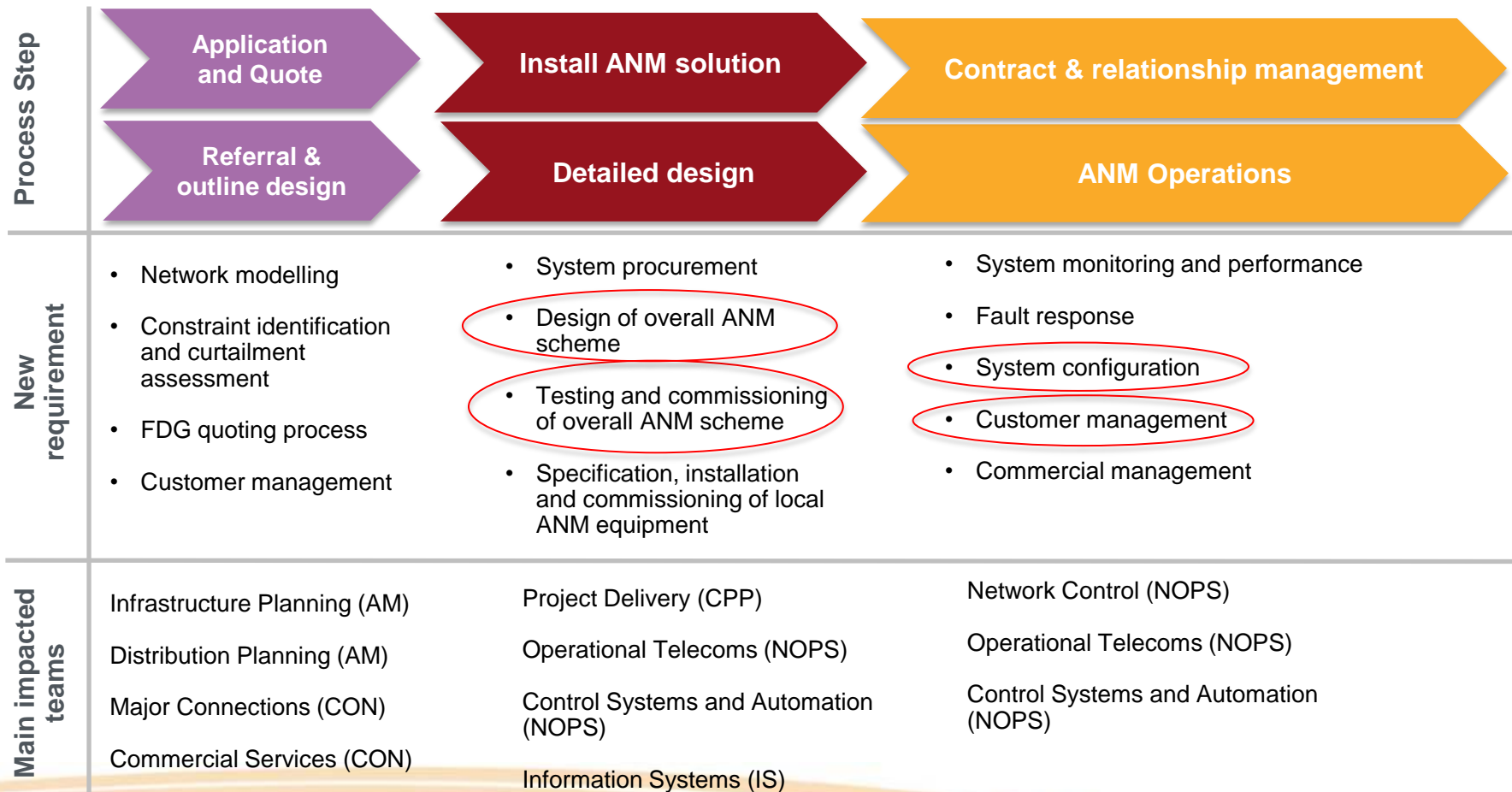


# Next steps for Flexible DG Connections

Session 4:  
Sotiris Georgiopoulos | UK Power Networks

# Executing Active Network Management at scale requires new functionality across the business



# Is the technology ready for scaling up?

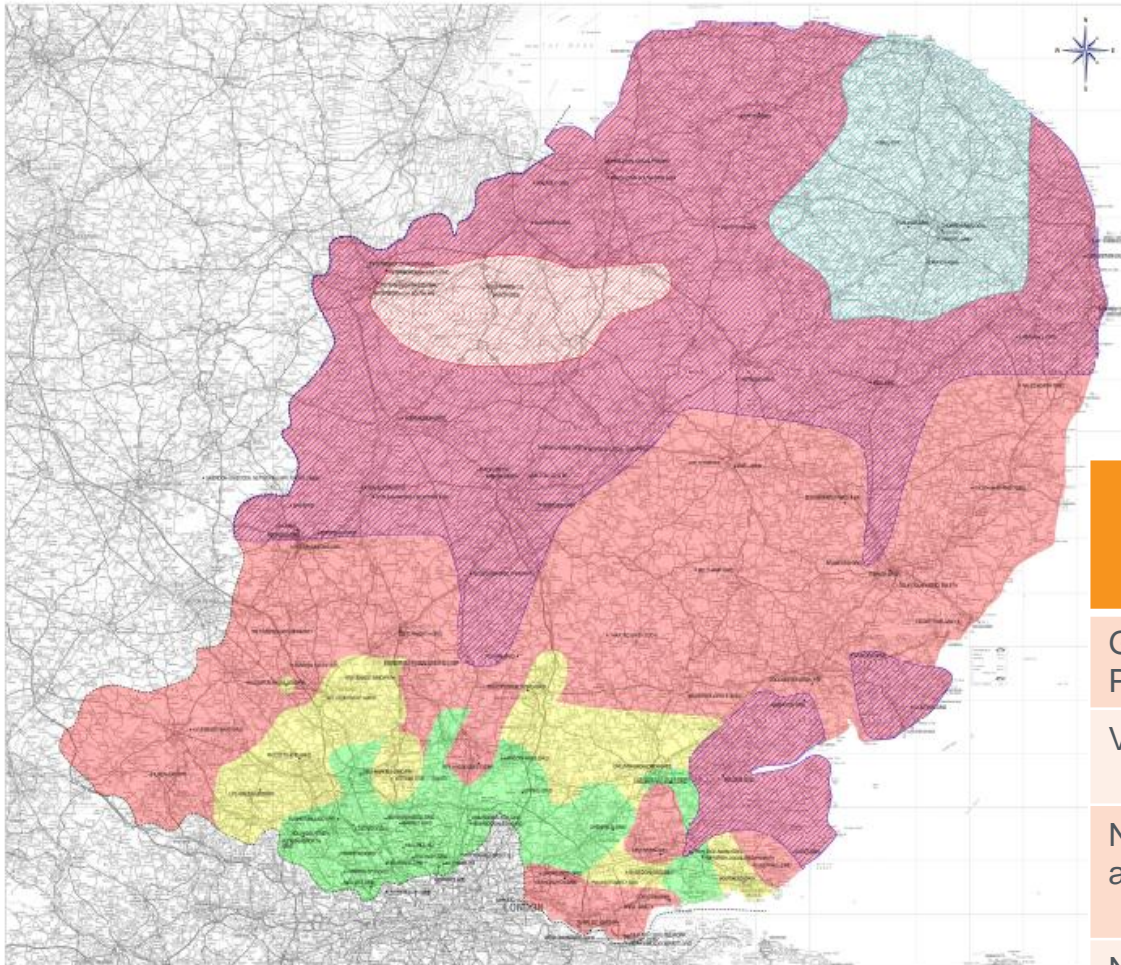
- ANM technology – demonstrated mainly at lower complexity EHV/HV semi-radial networks. Further development to accommodate complex networks in fully automated manner
- Smart devices – QB,DLR, Protection (ready) – AVC, 61850 (ready, further work for advanced use cases)
- Communications technology – optimal balance between the smart grid requirements and cost-effectiveness

➤ ENA Active Network Management Good Practice Guide (Summer 2015)

