STATEMENT

Last update: November 2024

ASERCOM
ASSOCIATION OF EUROPEAN REFRIGERATION COMPONENT MANUFACTURERS

Statement on Network Codes for Heat Pumps

Driven by more and more renewable energy from PV and wind turbines, our electrical grids face increasing challenges to balance load and generation of electricity. Especially consumers which have some energy storage capacity are expected to contribute in future to grid stability. This can happen if loads with a storage capacity can be disconnected in times of a critical grid situation, when an overload of the grid is happening and a blackout is a realistic risk.

Heat pumps can be used to heat buildings or processes with a certain thermal capacity and a disconnection of the heat pump for a certain time to stabilize the grid would not necessarily create a damage or problem in the building or process. This is the reason why the European Union Agency for the Cooperation of Energy Regulators (ACER) and ENTSO-E, the European Network of Transmission System Operators for Electricity, are working on network codes and a framework to use heat pumps to help stabilize the electrical grid in an emergency situation. ACER proposes a “limited frequency sensitive mode” for various demand units (LFSM-UC) including heat pumps. *ASERCOM* is publishing this statement to give some technical input to this discussion and to highlight some important constraints. *ASERCOM* is focusing on heat pumps in residential or light commercial applications.

ASERCOM would not agree to apply the same regulatory measures to more complex applications with a heating function e.g. refrigeration applications with combined heat reclaim feature and industrial heat pumps.

1. RACHP equipment is able to offer thermal flexibility by either transferring electrical energy into thermal energy and to buffer it or by using this buffered thermal energy to reduce electrical energy consumption on a short-term notice as was demonstrated in Ecodesign Lot 33 (smart appliances). Due to this, before an emergency disconnect occurs at the very end, *ASERCOM* recommends that other options like continuous load reductions by frequency inverters and different operating points of the heat pumps which can help to avoid such an emergency situation. These earlier steps could be controlled by the grid frequency or by flexible and variable prices for electricity.

2. To avoid an emergency shut-down in case of a grid instability, in many cases early load shifts or adaptations can be used.

3. It is possible to disconnect a compressor in an RACHP circuit in an emergency situation within some hundred milliseconds without damaging the compressor or the system. This can be done in all RACHP circuits for example by various protection devices which protect the compressor against pre-mature damage due to encountering abnormal operating conditions. But such an emergency shut-down is not recommended to happen on a regular basis.

4. *ASERCOM* strongly recommends to disconnect only the main electrical loads in a heat pump: the compressor, the ohmic (back-up) heater and the fans. The controller, the safety devices and sensors must not be deactivated.

5. The heat pumps should not be hard-stopped when in de-frost or oil-return mode (which might occur less than 10% of the operating time) since damage might occur to the condenser or compressor.

6. The restart of the system should be actively managed by the controller and can happen when the grid frequency is increasing again and exceeds a certain threshold. To avoid a short cycling of the heat pump and high load peaks (in-rush current at start-up) in the grid when too many heat pumps restart at the same point in time, *ASERCOM* recommends to include a hysteresis of several minutes to the grid frequency monitor and also a random delay time which is avoiding that all heat pumps in a certain area restart at exactly the same time based on the grid frequency.

7. The disconnection of heat pumps should be limited to severe emergency situations when a (local) blackout of the grid is very likely to occur. (Low Frequency Demand Disconnection (LFDD) is the backup measure used by Distribution Network Operators (DNOs) to limit the fall in grid frequency in extreme events. Known in other countries as 'under frequency load shedding', in simple terms it cuts electricity from a proportion of customers when grid frequency plummets below the safe level.) This intends to stem the frequency drop and protect the grid from suffering a more serious issue or even a complete collapse.

Revision Index

Revision	Change	Date
A	Initial issue	November 2024
B	Final approval	
C	1. Review	
D	2. Review	
E	3. Review	