

IEC TC57, WG17

Distributed Energy Resources and Distribution Circuit Automation— Expansion to Feeder and Network Equipment

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Overview

- ▶ Basis for expansion
- ▶ Feeder and network equipment
- ▶ Fast track process
- ▶ Benefits

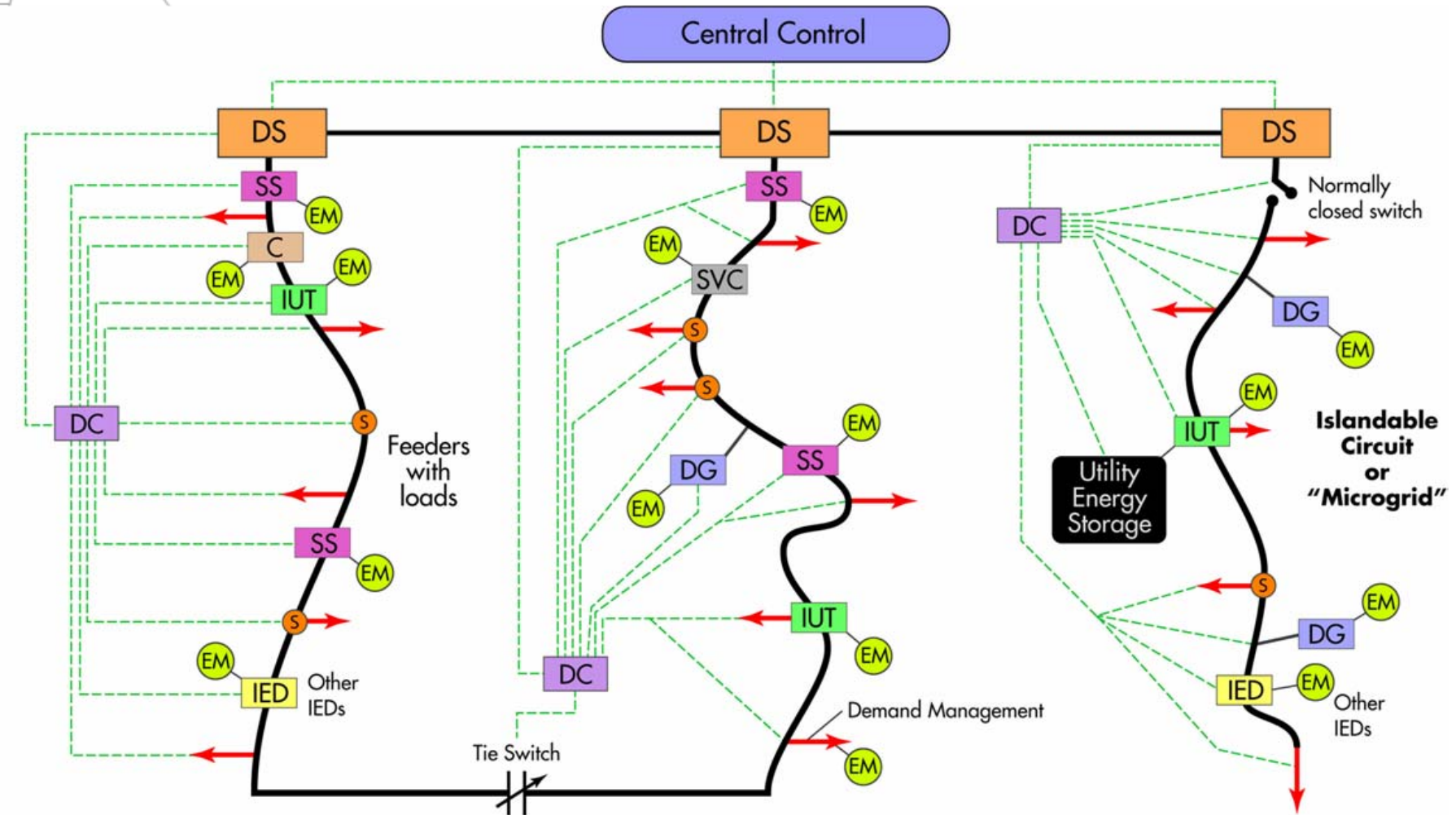


Basis for Expansion

- ▶ Utilities are increasing their automation of feeder and network equipment and increasing their real-time monitoring of distribution operations
 - ▶ Includes both existing and new equipment
- ▶ Advanced distribution automation, which includes new types of feeder and network equipment and advanced monitoring, is being developed and will require integration into the communications infrastructure
- ▶ There is an urgent need to develop IEC 61850 standards for feeder and network equipment and real-time monitoring systems
- ▶ Original vision of WG-17 was to begin with DER and then expand to other types feeder equipment

