

RIIO-ED2 Overarching Working Group

Meeting 3



OFG1161

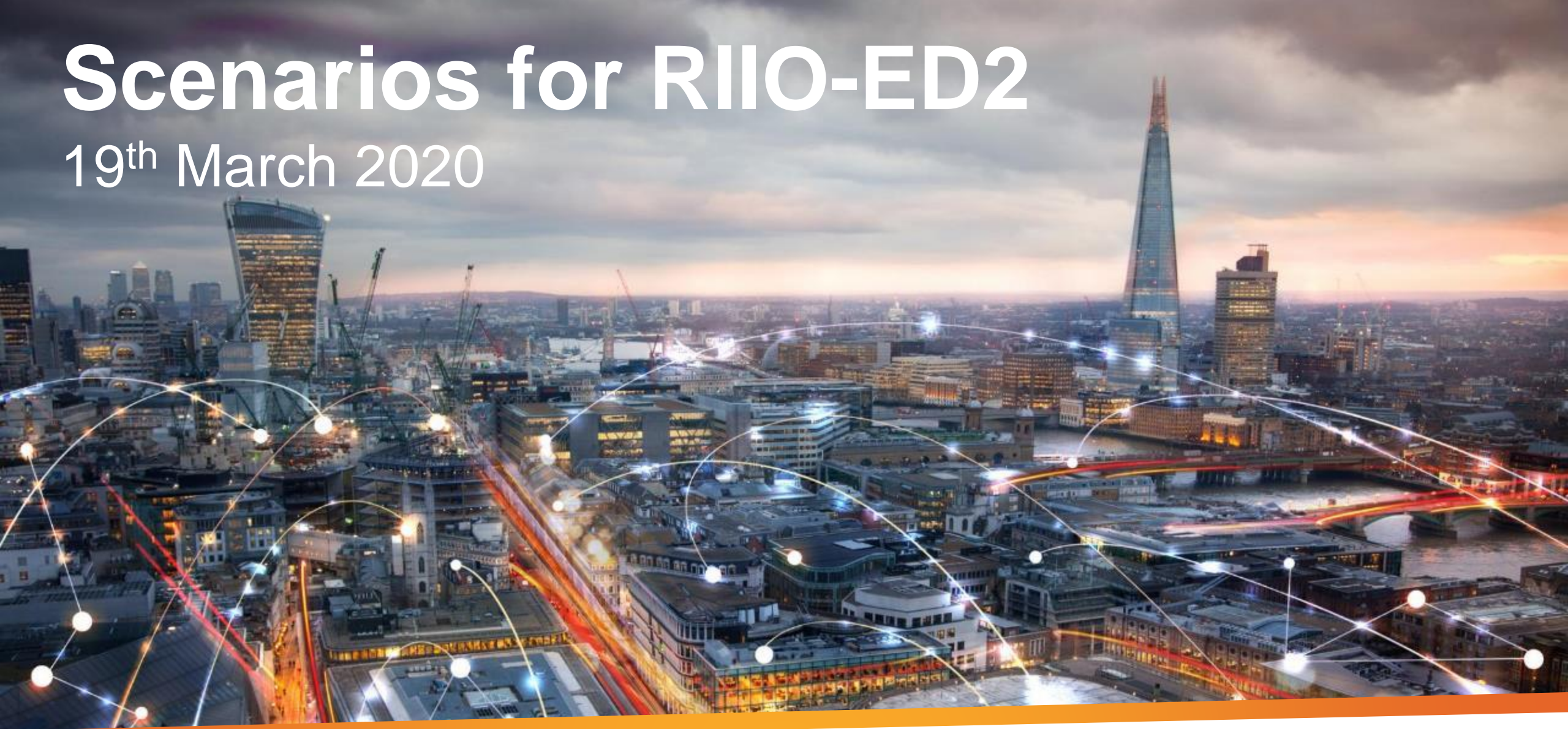
19 March 2020

Time	Agenda item
1000-1010	Setting out expectations for this group (James Veaney)
1010-1050	UKPN – Scenarios for RIIO ED2 (James Hope)
1050-1130	Scot Gov - Devolved priorities and RIIO ED2 (Simon Gill)
1130-1210	NPg - Handling low carbon uncertainty in ED2 (Keith Noble-Nesbitt/Patrick Erwin)
1210-1250	JOINT - Proposal for regulatory treatment of Load Related Expenditure in ED2 (Paul Auckland)
<i>30mins</i>	LUNCH
1320-1400	Ofgem - Approach to managing net-zero in ED2 (James Veaney)
1400-1440	NPg – DSO functions (Jim Cardwell)
1440-1520	SSE/ENA – Data (Steven Gough)
1520-1550	JOINT - Subgroup - Achieving Net Zero including Strategic Investment (Paul Auckland)
<i>followed by</i>	AOB

