

Agenda

- What is ripple control up to now ?
- What are today's requirements ?
- How can ripple control be enhanced ?
 - Tariff switching applications
 - Address range
 - Data rate and speed
 - More flexible applications for public lighting
- New applications with Swistra
- Possible other applications with Swistra
- Conclusion

What are today's requirements?



- Load control
 - Differentiated addressing, also in the private area
 - Real time control
 - Flexible group assignments under regional and thematic aspects
 - Supply limitation through transmission of limiting values and/or dimming values
- Metering/Billing
 - Passive load management with TOU tariffs, also for prepaid meters
 - Receive corruption proof metering information (mail, Internet, SMS)
 - Disable / enable non-paying customers
 - Provide tariffs online
 - Customer information about actual tariff (costs per kWh)

What are today's requirements?

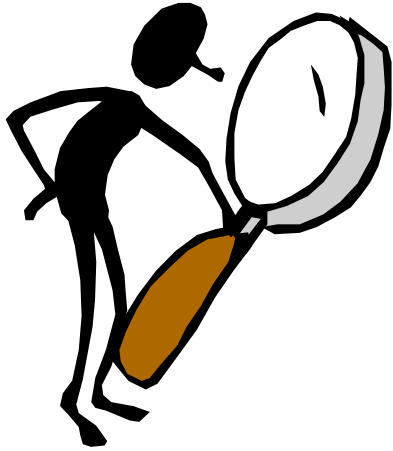


- Street Lighting
 - Better individual addressing
 - Dimming of street lights
 - Flexible programming according to changing municipalities wishes (variations in times for on/off-switching)
- Customer Information
 - Transmission of information in an SMS-like format (RCMS = ripple-control message service), e. g.:

Daily Tariffs:

00:00 - 10:00 h	0,12 €
10:00 - 15:30 h	0,14 €
15:30 - 00:00 h	0,16 €

What can be achieved with Swistra?



Everything which was possible so far +

- Load control industrial customers
 - Coverage of individual aggregates with unlimited addressing
 - Transmission not only of on and off states but also of supply limits, supply times etc.
- Load control private customers
 - Fast transmission of commands in real time
 - Generation of load groups with multiple relations
 - Presetting of supply limits
- Metering
 - Transmission of checksums for meter reading cryptography
 - Accessing individual meters with their ID numbers (disable / enable)
 - Preset / display tariff information
 - Transmission of the exact time (+/- 20ms)

What can be achieved with Swistra?



Everything which was possible so far +

- More flexible Public Light switching
 - geographical addressing possible with broader address range
 - Transmission not only of on and off states but also of dimming values
- Load control decentralized production
 - Fast transmission of commands in real time
 - Communication via 50Hz network under control of network operator
- ...

The Swistra Protocol (1)

- Made possible by modern ripple-control receivers with software-based digital filter technology → determine pulse rise and decay with accurate resolution.
- Integration into existing Ripple Control Systems (e.g. Decabit, Semagyr, Ricontic) → existing receivers can be retained, but without the benefit of the Swistra protocol
- System parts to be upgraded: Controller and receivers, upgrade of the static transmitters not necessary with transmitters so far tested
- Upgrades an existing Ripple Control System with speeds of roughly 1 Baud (1 Bit per second) to a coding system of at least 8 Bits per second
- Further increase of speed with modern transmitters allowing to change output voltage during transmission

Signalling of TOU tariffs



- Tariff switching with relay(s) of the receiver
- Tariff switching within meter
- "SML"-interface to meter 2 / 4 / 8 tariffs
- Inexpensive communication over whole network



RC and bidirectional communication

- Various ripple control receivers are currently being developed in order to enhance the system for bi-directional communication.
 - Hybrid receiver with additionally integrated powerline modem for a proprietary communications protocol
 - Open communications interface with Ethernet communication
 - Powerline for in-house communication and web (Ethernet) interface for smart metering applications
- In all cases it is assumed that ripple control is the best way of broadcast communication for quick switching actions over the whole network.

RC and decentralized production

- In Germany RC is widely used to influence the decentralized production sites from renewable energies in order to keep the network stable → Ripple Control is an important part of a smart grid
- Especially in northern Germany where there is a lot of production from wind energy and the network is sometimes not able to transport enough energy, this has become an important application.
- The current political discussion goes to a direction that generating energy will specially be subsidized at moments when it is needed. We expect that there will be variable tariffs for power generation in the future, which can of course be ideally signaled by ripple control.

Conclusion

- To summarize, the new high-speed Swistra protocol with more functionality than existing ripple control protocols, provides the ideal solution for existing ripple control users to update their systems at relatively low cost, so as to provide additional features over and above their existing applications.
- In particular, the Swistra protocol enables Time Of Use tariffs to be introduced for prepayment metering customers, without the need for expensive smart meter systems.
- Swistra also enables text information to be transmitted to Customer Interface Units to provide relevant tariff information to the customers.

Thank you very much for your attention!

