# FCWG 9 May 2012

## UK Power Networks' Strategy for Business Plan Development

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# UKPN Strategy for Business Plan Development

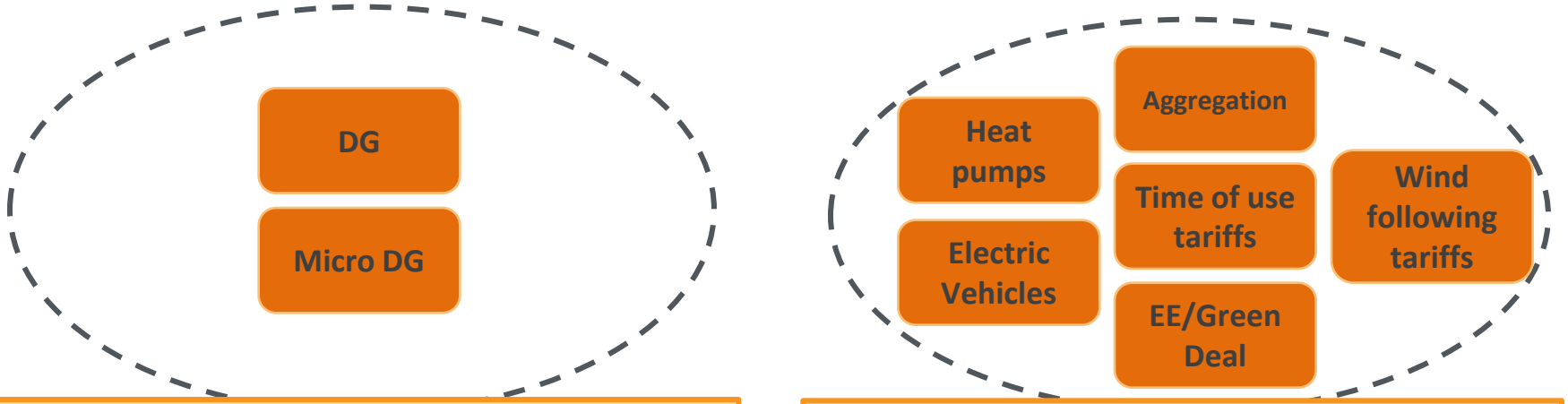
- Load scenarios
- External drivers – immediate and longer term
- Dealing with uncertainty through flexibility
- Future Network Development Plan
- Tools to manage uncertainty

# UKPN Load Scenarios

| | Rate of economic growth | Impact of low carbon technologies | Impact of electricity market reform |
|---|---|---|---|
| Engaged Green Society | High | High | High |
| Green Tech Revolution | High | High | Low |
| Green Stimulus | Low | High | High |
| Business As Usual | High | Low | Low |
| Economic Concern | Low | Low | High |

- Based on credible UKPN regional scenarios
- Uncertainty a factor of:
  - Rate of economic growth
  - Rate of penetration and impact of LCT's
  - Speed of market reform - e.g. take-up rate of ToU tariffs
- Currently reconciling with Government's 4th Carbon Budget scenarios (SGF WS1)
- Will be further informed by output of SGF WS3

# Accommodating immediate and longer-term external drivers




**Higher volume of new (intermittent and non-dispatchable) sources**

**High volume of new domestic and (flexible) I&C demand**

**Challenges of the low carbon transition**

Avoiding being a barrier to The Carbon Plan – ensuring that the rate of connection of clusters of new sources of generation and demand does not exceed the pace at which the business can prepare the network

A business plan that considers a traditional approach (without innovation or considering the long-term implications) for these new requirements is unlikely to be fit for purpose

# Uncertainty and Flexibility - our ability to respond and adapt to a range of scenarios

## Be ready

*Having Leading Indicators in place to anticipate customer and stakeholder requirements (where will new generation and new demand appear and how will it impact)*

## Speed & flexibility

*Offering simple accessible 'smarter' solutions and connection offers that are willingly adopted – and, where justified, building headroom in advance*

