDC) transmissions in the manufacturers' laboratories before their delivery on-site. The mobile divider consists of five 200 kV modules, usually located in Finland, Sweden, Germany, Holland and Turkey. To measure voltages in excess of 200 kV, the required number of modules is taken to the calibration site. The highest possible voltage at the moment is one million volts.

The testing and calibration of the divider took place in early June in Aalto University's High Voltage Laboratory. This is the only facility in Finland where voltages of up to one million volts can be tested and calibrated. Five European national standards laboratories took part in the design and construction of the DC voltage divider. Cooperation in this sub-project was coordinated by MIKES.

High-voltage direct current (HVDC) connections are the only technique for transmitting power over [long distances](#) from [wind farms](#) far out in the sea to the continent through [submarine cable](#) lines, or between countries when interconnection of AC networks is not possible. There are two HVDC cable connections between Finland and Sweden, and one between Finland and Estonia. A second cable connection to Estonia is under construction.

An increasing number of new HVDC lines is being built globally. To measure the power of the current point-to-point HVDC networks, a conventional AC voltage measurement is being used. A precondition for this is that line users reach a mutual agreement on sharing the costs of power losses. For the radial HVDC networks of the future, quantifying losses between various substations and line sections – and sharing the costs fairly between various actors— will not be possible without HVDC metering. For this purpose, calibration techniques need to be developed to assess the uncertainties of HVDC power metering.

The measurement was part of a project on metrology techniques for HVDC connections under the European Metrology Research Programme (EMRP).

More information:

www.euramet.org/index.php?id=emrp_call_2009#c8344

Provided by Aalto University

APA citation: The most accurate million-volt measurement carried out in High Voltage Laboratory (2013, July 8) retrieved 4 December 2021 from <https://phys.org/news/2013-07-accurate-million-volt-high-voltage-laboratory.html>

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