UK Power Networks – OC2 Data Sharing

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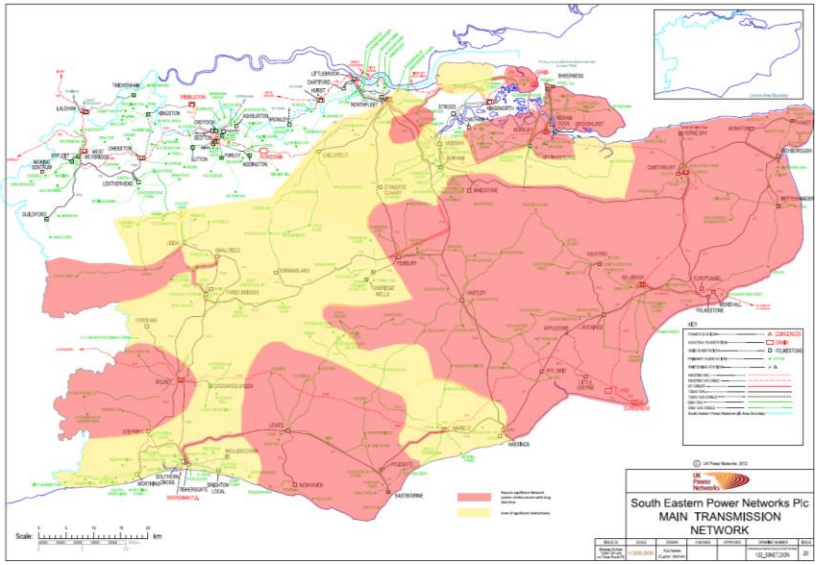
Agenda

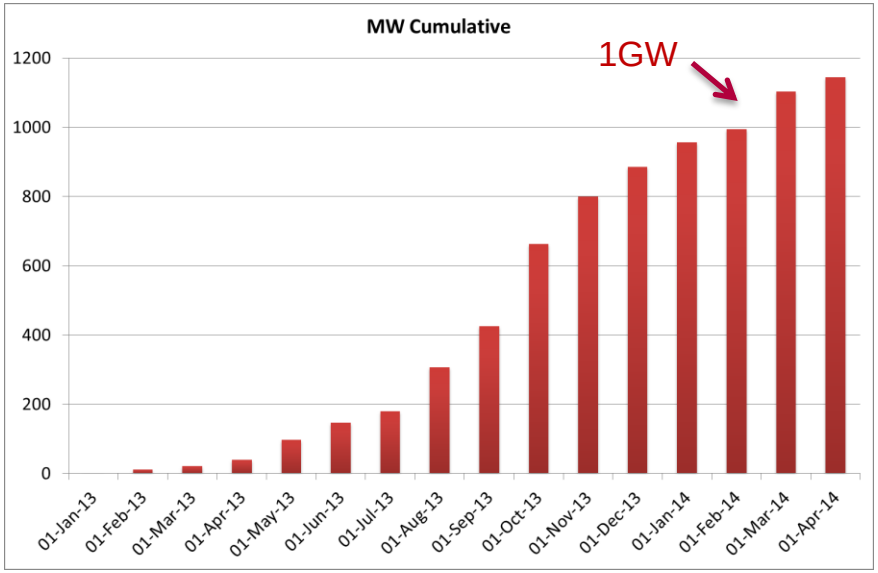
- UKPN's Innovation Project Overview - Kent Active System Management (KASM)
- How is UKPN's network planning is affected by the Grid Code?
- Implication on UKPN's Long Term Planners
- Options moving forward
- Timescales
- Questions and Next Steps

Project Background (update):

