



Solutions in the context of automatic underfrequency load shedding (UFLS)

In response to decentralized generation, a change in strategy was required with regard to the scheme for automatic low frequency demand disconnection. Transmission system operators and distribution system operators therefore jointly decided to redesign the scheme and established a compulsory, nationwide decentralized and autarchic structure, which also considers the particular feed-in situation.

Automatic low frequency demand disconnection scheme

Key elements of the new UFLS concept are:

- classification of the frequency range 49.2Hz-48.2Hz into three to five shedding stages;
- shedding of 50% of the average annual load (reference grid load), the classified shedding stages are applied;
- highest shedding level is medium voltage;
- classification of grids into three types – without energy recovery, with temporary energy recovery or with preponderant energy recovery;
- only networks without ongoing energy recovery are shed.

Manual load shedding

Manual load shedding is a preventive adjusting measure (compare § 13.2 German EnWG*) in case of congestion caused by too heavy load flow, missing control area adequacy (too little generation) or violation of voltage levels.

Decisive points to trigger adapting measures with load shedding:

- non-discriminatory selection of networks, which do not inject recovered energy at present;
- consideration of outgoing feeder with frequency protection relay;
- rolling process in case a measure lasts longer than 90 minutes;
- re-structuring of frequency groups upon completion of the measure.

Solutions by VIVAVIS

The VIVAVIS portfolio provides solutions for both automated and manual load shedding.

Frequency protection devices for automated load shedding

The combined protection devices **ACOS 353/354** or the protection devices **ACOS 333/334** provide frequency protection functions required for automatic underfrequency load shedding. Active power direction detection prevents tripping in the event of energy recovery and thus averts further deterioration of the generation situation when shutting down automatically or manually. Tripping is indicated by a message and thus distinguished from a sheer breaker event or any other defensive measure.

* German Act on Electricity and Gas Supply (EnWG)

Station automation system ACOS 750

Currently made settings for frequency levels, tripping and energy recovery messages as well as commands imposing blockades are sent to the control station via the control station technology and are in addition considered by local processing functions and logic (eg electrical interlocks, switching competence). As control station technology, you can use **HIGH-VIS SAS** as station console or **ACOS 750** as automation system.

VIVAVIS HIGH-LEIT and CAIGOS-GIS

Load shedding disconnects consumers and generators from the power system. Affected medium-voltage sectors can be immediately identified in VIVAVIS **HIGH-LEIT**.

CAIGOS-GIS offers visualization of no longer supplied low-voltage sectors and affected consumers as well as generators.

HIGH-LEIT feed-in management (HIGH-LEIT EEM) for automatic and manual load shedding

HIGH-LEIT EEM is activated in case of both automatic and manual load shedding. Whereas manual load shedding is initiated via an announcement and the non-discriminatory selection of outgoing feeders, automatic load shedding does not select any outgoing feeders and immediately initializes the measure as 'Running'.

Further conducting (rolling process, completion, reconnection, logging) is identical in both cases. The rolling process is started after 90 minutes at the latest and based on the defined frequency groups.

In order to guarantee non-discriminatory behaviour with regard to future disconnections, **HIGH-LEIT EEM** allocates all outgoing feeders with automatic load shedding affected by the measure to the lowest frequency group when executing the rolling process or completing the measure. All outgoing feeders that have not been involved are allocated to the respective higher frequency group. In addition, **HIGH-LEIT EEM** tries to recover the original range of the frequency groups. The re-allocation is made by means of a command to the frequency protection that activates the respective parameter set.

Your benefits

With products by VIVAVIS, we are able to offer consistent solutions for every issue related to automatic underfrequency load shedding on all levels. All products can be integrated into existing system environments, thereby guaranteeing the protection of your investments.

For further information, please consult our brochures and product data sheets or contact us via email or phone. We are looking forward to offering you comprehensive and competent advice or tailor-made solutions.

