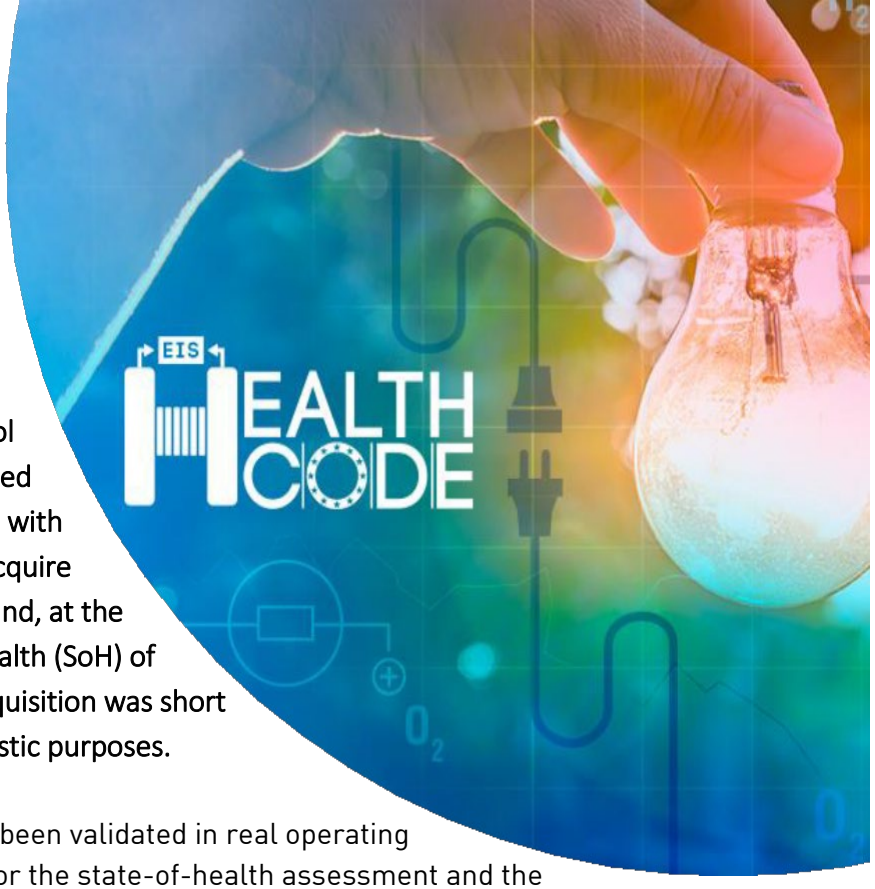
Public Abstract

Deliverable D5.3 Diagnostic Tool Final Validation



The Monitoring and Diagnostic Tool (MDT) was successfully implemented into the EIS-board. The integration with the system hardware allowed to acquire high quality EIS spectra on-board and, at the same time infer on the State of Health (SoH) of the system's stack. The time of acquisition was short enough for monitoring and diagnostic purposes.

The proposed diagnostic tool has been validated in real operating environment. The time required for the state-of-health assessment and the faults' classification on both the systems, plus the time for measurements and communications, is suitable for diagnostic purposes. The tool was able to acquire the EIS spectrum and process the data in a reasonable time, considering that the low frequency part of the spectrum requires minutes for its measurement. The following table shows the qualitative results related to detection efficacy of the complete tool, obtained during the experimental activity on the real systems:

system	On-line Qualitative index					
	FS	AS	FL	DR	CO	SP
EPS	☺☺	☺☺	☺☺	☺	not scheduled	not scheduled
BPSE	■	☺	☺	■	☺	■

The main terms of validation for the diagnostic tool are diagnosis efficacy (and consequently systems reliability improvement and maintenance management optimization), cost efficiency, easy HW/SW integration.

The diagnostic algorithms proposed within the HEALTH-CODE project were able to detect the 100% of EIS acquired spectra and correctly isolate more than the 90% of the incipient faults induced on both investigated systems (μ-CHP and backup).

To summarize, once implemented, the tool can have a positive impact on the reliability of the fuel cell systems thanks to its fast reaction to any fault that could affect system operation and lifetime. Remote monitoring and fault identification will allow the operator to quickly react to preserve system performances and lifetime.
Another advantage concerning monitoring and diagnostic and closely related to system reliability, is the impact on maintenance: the knowledge about system status allows a more punctual and defined maintenance activity, resulting in decrease of extraordinary interventions and thus in a reduction of the whole maintenance cost.