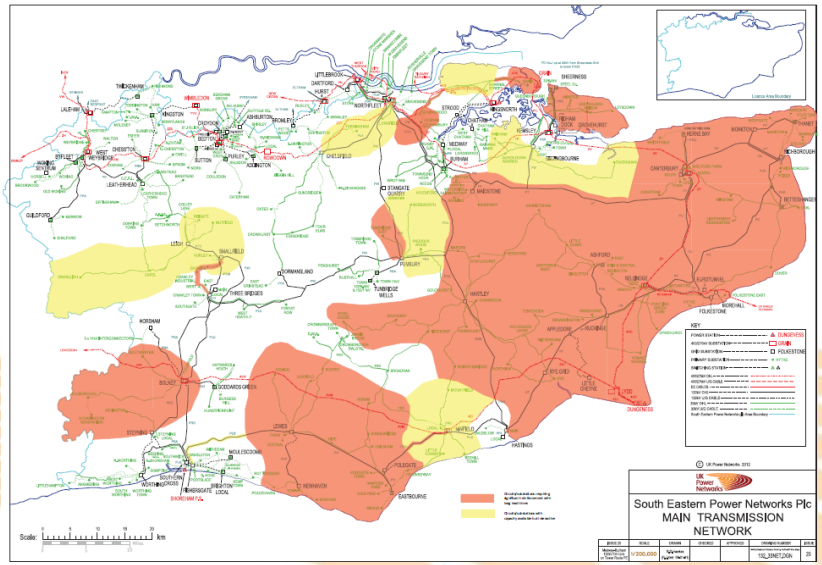
DG Heat Map:



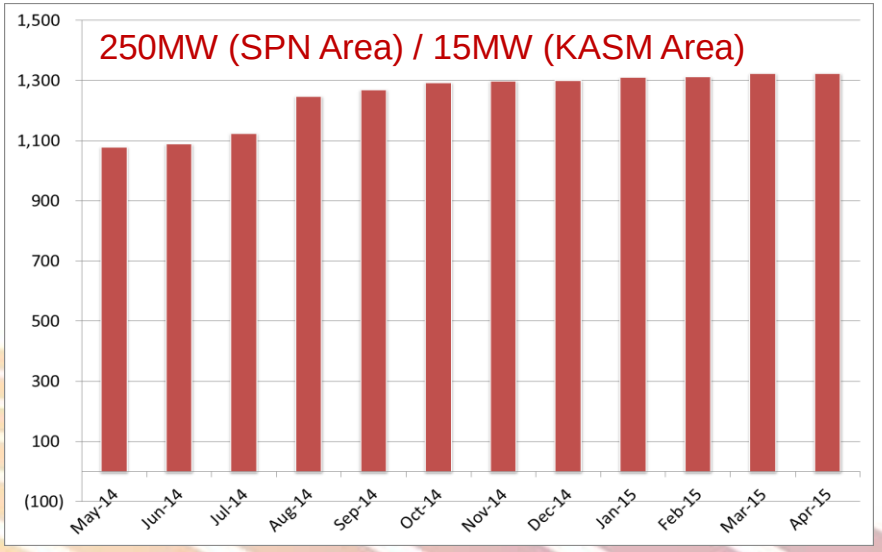
SPN DG Connection Offers Accepted (Cumulative)