Conceptual View of Distribution System of the Future

Source: EPRI Advanced Distribution Automation (Program 124)



DS = Distributing Station

DG = Distributed Generation

DC = Distributed Control

C = Controllable Capacitor Bank

SS = Sectionalizing Switch

→ = Load (customers)

IUT = Intelligent Universal Transformer

SVC = Static VAR Compensator

IED = Intelligent Electronic Devices

EM = Embedded Monitoring

S = Real-time Sensor



Examples of Feeder and Network Equipment to be Considered--1

- ▶ **Existing types of equipment (not an exhaustive list)**
 - ▶ Switchgear
 - ▶ Switched capacitor banks and static VAR compensators
 - ▶ Voltage regulation devices
 - ▶ Network protectors
 - ▶ Power quality enhancement devices, such as DVR and DSTATCOM
 - ▶ Protection systems
 - ▶ Demand management systems
 - ▶ Current real-time monitoring sensors and devices
 - ▶ Continued effort on DER



Examples of Feeder and Network Equipment to be Considered--2

- ▶ New types of equipment (not an exhaustive list)
 - ▶ Power electronic systems to replace distribution transformers
 - ▶ Multi-function solid-state switchgear (does more than just interrupt current)
 - ▶ Widespread real-time distribution system monitoring based on new sensors and sensing functions embedded in other equipment
 - ▶ Advanced metering infrastructure (AMI)



Fast-Track Process Needed

- ▶ Use logical nodes from existing libraries from prior IEC standards to build object models, when possible (WG-10, CIM, etc.)
- ▶ Supplement with new logical nodes, where necessary
- ▶ Some devices can be handled by simply noting that an object model from the substation area applies to a feeder or network device
- ▶ Other devices will require more development
- ▶ In either case, it is desirable to move the new standard through the IEC process as quickly as possible in an existing working group and to not need to start multiple new working groups
- ▶ Fortunately, most of the device types are much simpler than DER to model
- ▶ Encourage parallel testing activities via sponsored research



Not Included

- ▶ Customer systems behind the meter are not included
- ▶ AMI needs special consideration
- ▶ AMI is potentially the single most important information source for monitoring systems in automating distribution circuits
 - ▶ It should be included in the expansion of WG-17, if it is not being adequately addressed elsewhere
 - ▶ Coordination with other metering working groups in any case
 - ▶ I raised this in the SPAG meeting yesterday
 - ▶ Put on the table for discussion today
 - ▶ Need to know what else is being done in AMI and finalize the NWIP for WG-17 expansion accordingly



DER Retained

- ▶ DER will be retained in the scope of WG-17
- ▶ Can be on either side of meter
 - ▶ In many countries, lawmakers have steered it behind the meter
 - ▶ Passion of utility DER advocates has waned in that they are not allowed in the game
 - ▶ Many DERs now in service can only be run in emergencies due to emission limits
 - ▶ DER can be a vital tool for utility automation, as a volt/VAR management tool, emergency power source, etc.
 - ▶ Original vision for DER (going back 30 years) was that it would be predominately a utility system component for distribution system support via a variety of functions
 - ▶ DER's primary value in many cases will not be from acting as a mainstream kWh source
- ▶ WG-17 has developed DER object models that apply to either side of meter—approach to be continued
- ▶ Development of additional DER object models dependent on better support from the “DER community” than we have gotten in the past



Benefits of Expansion

- ▶ Allows ready use and adaptation of logical nodes, protocols, and other standards components previously developed by WG-17, WG-10, WG-18, WG-19, and others
- ▶ Facilitates integration of the added standards into the structure and numbering system of the IEC 61850 series of documents
- ▶ Broadens IEC 61850 beyond substations and thereby encourages earlier migration to IEC 61850 from legacy architectures



Helps Maintain Viability of WG-17

- ▶ DER standards writing is limited by the availability of contributed information from WG members or from industry
- ▶ Standards writing for other feeder and network equipment and real-time monitoring systems will help fill the WG-17 work gap during periods when little or no new DER information is available (or while we are waiting for feedback in a current voting process)
- ▶ The expansion to other feeder and network equipment may help us attract new members to WG-17—especially active members

Thank you for your attention.
Any questions?

Working Group 17 Status
Report