- January minutes
- Date of next meeting : 17 April

Scenarios for RII0-ED2

19th March 2020



Purpose

- Provide an overview of key questions that have arisen from discussions in the National and Regional Planning sub-group of the OAWG
- Give an overview of how local DFES is being shaped
- Discuss the merits and drawbacks of different policy stances
- Agree where further work may be required in the sub-group v matters to be debated at the main OAWG or left with Ofgem

Clarity over purpose of having a scenario or multiple scenarios

- Under the RII02 framework, companies are being encouraged to undertake more extensive and wide-ranging customer and stakeholder engagement to help shape and inform their business plans
 - Ultimately this could result in 14 regionally based plans
 - Meeting “customers’ wants and needs” is a common theme in Ofgem publications
- At the same time, for RIIO2 and GD2 companies were told by Ofgem to base their plans on the lowest view consistent with the industry produced “common scenario”
 - The industry “common scenario” involved licensees across gas distribution and transmission, electricity distribution and transmission and the electricity system operator all working together
 - The starting point for this work and its underlying basis was the 2018 FES
 - At that time not all of the FES scenarios met Net Zero – that is still true of the 2019 FES
- A single, “common scenario” has been suggested as necessary for Ofgem to conduct benchmarking across the 14 DNOs as part of its cost assessment
 - Understanding whether the “common scenario” is in addition to, or a replacement of the DNO’s own view is needed

Clarity over what should constitute the DNO’s plan v what is required for Ofgem to undertake benchmarking is required

Local v National

- Should the RII0-ED2 framework allow for DNOs to plan against local wants and needs or impose a national “one size fits all” standard?
- Will the framework accommodate different areas within the same licensee footprint targeting different decarbonisation pathways?
- Even with DFES are these granular enough to line up with local area energy plans?
 - DNOs to outline the granularity of their individual DFES’ – suggested follow up work
- Should any mandated scenario(s) have to meet the local targets?
 - In certain parts of the country e.g. Scotland, Wales and London, political and economic levers give greater credence to sub national plans
 - The Scottish Government’s slides will expand on this
- Are local area energy plans and targets underpinned by funding and concrete measures?
 - What level of evidence will be required to support inclusion?
 - Clarity will benefit all participants in the process and avoid unnecessary issues later in the process

The National v Local question needs answering

Our networks are seeing a lot of change



Distributed Generation

9.4GW of Distributed generation

Over **170,000** distribution connected generators

Up to 8GW of new capacity forecasted by 2028

Source: Internal and NG FES



Electricity Storage

>2GW of accepted offers

290MW connected storage connected

2GW – 3GW of extra capacity by 2028

Source: Internal



Electric Vehicles

85,000 plug-in EVs in UKPN network areas (30% of the UK total)

c.30,000 charge points across UKPN network areas

Up to 3m EVs forecasted by 2028

Source: DVLA, SMMT, Zap Map and OLEV



Electric Heat

11,000 residential RHI installs on our network

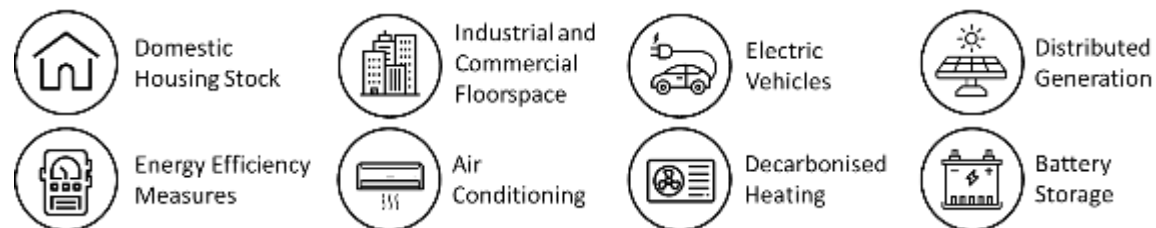
No gas boilers in new homes from 2025

Potential new policy mechanisms to increase low carbon heat uptake

Source: Ofgem and BEIS

Overview of UKPN DFES approach

- The **purpose** of the DFES is to allow us to understand **how key demand and generation drivers may be deployed across our networks to achieve net zero**
 - i.e. the how many, by when and where