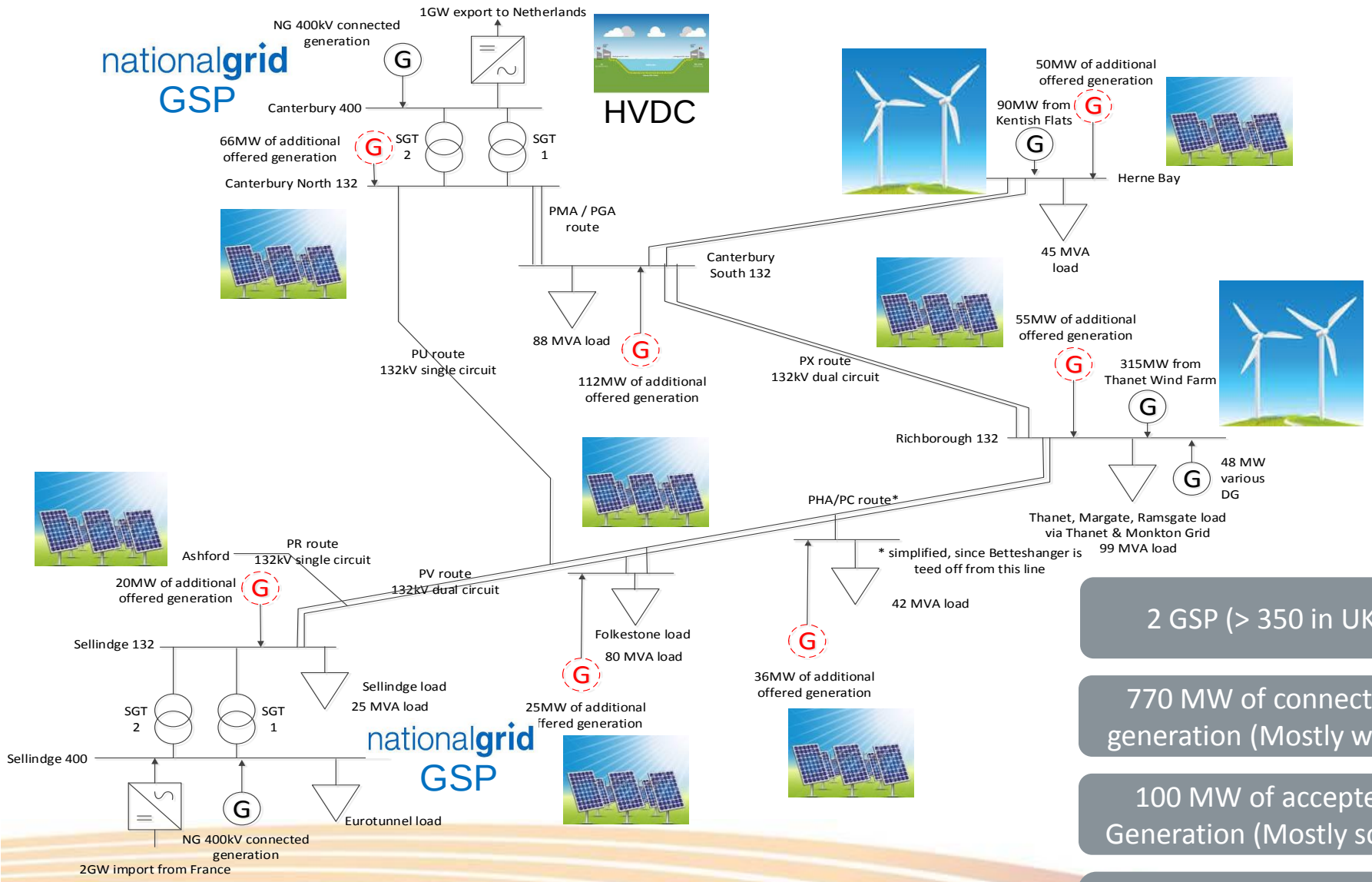
DG Heat map (Nov 2015)



SPN DG Connection Offers accepted (May 14 – June 15)



Increasingly Dynamic DNO Network (East Kent Area):



2 GSP (> 350 in UK)

770 MW of connected generation (Mostly wind)

100 MW of accepted Generation (Mostly solar)

2 Interconnectors
(Third 1GW with Belgium by 18/19)
(Fourth 1GW with France)

Summary of Issues:

Increasing wind / solar farms connected
(Unpredictable power flows)

Parts of the network reaching Reverse Power Flows limits
(Export to Transmission Network)

East Kent network requires 34 Contingency scenarios to be analysed

No longer “day” of highest winter and lowest summer demand

Worst case operational and planning practices
(Min Demand, Max Generation / No diversity)

Long lead times and high cost for generation to connect
(£11m / Post 2020)

Existing generators can be constrained up to 30% during outages
(90MW for some generators)

Greater need for monitoring and real-time analysis
(KASM)

KASM Project:

£3.9m / 3 years

Investigate whether contingency analysis software can be used to safely run the high voltage network closer to its limits, by moving away from conservative, 'worst case' assumptions.