## Long-term best view

*Deploying smart technical and commercial solutions where there is a whole-life positive investment case compared with conventional network investment*

## Build the toolbox

*Being innovative in developing standardised smart solutions that can be deployed to accommodate new technologies in a simple and effective way*

## Manage the network

*Promoting innovative solutions that preserve the option of a more active network management regime as and when low carbon technologies demand*

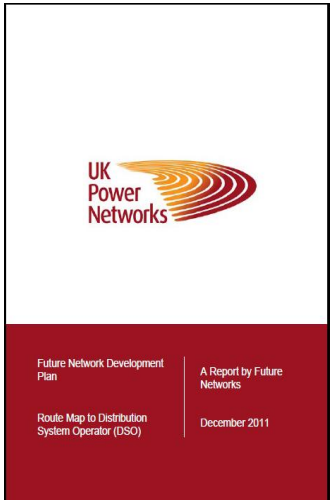
## Continuous Improvement

*Leading or actively participating in innovation projects, disseminating knowledge and embedding learning as BaU*

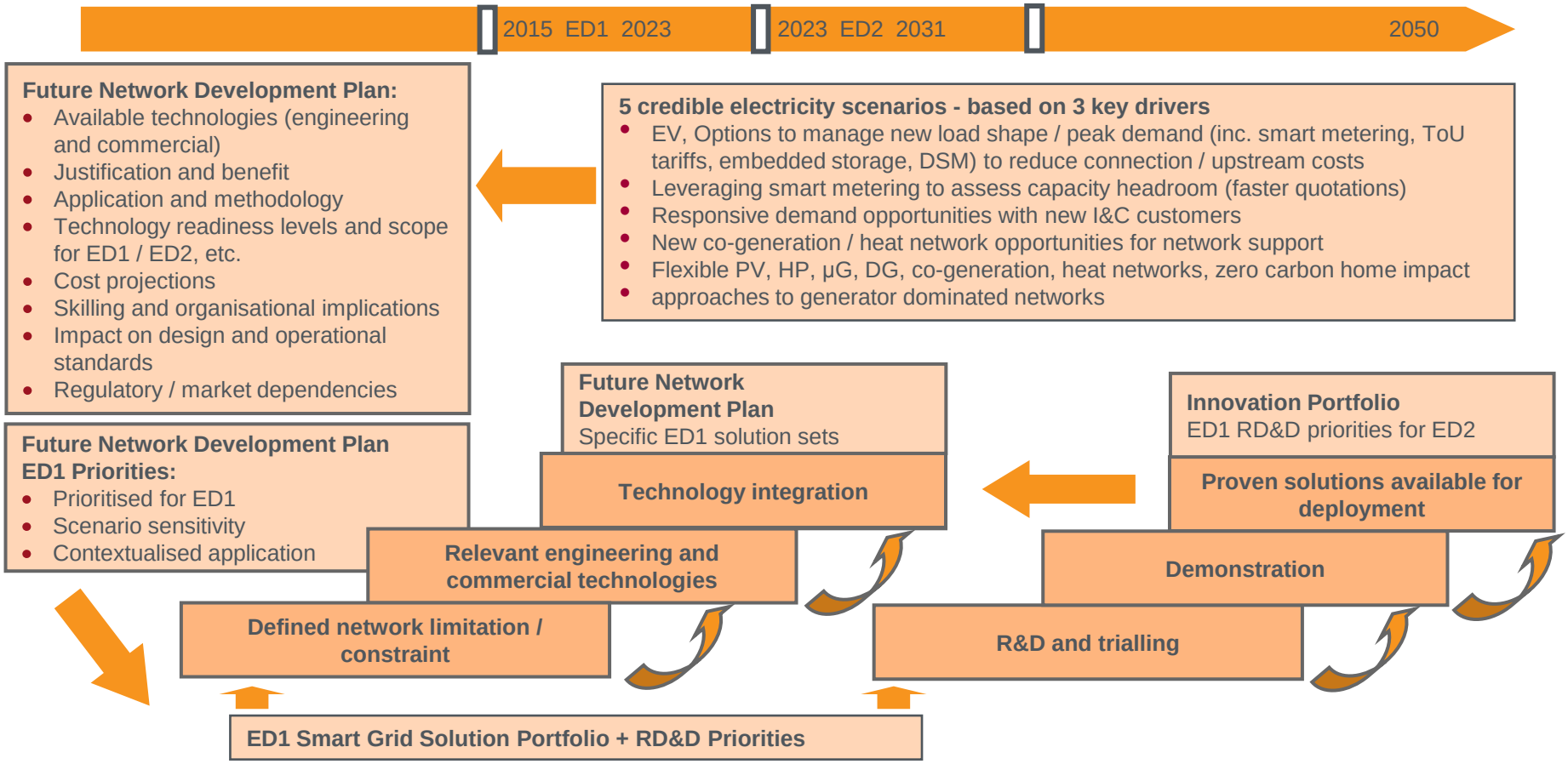
# Future Network Development Plan

- A suite of documents that articulate the requirements for UKPN to deliver an efficient and economical response to the challenges and opportunities arising from The Carbon Plan
  - The Route Map from DNO to DSO (articulating the requirements and overall strategic direction)
  - High-Level Use Cases (tabulating for each technology: the network application, methodology, needs, benefits, scope and TRL)
  - Dependencies and Costs (tabulating the UKPN skilling and organisational implications, system dependencies, and regulatory / market framework dependencies, and costs)
  - ED1 Priorities (describing for each future energy scenario, the key smart grid technology applications for deployment during ED1 – and the priorities for further R&D)

System Monitoring
System Automation
Fault Level Management
Voltage / Power Factor Control
Energy Storage
Distributed Generation
Distributed Energy Resources (including micro-generation)
Multi-Rate Time-of-Use Tariffs
Balancing Services
Distribution Network Constraint Management
Security Support / Optimisation
Network Management / Support Systems
Information Communications Systems



# Tools to Manage Uncertainty




**Future Network Development Plan methodology permits multiple scenarios to be evaluated and appropriate strategies to be deployed**