- We have worked with Element Energy to develop **bottom up forecasts for the key demand and generation drivers** taking into account the specific characteristics our network
 - For example how the composition of the domestic and industrial and commercial building stock impacts low carbon heating technology uptake
- **Output format co-created with stakeholders, data will be open and accessible to all**
 - We are also publishing the methodology and key assumptions

We have engaged with a range of stakeholders to help develop our scenarios

Key market participants including

- Chargemaster
- Tesla
- Association of Decentralised Energy
- British Solar Renewables



Key regional stakeholders including

- Greater London Authority
- Coast to Capital
- New Anglia Local Enterprise Partnership
- Greater South East Energy Hub



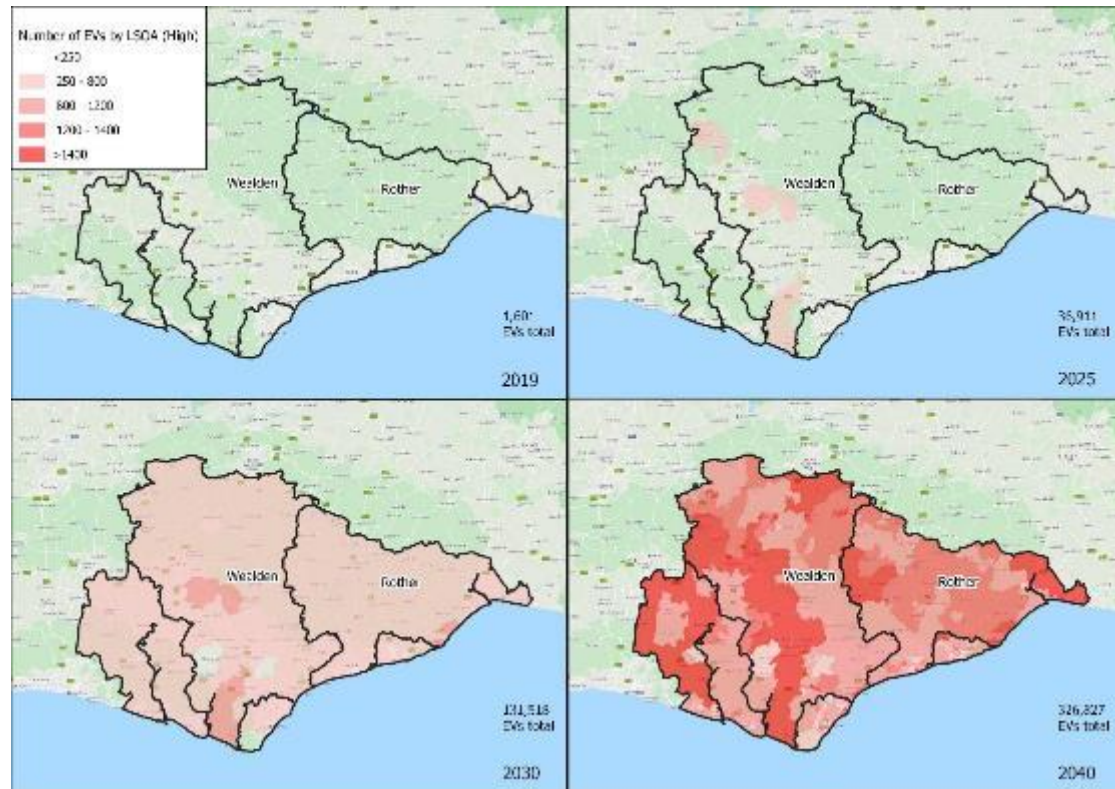
Examples of key feedback from stakeholders which has changed our forecasts

- Low EV forecast not credible given current take up rates and Govt stated policy
- High short term EV forecast too optimistic given supply constraints
- Given market developments hydrogen not expected to be powertrain of choice for cars
- Pipeline acceptance rates for some generation technologies too optimistic given current market conditions e.g. gas reciprocating engines