New capabilities: Real-time and automated contingency analysis

Benefits:

- Reduce constraints on renewable generators
- Release network capacity
- Defer costly network reinforcements

Project partners:

NAVIGANT

nationalgrid

Supplier (Bigwood):

BSI

Case Studies:

	What is it?	How we do it today?	How KASM will deliver?
Reliability Management (Control Engineers)	Real-time monitoring of the network operation and mitigation of the effects of faults	Restorative **Alarms indicate** to the control room engineers when asset loading exceeds established limits. Engineers make decisions on corrective actions POWER-ON	Preventative **Constantly analysing potential contingencies** before they occur, alerting control room engineers, and recommending preventative actions POWER-ON + CA
Outage Management (Outage Planners)	Assessing short-term operating conditions for the network based on planned maintenance and forecasted generation and demand	Manual Outage planners **manually analyse** all possible contingencies, to ensure that outage plan is consistent with n-1 reliability requirements DIGSILENT	Automated **Automate the analysis of all possible contingencies**. Forecasting capability will allow outage planners to use hourly (or sub-hourly) estimates of demand and generation DIGSILENT + CA
Network Capacity Management (Infrastructure Planners)	Assessing network capacity, and determining timely reinforcement to ensure reliable operation	Worst case Infrastructure planners design the system to withstand worst case planning assumptions DIGSILENT	Actual Archiving capability will enable infrastructure planners to incorporate actual diversity of generation and coincidence with demand. DIGSILENT + CA

How is UKPN's network planning is affected by the Grid Code?

Operational Planners:

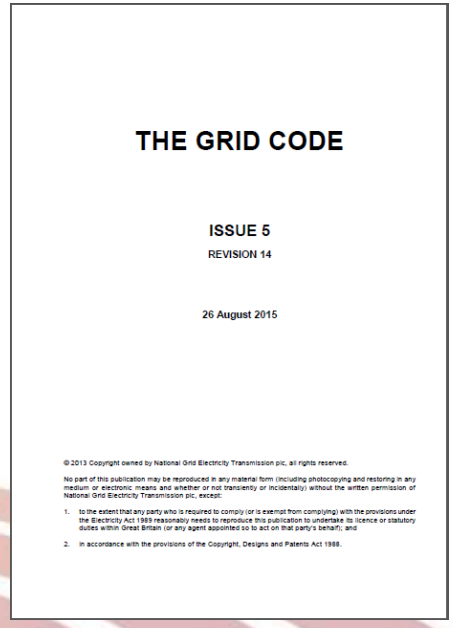
- Full visibility of National Grid Network and generators connected
- Receive National Electricity Transmission Study Network Data Files (NETSNDF), showing expected running arrangements and expected output of generators 2 weeks in ahead of real-time

Long Term Planners:

- Limited visibility of National Grid Network and generators connected. Network modelled as equivalents.
- Receive a reduced network model under the week 42 data

Grid Code OC2.4.1.3.3.(i).z.5 states that:

'…the data from the National Electricity Transmission System Study Network Data Files received by each Network Operator ***must only be used by that User in operating that Network Operator's User System*** *and must not be used for any other purpose or passed on to, or used by, any other business of that User or to, or by, any person within any other such business or elsewhere.'*



THE GRID CODE

ISSUE 5

REVISION 14

26 August 2015

Implication on UKPN's Long Term Planners

Issues:

- South East network is extremely complex due to interconnected nature, generation patterns and interconnectors
- Complex power flows can cause issues such as potential post-fault plant overloads and reverse power flows towards National Grid
- UKPN are now exporting to National Grid's network it is important to accurately model the whole network in longer-term planning timescales
- Longstanding issue but highlighted by the KASM project

Benefit of having access to NETSNDF:

