

## **Abstract**

### a) Synopsis

Enhancement of voltage control strategies for rural distribution networks, allowing the integration of a high share of distributed generation while maintaining the quality of supply. Energy producers and consumers are actively integrated into distribution network operation and the economical frameworks of all players are considered.

### b) Summary

In order to reach the environmental and economical objectives such as those fixed by the Kyoto Protocol, the electricity generation from renewable energy resources will gain an increasing importance. While it is already well-known that the energy supply structure is facing some major changes, the fact that accompanying changes in the planning and operation of the network are needed is still not widely acknowledged. Without adequate innovations in the network operation, the efficient integration of a large number of distributed generators will not be possible.

The hosting capacity of rural networks (most of the Austrian territory having the highest renewable energy potential are rural areas) is mainly limited by the voltage rise effect resulting from the power injection.

The objective of the BAVIS project is to further develop a set of voltage control concepts. These concepts will make use of network assets such as On Load Tap Changers as well as network users. Depending on the acuteness of the voltage problem and on the network properties, different concepts for voltage control are proposed.

These voltage control concepts will allow distribution network operators to make a more efficient use of the available voltage band (for consumers as well as for generators) and thus a better use of the existing infrastructure.

Thanks to the innovative voltage control concepts, expensive and very long network reinforcement will be delayed or ideally replaced. Through the use of the developed voltage control concepts, the following benefits will be achieved:

- Direct saving of investments
- Better use of existing network assets
- Avoidance of the binding risk associated with long term investment

Through the more efficient use of the infrastructure, the connection of a high penetration of distributed generation will be made possible. As shown by previous investigations, a significant increase of the connectable generation capacity can be expected.

Last but not least, simplified methods for planning an active distribution network and for assessing the connection of network users will be developed. This way, distribution network operators will have at their disposal adequate methods allowing assessing with a limited effort the adequacy of the proposed control methods for particular areas.