30 key stakeholders engaged with

We want the data to be as useful to stakeholders as possible

EV analysis produced for East Sussex County Council



- Splits on a DNO basis are not useful for the majority of our stakeholders
 - The GLA is served by all three of our licence networks
- Splitting down by LSOA allows stakeholders to construct their own geospatial analysis
- The data is split by
 - LSOA
 - MSOA
 - Local Authority
 - Local Enterprise Partnership; and
 - Grid Supply Point

We have constructed three views of the future

Steady progression – General progress towards decarbonisation continues; however, the rate of change is not sufficient to meet net zero carbon emissions in 2050.

Engaged Society – Meets net zero emission in 2050 with significant engagement at an individual level and a high degree of electrification including heat

Green transformation - Meets net zero driven primarily by centralised initiatives and transformation of existing infrastructure, including the production of low carbon hydrogen for heat, requiring less change for individuals.

	Steady Progression	Engaged Society	Green Transformation
Net zero compliant	No	Yes	Yes
Electric vehicles (car and vans)	Low	Medium	Medium
Electric vehicles (other)	Low	Medium	Low
Heating	Medium electrification	High electrification	Low electrification with decarbonised gas
Small scale PV	Medium	High	Medium
Large scale solar PV	Medium	Medium	High
Battery storage	Medium	High	Medium
Flexibility	Medium	High	Low

Timing Issues

- The National Grid FES published in July 2020 will inform the next round of DFES publications
- Do these form the basis of the 2021 draft and final submissions?
- Or should DNOs be producing updated DFES documents in 2021 using the latest available information?
 - Does the December 2021 date work?
- The benefits of using the most up to date information need to be weighed against the likely desire from Ofgem's Challenge Group for minimal changes to plans between the draft and final submissions
 - Suggest early engagement with the CG on this issue
- Ensuring that appropriate uncertainty mechanisms are in place to flex allowances – noting that the further back in time forecasts are “locked in” the greater the possibility that such mechanisms will be triggered and/or the revenues associated with them will increase i.e. greater bill volatility

Updating company DFES' in 2021 post National Grid's 2021 FES publication may compress the December 2021 submission date

Business Plan Guidance

- Ofgem Business Plan Guidance – will it specify a scenario to use and will there be a requirement for a comparison between a “common scenario” and the DNO’s actual business plan?
- Will Ofgem mandate how any “common scenario” should be apportioned across the country?
 - Simple drivers such as customer numbers are readily available, but are not necessarily the most appropriate
- What is the evidence framework to enable deviation from the “common scenario”
 - Particularly relevant when thinking about “high confidence” and “low confidence” costs and penalties for disallowed costs
- What figures are priced into the control?
 - National values e.g. Value of Lost Load
 - Local desires on visual amenity

How locally derived evidence, such as willingness to pay, is harmonised under any “common scenario” needs thinking through

Other considerations

- Given the parallel work on access and charging will scenarios be based on the current connections charging arrangements?
 - How could/should any sensitivity analysis be undertaken?
- Extent to which whole system scenarios are required v scenarios focussed on electricity distribution, with cross checks to National FES scenarios
 - As Ofgem and gas and transmission licensees approach finalisation of ex ante allowances and uncertainty mechanisms, will parties be expected to input to RIIO-ED2 scenarios, and by extension possible revisions to their own scenarios?

Is the focus on Electricity Distribution or broader?

Recap

1

Clarity over what should constitute the DNO's plan v what is required for Ofgem to undertake benchmarking is required

2

The National v Local question needs answering

3

Updating company DFES' in 2021 post National Grid's 2021 FES publication may compress the December 2021 submission date

4

How locally derived evidence, such as willingness to pay, is harmonised under any "common scenario" needs thinking through

5

Is the focus on Electricity Distribution or broader?

