The objective of MIGRATE is:

- to develop and validate innovative, technology-based solutions in view of managing the pan-European electricity system experiencing a proliferation of Power Electronics (PE) devices involved in connecting generation and consumption sites. This overarching goal is split into two components combining two time horizons:
- in the short to medium term, incremental technology-based solutions are needed to operate the existing electric HVAC system configuration with a growing penetration of PE-connected generation and consumption, based on novel methods and tools,
- in the long term, breakthrough technology-based solutions are needed to manage a transition towards an HVAC electric system where all generation and consumption is connected via 100% PE, based on innovative control algorithms together with new grid connection standards.
Expected Impact

- Maximisation of the amount of Renewable Energy Sources installed in the system while keeping the system stable.
- Anticipation of future potential problems and challenges.
- Clarification of the need of new control/protection schemes and possibly new connection rules to the grid.

**MIGRATE** will provide requirements for future measures, methods and tools for a secure operation of the upcoming converter dominated power system.

Illustration of the main concept of the MIGRATE project. The abscissa represents the PE penetration where L1 and L2 are asymptotes where severe stability problems could be met within the existing framework. The ordinate axis represents a generic stability index.
**WP Objectives**

**WP1:** The development of mitigation approaches in order to address power system stability issues under high penetration of power electronics.

**WP2:** To demonstrate that the solutions created are capable of maintaining a high level of accuracy and reliability for a range of different power systems, beyond those they were originally envisioned for, and as such are ready for pan-European application.

**WP3:** To develop new controls and management rules enabling the operation of a grid with 100% converter-based devices and keeping today’s level of reliability.

**WP4:** To provide a detailed insight of the behaviour of present protection practices in scenarios of high penetration of PE based generators and propose evolutions of the design and implementation of protection systems during the transition period.

**WP5:** The development of appropriate models, modelling platform and advanced methodologies and to study and improve power quality in power-electronic rich hybrid power networks of the future ensuring secure operation of the network and appropriate quality of supply to network users.

**WP6:** To demonstrate that the envisaged technical solution towards a 100% penetration of PE can be proposed by manufacturers and implemented by TSOs at affordable costs based on novel connection standards described in the future version of the transmission grid codes.

**WP7:** To enable smooth communication, dissemination and knowledge sharing among the targeted stakeholders at EC level.

**WP8:** To adequately coordinate and organise the project at strategic level.
Facts

Horizon 2020 – LCE-6: Transmission Grid & Wholesale Market
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