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Additional slides

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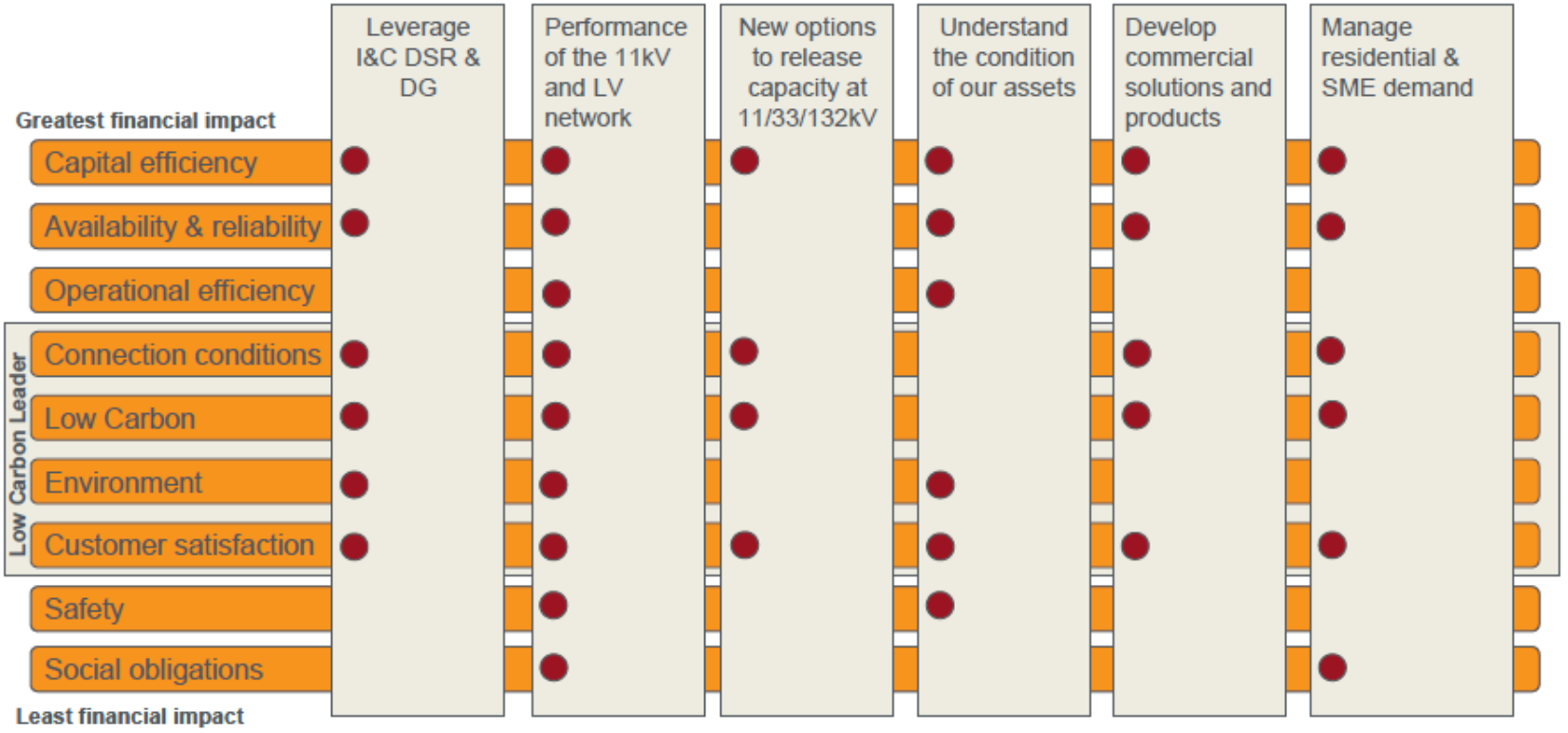
# Approach to Delivering Primary Outputs



# Translating into Possible RIIO Output Measures

| ED1 Smart Grid Deliverable | ED1 Primary Output Category | Possible ED1 Output Measure |
|---|---|---|
| Enhanced System Integrity | Reliability and availability | Unplanned outages |
| Increased Supply Resilience | Reliability and availability | SAIFI (CIs) and CAIDI (avg. interruption duration)* |
| System Voltage Optimisation | Environmental Impact | Hybrid – load and loss load factor (higher) and ADMD (lower) |
| Facilitating higher levels of DG Penetration | Conditions for Connection | Speed and cost of connecting DG |
| Enhanced System Security through procured ancillary services | Reliability and availability | Cost of maintaining ER P2/6 security |
| Provision of upstream System Balancing ancillary services | Social Obligations | Cost of national system balancing |
| Increased Plant and Line Utilisation | Social Obligations | Avg. peak utilisation factor (i.e. higher LI through active management) |
| Smart Management of Distributed Energy Resources | Conditions for Connection | Speed and cost of connecting micro-and mini-generation |
| Smart Management of Electric Vehicles and Heat Pumps | Conditions for Connection | Speed and cost of connecting EVs and heat pumps |
| Improved Network Visualisation | Conditions for Connection | Capacity headroom |
| Enhanced Network Flexibility and Interoperability | Social Obligations | DG and DER accommodation levels |
| Advanced Power Outage Management | Customer Satisfaction | SAIFI (CIs) |
| Advanced Voltage Quality Management | Customer Satisfaction | Customer voltage and power quality complaints |
| Improved Load Factor | Conditions for Connection | Capacity headroom (i.e. increased due to peak shifting) |
| Losses Optimisation | Environmental Impact | Technical losses |
| Enhanced Control Systems Resilience | Social Obligations | Cyber security resilience (performance against attacks) |