Scotland's Energy System: Devolved priorities and RII0-ED2

19th March 2020

Ofgem ED2 Overarching Working Group

Simon Gill, Head of whole systems and Technical Policy



What this presentation will cover:

- *Highlight examples from Scotland where devolved policies, targets and ambitions are likely to have a material impact on electricity distribution during ED2*
- *Identify some of the characteristics of those policies*
- *Describe the EV Strategic Partnership between Scottish Government, Transport Scotland, SP Energy Networks and SSEN.*
- *Describe the Scottish Government's proposal for Local Heat and Energy Efficiency Strategies (LHEES) as a potential example of LAEPs*
- *Pose some questions for discussion.*



The Scottish Climate Change Act

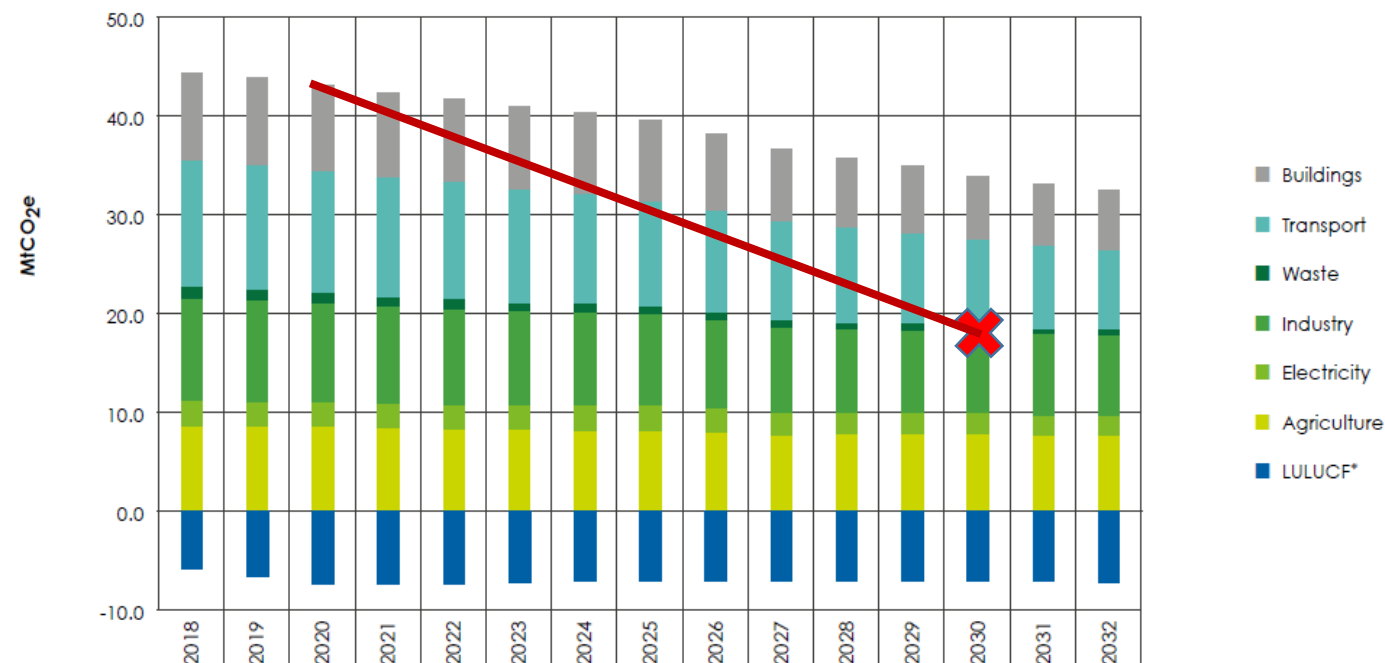
Scottish 2019 Climate Change Act

The Scottish Ministers must ensure that the **net Scottish emissions account for the net-zero emissions target year is ... 2045.**

The Scottish Ministers must ensure that the net Scottish emissions account for the year—

- (a) **2020 is at least 56%** lower than the baseline,
- (b) **2030 is at least 75%** lower than the baseline, and
- (c) **2040 is at least 90%** lower than the baseline.

Figure 1: Pathway to 2032



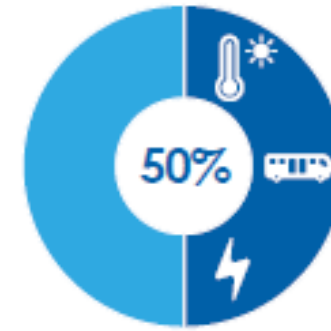
This is a statutory Scottish Target set in legislation: it is likely to require faster investment in network infrastructure during ED1 and ED2 than elsewhere in GB. what weight should this hold target have in price control decisions?



