Active Network Management

The traditional passive network management or "fit&forget" principle in Distributed Generation (DG) connection needs to be changed into Active Network Management (ANM).

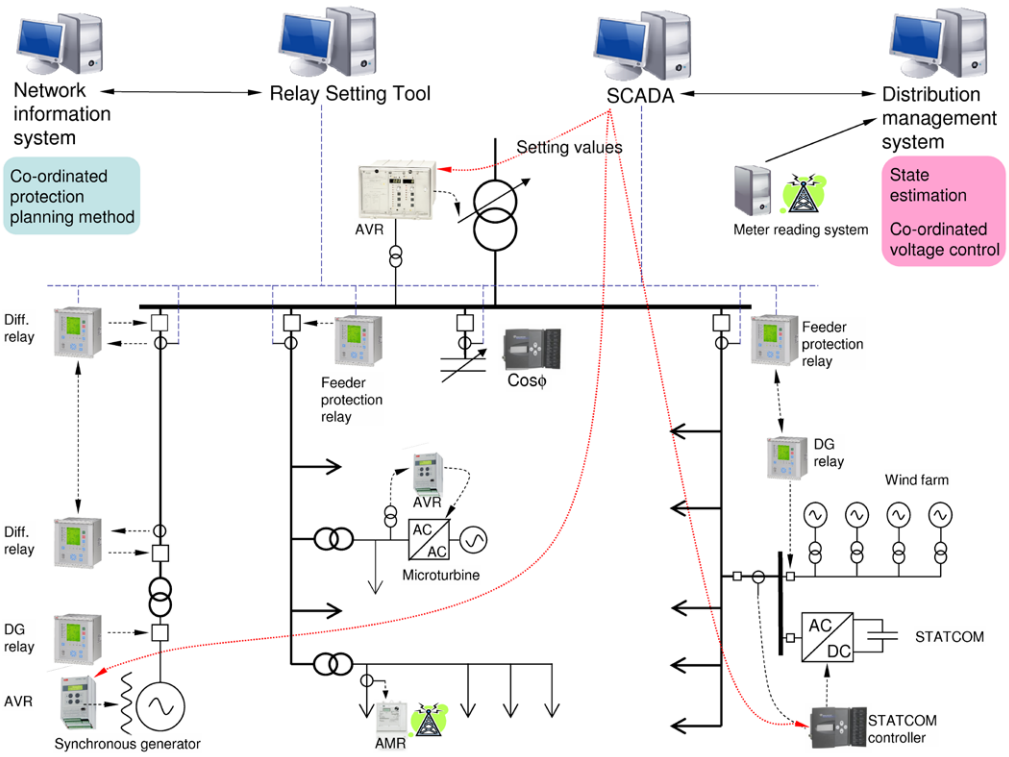
With proper management of active resources the overall system performance may be improved from presently used practices. DG provides a good potential as a controllable resource for the active network. Other existing controllable resources are direct load control, reactive power compensation and demand side management.

ANM method adds value by increasing the potential for renewable energy, by improving efficient utilization of distribution network assets and by supporting distribution network by ancillary services from customer-owned resources.

ANM CONCEPT

The distribution network management concept of ADINE project is based on existing systems like SCADA, Distribution Management System (DMS), substation and distribution automation and Advanced Metering Infrastructure (AMI). The ANM system operates on protection, decentralized control and area control levels.

The intelligence of ANM is based on investments in controllability and ICT. Area control level may e.g. be used to coordinate individual resources and thereby increase the synergy benefits of network management.



Overview of the Active Network Management concept in the ADINE project. All hardware devices like protection relays, AVR of tap changer, AVR of DG units, STATCOM controller and power factor controller are working in decentralized way. On the top of the decentralized control system there exists also a centralized system for distribution network management.

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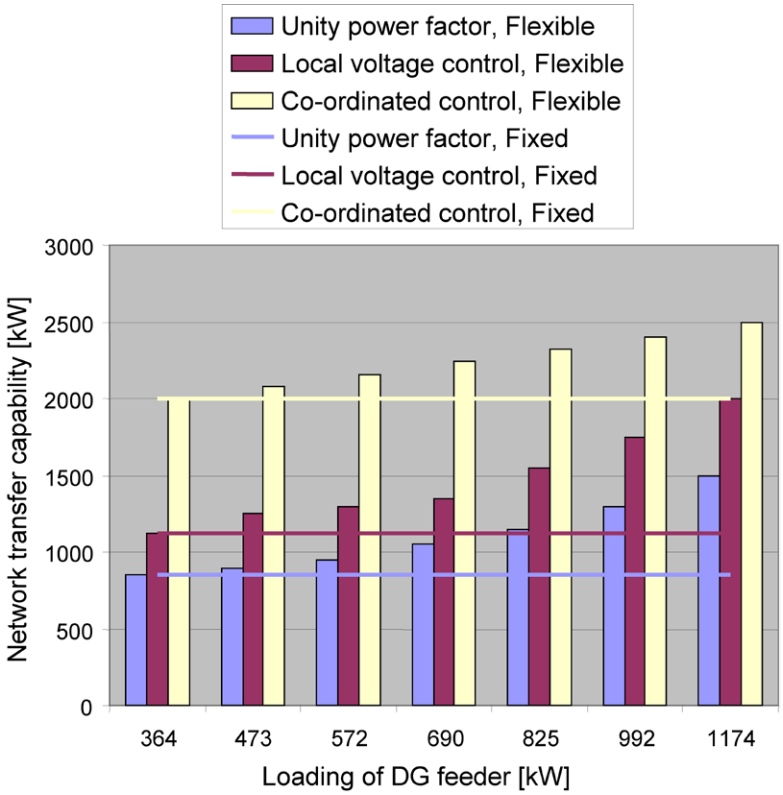
ANM FEATURES

ANM concepts add new features for protection system and automatic control system levels. New protection system features are e.g. distance and differential protection schemes and communication based LOM. The ANM concept includes at decentralized control system level local voltage, power quality and frequency control, load shedding and production curtailment features. Many new features are also added for the area control level like coordinated voltage control, power flow management, fault location schemes, automatic network restoration and island operation.

The aim of ANM is to add more flexibility for network management in order to utilize existing network assets more efficiently. The addition of flexibility comes from the utilization of active resources through grid code requirements or ancillary services provided by resources. Active resources are needed to integrate as a part of distribution system instead of just connecting. Active resources are typically utilized in extreme network conditions when network is not capable to transfer produced wind power.



Benefits of ANM are based e.g. on more efficient utilization of existing network assets. The example shows how much the size of DG may be increased when non-firm network capacity and ancillary services are applied in DG connection.

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OSKE

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