

Future Power Systems 11 - New data from the customer to the Industry

Proper data communication between the active customer and the industry is vital for efficient operation of the system, to reduce and smooth out the operation of the remaining fossil-fired plant while maintaining adequate security of transmission and distribution systems.

The industry requires data for the following processes.

Market and System Operator - data to ensure accurate matching of Generation with Demand with adequate reserve capability.

System Operator - data to ensure the Transmission system is secure and stable (steady state and after credible fault) and that delivered Power quality is adequate.

Distribution operator - data to ensure maintenance of end user power quality and security of supply

This all requires accurate forward predictions and metered actuals for Generation and Demand Power, by time and by location.

At the lower levels, Distribution group loadings with feeder and voltage data is required, together with predictions of projected import/export and possible changes to same by participation.

For matching and transmission security, location aggregated data is appropriate; again both the intended trajectory and capability to alter same are required.

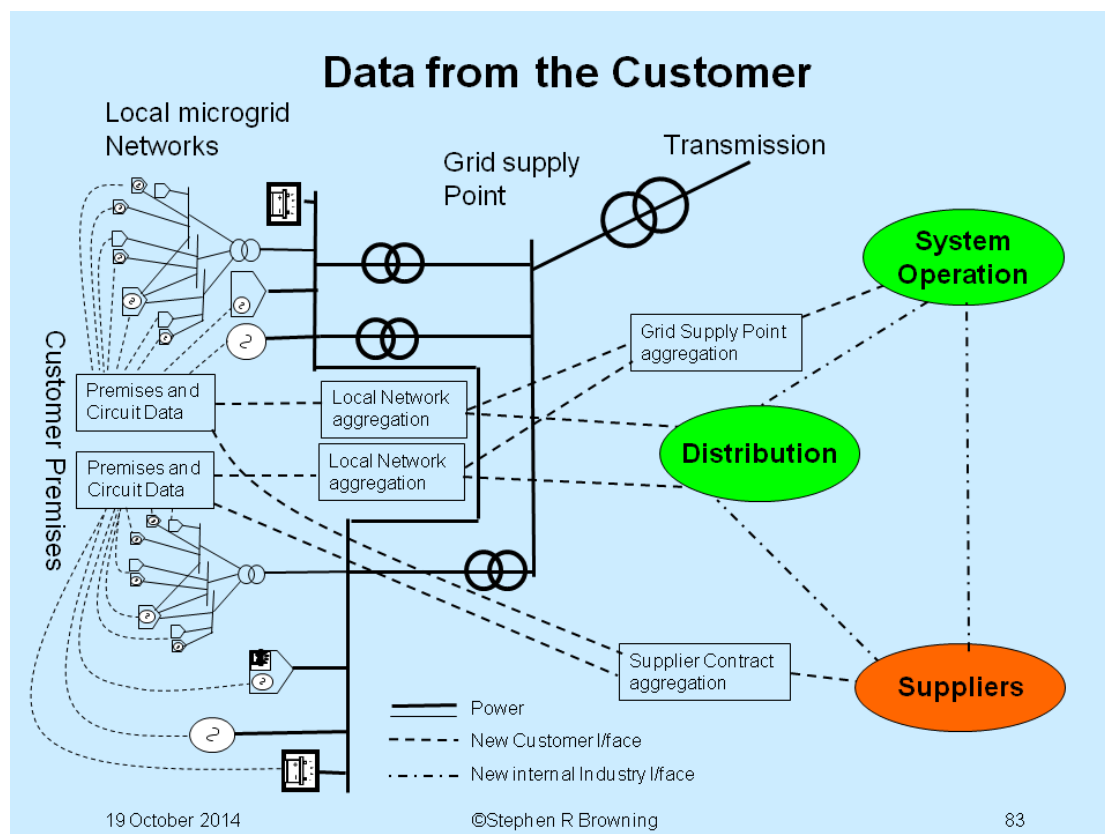
For extensive distributed resources, effective aggregation is of paramount importance.

The distributor needs an accurate view of his system conditions but not the full detail of each individual premises contribution. Any control action will probably be automatic at the lower levels, to alter active resources import/exports (demand, generation, storage) and any system compensation equipment fitted.

The market and operator require multi-megawatt aggregated data for demand and generation and variable resources capability. The market requires this information aggregated by supplier for forward bi-lateral trading. The operator requires totals by grid supply point and overall.

Both operator and market need predictions of timescale and persistence information on variable resource capability - the lead time to activate a change and the duration that can be sustained. Various pilot initiatives are already being carried out for done on provision of short notice short term Demand management and backup Generation use to provide ancillary (reserve) services to the operator.

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The aggregation of Distributed Energy Resources (DER) forms a Virtual Power Pool (VPP). This can comprise all active elements (Generation, Demand Management, Storage and Reactive control).

A VPP can offer network services to maintain stability, security and power quality at local level.

VPP aggregation forms multi-MW blocks.

Supplier aggregated blocks can be used for short term energy trading in the market to meet the half hourly energy requirements. (Commercial VPP)

Separate location aggregation is used to provide services to the system operator. (Technical VPP).

Blocks of dispatchable power are used to maintain system demand-generation matching

Blocks for ancillary service provision (power/reaction time/duration capability) can be used to provide response to cover unexpected changes in the generation-demand match at near real-time.

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There are currently a number of experiments being carried out with VPPs and as noted above there are separate initiatives and mechanisms for provision of ancillary services by DER management. It is imperative that the overall interface framework and the data content requirements are clearly defined for each purpose. There are different requirements to support local security, provide ancillary services, dispatchable power and marketable energy. It is important that a single set of data from the premises level can be configured to meet each requirement by clever filtering and aggregation.