The Energy Strategy



2030 Whole System targets



THE EQUIVALENT OF
50% OF THE ENERGY
FOR SCOTLAND'S
HEAT, TRANSPORT
AND ELECTRICITY
CONSUMPTION TO
BE SUPPLIED FROM
RENEWABLE SOURCES

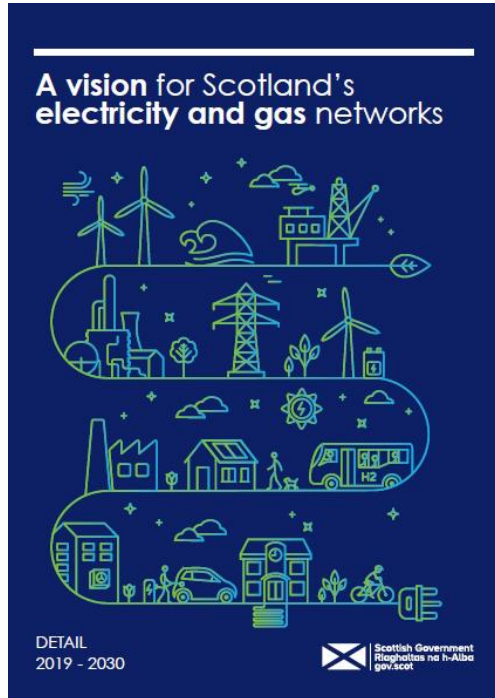


AN INCREASE BY **30%** IN THE PRODUCTIVITY
OF ENERGY USE ACROSS THE SCOTTISH
ECONOMY

This is a non-statutory Scottish target laid out in a flagship Scottish policy document and supports the UK direction of travel to net zero



The Vision for Scotland's electricity and gas networks to 2030



Our vision: By 2030... network regulation and governance will be more flexible and agile, based on deeper relationships with consumers. Scottish policies and priorities, as well as those of local authorities, will be taken fully into account ensuring that networks help deliver regional and local aspirations for energy. A coordinated, “whole system” approach to infrastructure planning will exist, with strong and effective discussion between the electricity and gas network companies and everyone in the wider energy system. The way networks are funded ensures that the essential service they provide – access to affordable, reliable, and low carbon energy – is available to all citizens and businesses in an efficient and cost effective way. about the long term role of the networks and the wider decarbonisation

These are ambitions and areas of focus that the Scottish Government would like to see reserved policy and regulation take account of

<https://www.gov.scot/publications/vision-scotlands-electricity-gas-networks-2030/>



Wider energy policy



Programme for Government

“phase out the need for new petrol and diesel cars and vans by 2032”



Energy Efficient Scotland

“by 2040 our homes and buildings are warmer, greener and more efficient”

These are non-statutory policies in devolved areas where substantial SG funding is being made available to deliver them.



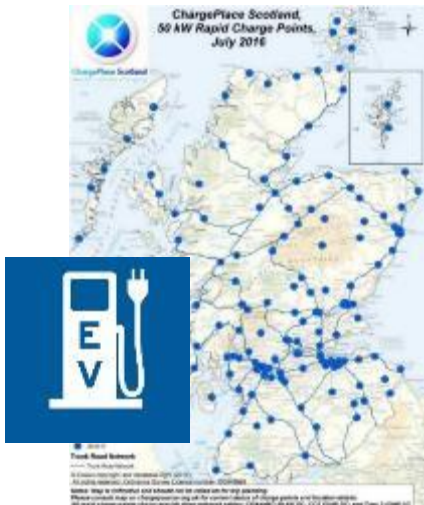
Charge Point Scotland

CHARGE PLACE SCOTLAND

Over 1000th public
chargepoint

Less than 2.78 miles
between chargepoints (over
4 in rUK)

CPS considered 'miles
better' than provision in
E & W



- National network of electric vehicle charge points available across Scotland.
- Developed by the Scottish Government through grant funding of Local Authorities and other organisations to install publicly available charge points.
- A Host is the designated owner of the charge points they have installed and are also responsible for maintenance and general upkeep of their charge points.
- The ChargePlace Scotland network is operated on behalf of the Scottish Government by Charge Your Car Ltd.