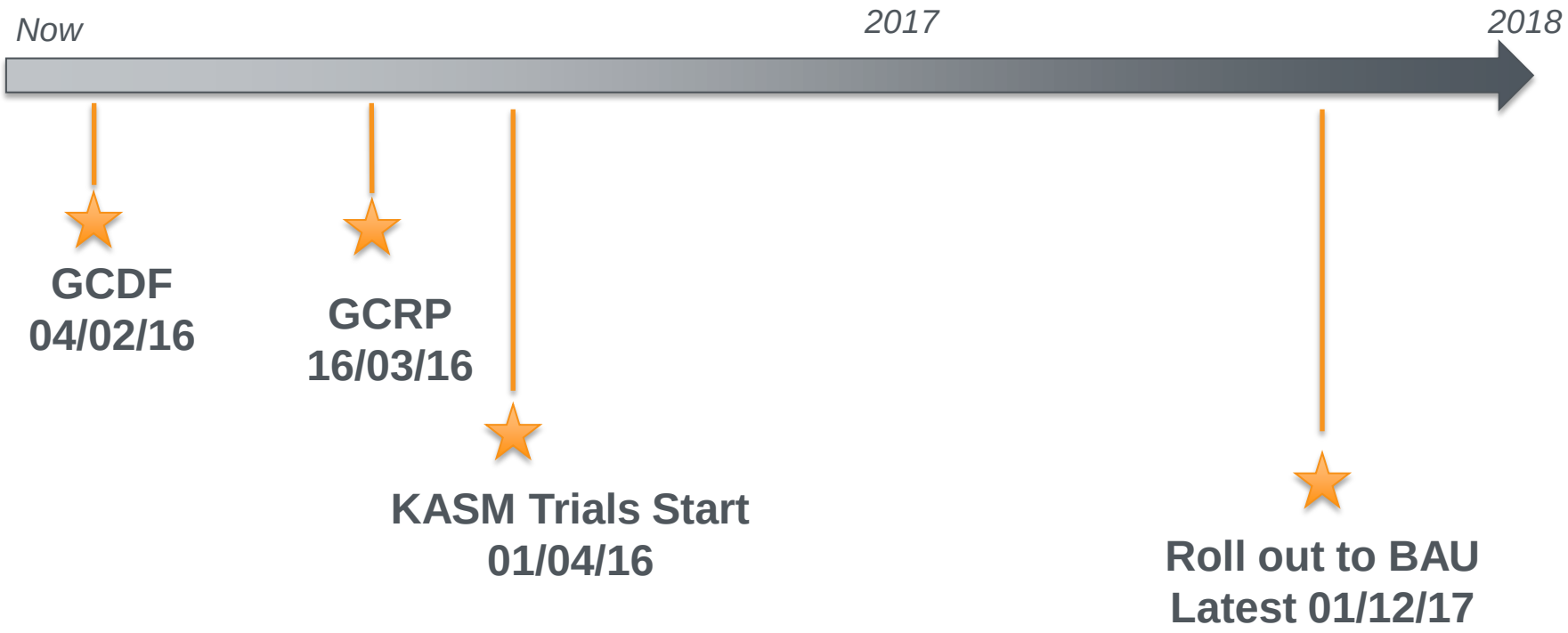
- The ability to model the full network including 400 and 275kV running arrangements will ensure better protection of distribution and transmission assets and better utilisation of existing infrastructure.

Options moving forward

Ref	Option
1	Conclude that NETSNDF data can be used for planning purposes as well as operationally.
2	Seek a derogation from the Grid Code to allow sharing of data as required. This is unlikely to be successful as it raises questions of data ownership which makes a derogation inappropriate.
3	Seek permission from the data owners to use data as required. In terms of the ownership of NETS NDF study data the owners are National Grid, DNOs and generators
4	Strip out any potentially confidential data from the study files. This could be an interim solution but unless automated becomes a repetitive and labour intensive task which addresses the symptom and not the cause.
5	Make a change to the Grid Code to remove the restriction in OC2.4.1.3.3.(i).z.5 requiring the use of data supplied under this to be for operational purposes only.

Timescales

Timeline showing key milestones moving forward



- To start full trials long term planners need access to the NETSNDF
- A delay in starting the trials could result in delaying the roll out of the full solution
- Need a solution to allow trials to start as planned

Key Questions to Answer

1) What solution would allow the KASM trials to start at the beginning of April 2016?

2) Do we expect any issues progressing this to a Grid Code change request?

3) Would you be supportive of a Grid Code change request?

4) How long would we anticipate it takes to amend the Grid Code?

5) Do we think the NETSNDF data is available in the public domain?