# Evolution of business models

- Benefit allocation - Most financial benefit accrues to DG customers
  - Cost recovery and charging – Additional costs associated with operational delivery of solutions
  - Constraint modelling and Principles of Access – complex at scale, further development is required.
  - Reinforcement – Pooling the reinforcement and carry it out in a controlled manner provided suitable triggers are in place, key on the evolution of constraint management.
- Ofgem open letter consultations on the Flexibility project and Quicker and more efficient distribution connections

# Our first deployments



It is generally possible to connect generation equipment to the electricity distribution network of all voltages, but this capability can be restricted by a number of elements. These elements include constraints on:-

- a) the amount of new generation that can be connected relative to the existing load/demand on the system
- b) the proposed location and size of the generator
- c) the nature of our existing equipment and circuit ratings, and
- d) the amount of existing generation equipment already connected or which we are committed to connect.

The map to the left is indicative of the capability of the High Voltage electrical network to accept connection of new generation equipment. The area in red indicates that the network in that area is effectively at saturation point with respect to existing generation connections. The amber and green areas indicate those parts of the networks that currently have limited (amber) and spare (green) capacity to connect new generation equipment at high voltage.

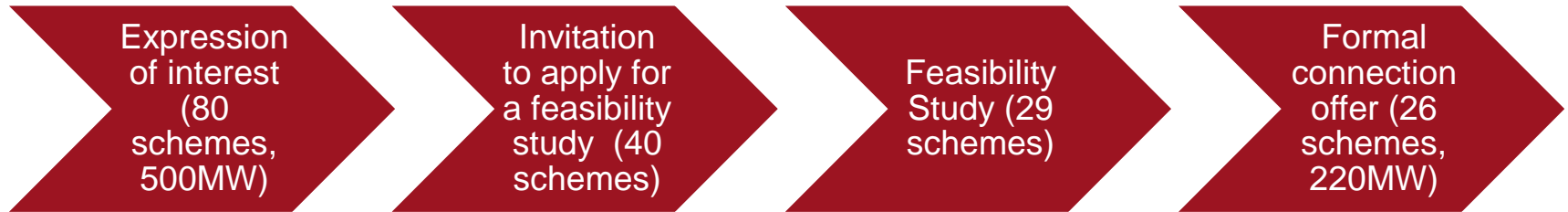
The landscape of the map will alter as new generation installations or other network changes occur and it should be used as a guideline only. Please note that the map illustrates the position in relation to the high voltage network as a whole and does not distinguish between 132kV, 138kV or 132kV connections. As a general proposition, connection of new generation equipment in any area is possible but those areas in the red zone, for example, are likely to require more substantial customer investment (resulting in a higher connection charge) in order to obtain a point of connection.

\* FPP This area innovation zone - indicative geographical boundary for flexible plug and play trial area.

Map last updated 5th December 2014.

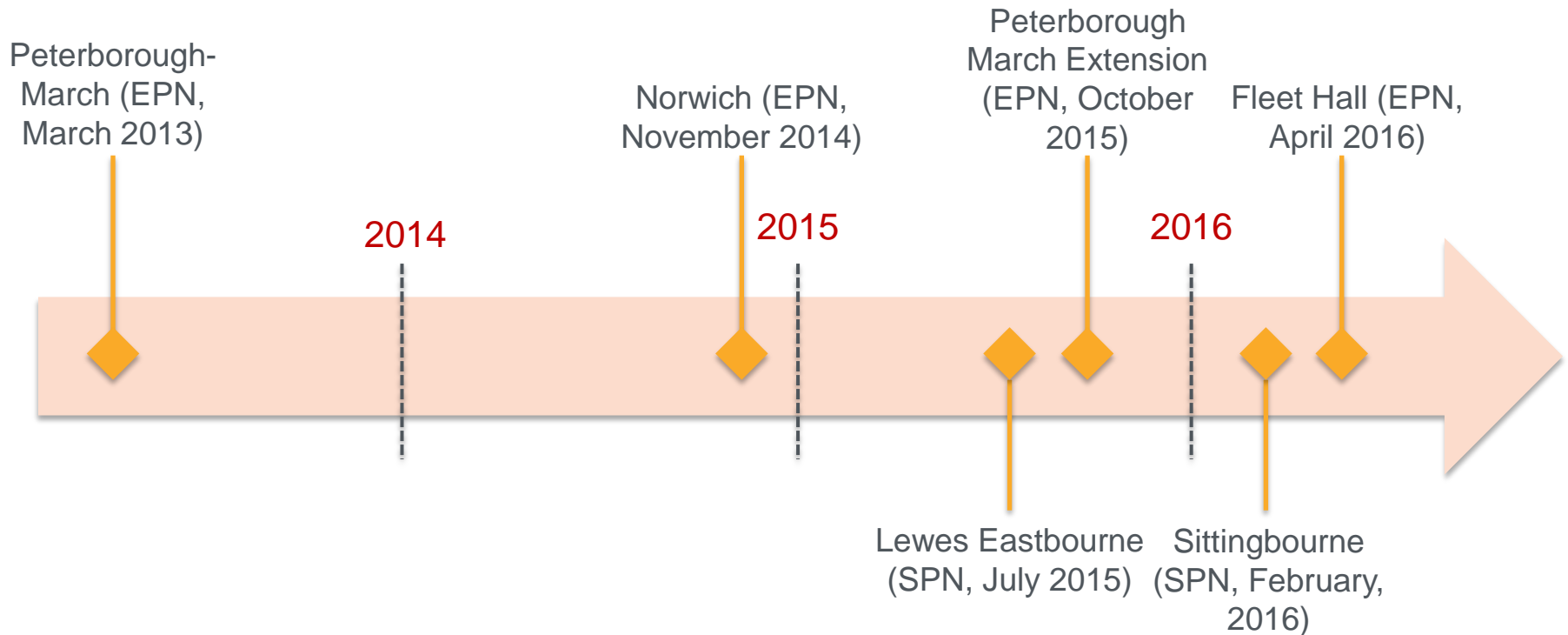
|                           | March Grid zone       | Norwich zone                  |
|---------------------------|-----------------------|-------------------------------|
| Grid Supply Point         | Walpole               | Norwich Main                  |
| Voltage levels            | 33kV and below        | 132kV and below               |
| No of Grids and Primaries | 2 Grids, 10 Primaries | 4 Grids, over 40 Primaries    |
| Network type              | Radial 33kV           | Interconnected 33kV (Complex) |
| Customer demand           | High                  | Very High                     |

# Status – Norwich zone



- FDG process in place and running in parallel with BAU process
- Feasibility charge to recover additional network studies required for curtailment assessment
- ANM central costs are non-contestable and these are cost-apportioned per MW to customers based on an estimate of the capacity to be released

# Flexible DG connections rollout - areas



- Cycle will continue on a 3 -6 month basis (accelerated if deemed appropriate)
- East Kent to be enabled in late 2016 in synergy with the KASM technology
- Selection criteria have focused on levels of DG demand and technical feasibility

# Concluding thoughts

- Award-winning project and fantastic progress over the last three years and V1 roll out underway
- From demonstration to BAU in less than three years reflects the speed of change in DNO operations
- Further incentives to DNOs for rolling out flexible connections to be considered linked with treatment of reinforcement
- Flexible connections is at the core of DG deployment and will lead to large scale active management of networks and new market arrangements



# Key achievements of Flexible Plug and Play



Engaged with 50+ DG developers  
→ Interviewed 20



Commissioned RF mesh wireless  
network for wide area comms



Trialled two DG access principles:  
LIFO and Pro-rata capacity quota



Integrated and commissioned smart  
devices across 12 sites



Made 40 connection offers:  
• 15 accepted, 54.4MW enabled,  
£44m savings



Installed and commissioned first  
quad-booster at 33kV



Developed analysis tool for  
investment options in DG  
dominated networks



Deployed IEC 61850 for  
interoperability between solution  
components

Successful deployment of new commercial arrangements and interoperable smart grid components to deliver faster and cheaper DG connections

For more information visit [ukpowernetworks.co.uk/innovation](http://ukpowernetworks.co.uk/innovation)