Thank you

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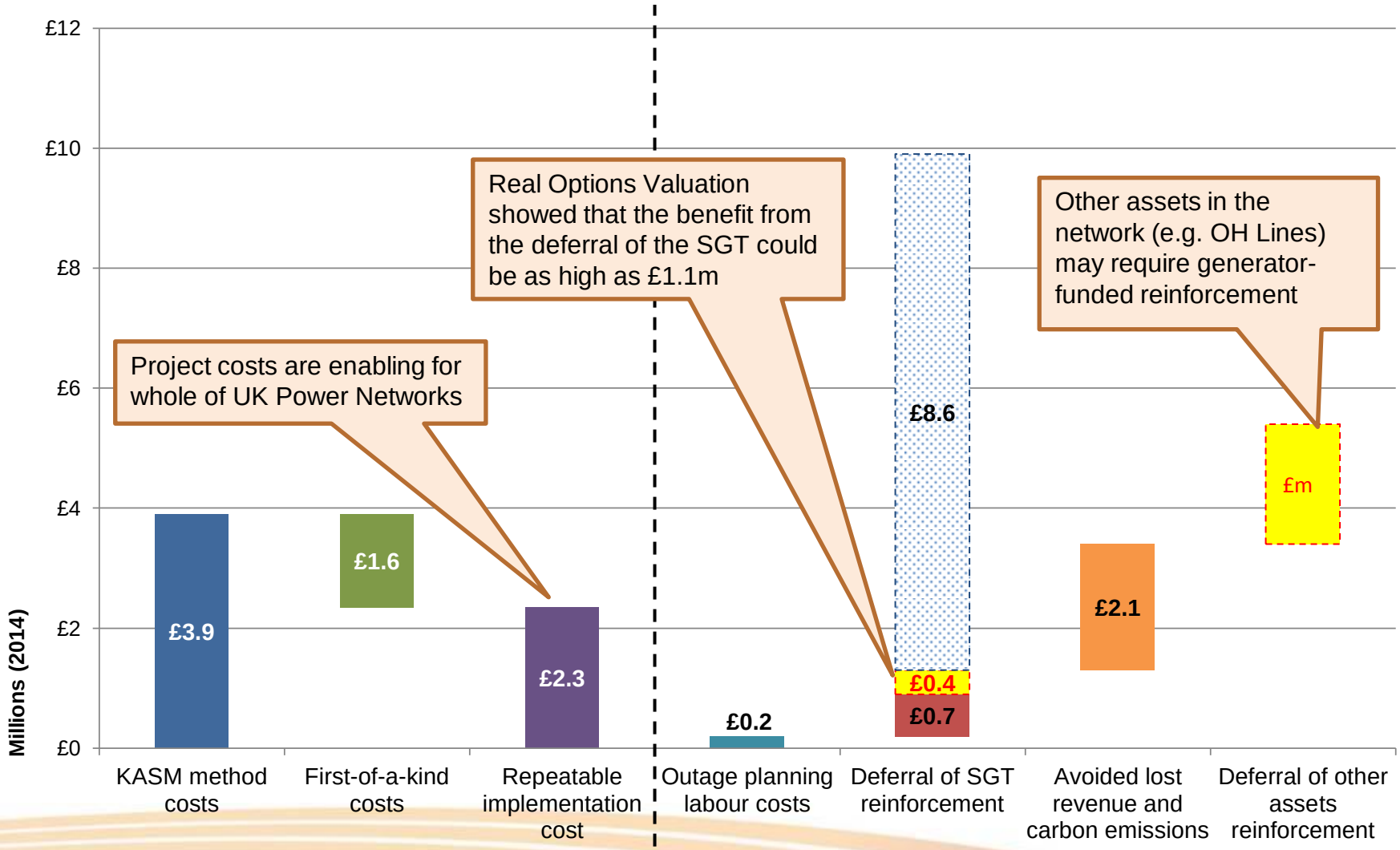
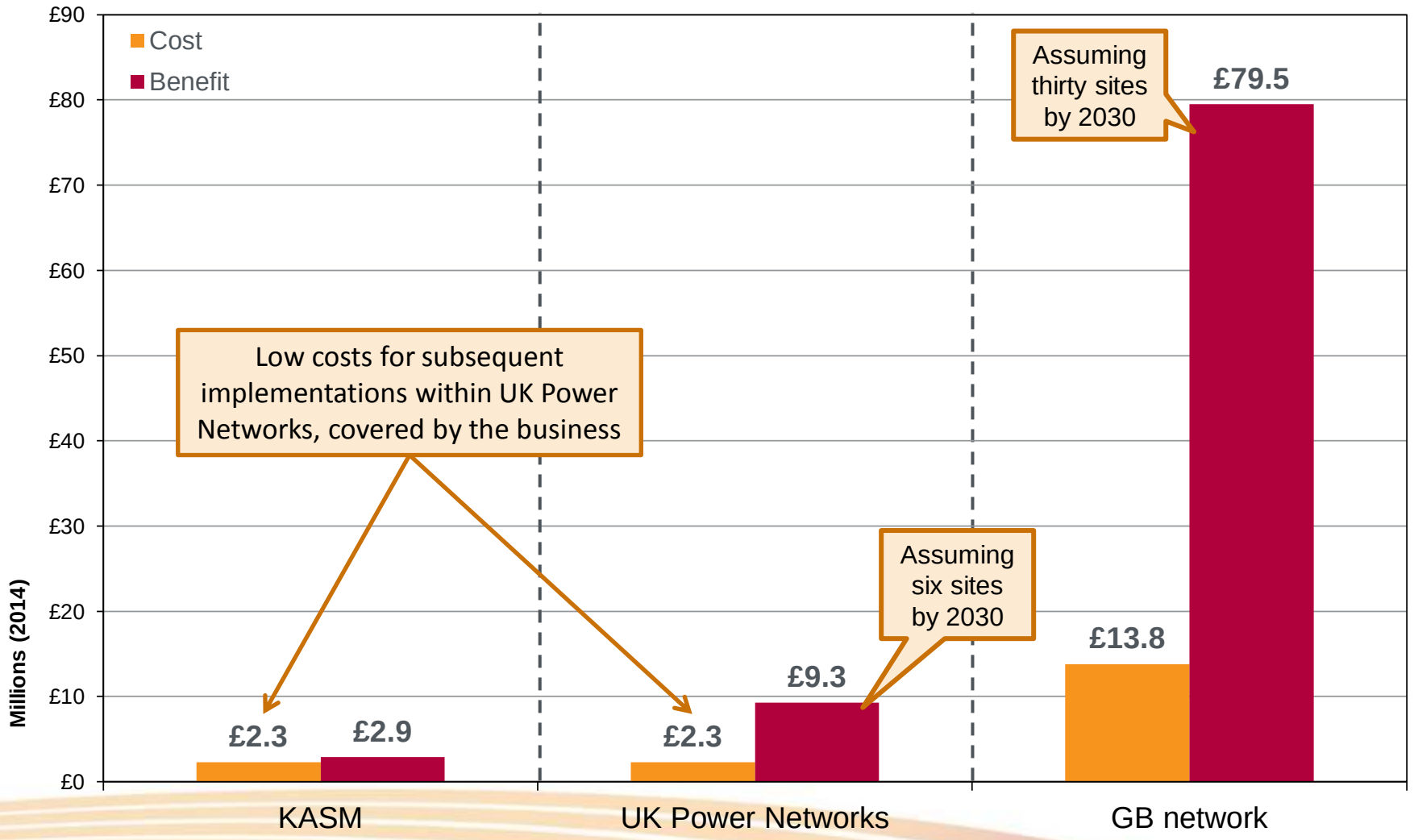
Delivering your electricity

Supporting Slides

Project Benefits:



GB Benefits:



SDRC's

	Criteria	Date
9.1	Development of the strategy for inter-control room communication protocol for the purposes of KASM	December 2015
9.2	Completion of the system integration of Contingency Analysis (CA) software into UK Power Networks systems, excluding a real-time link to National Grid	March 2016
9.3	Completion of installation of forecasting modules that will link the DNO control room with other data sources	March 2016
9.4	Demonstration of use of real-time contingency analysis in the control room	December 2016
9.5	Completion of trials and implementation of reliability management, outage management and network capacity management	December 2017
9.6	Development of business design to incorporate contingency analysis as business-as-usual	December 2017