Some issues that needed overcoming (End of 2018)

Local Authorities /
Scottish Government
were not engaging
strategically with DNOs

LAs / SG were not
considering network
connection costs when
choosing locations

Misunderstanding of
who should pay what
for network costs

DNOs didn't have a view of the SG / LA vision for public EV charge points

Awareness that GB-centred regulation / policy on electricity networks could be a
barrier to getting the electricity network capacity where and when it is needed

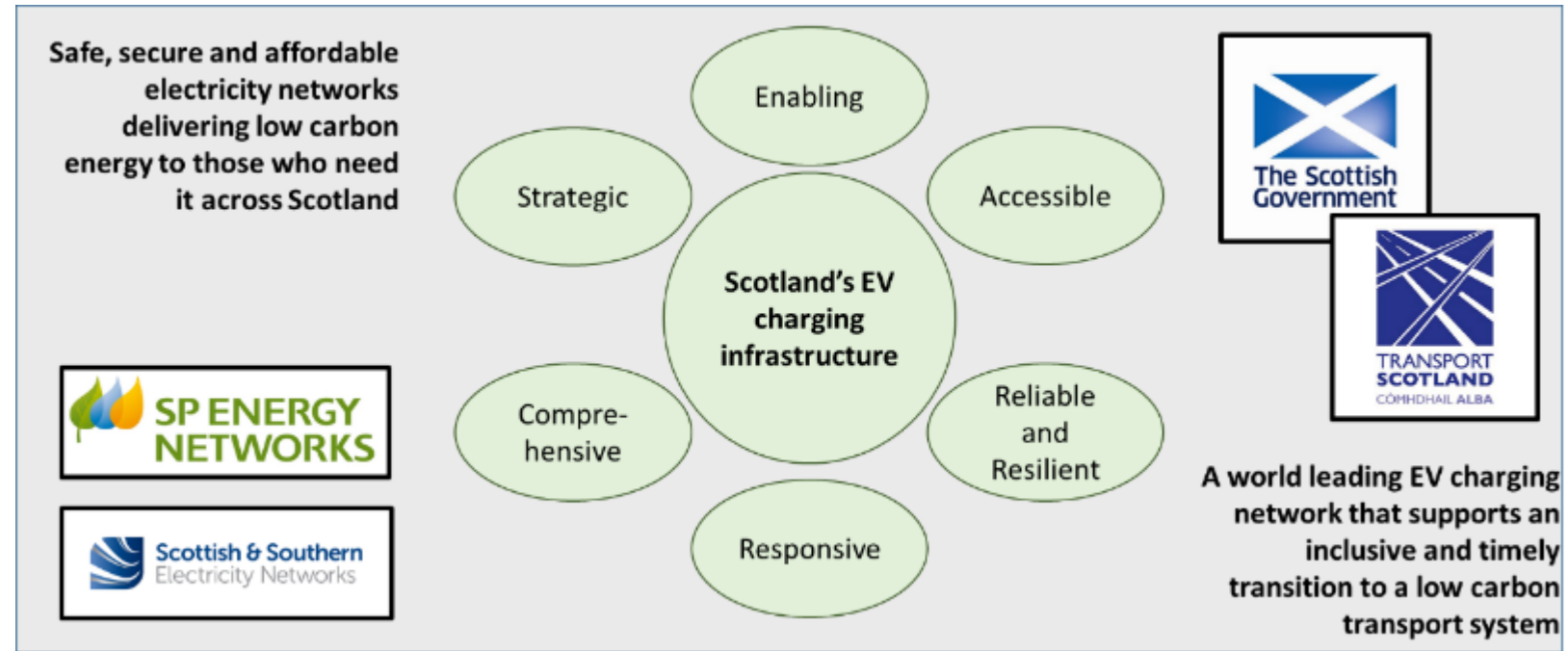
<https://chargeplacescotland.org/>

... Which led to



EV Strategic partnership

1. Develop an evidence led, accelerated model for **co-ordinating EV charging and electricity network infrastructure**, with efficient investment and fair distribution of cost, and which unlocks economic, social and environmental benefits.
2. Create a **strategic, lower cost approach to building and maintaining a world-leading public EV charging network in Scotland**, aligned with Transport Scotland's key objectives and guiding principles.
3. Identify potential changes to the **policy and regulatory context** in which electricity networks operate, helping to develop an industry-accepted role for network companies in the process of EV co-ordination.
4. Produce **recommendations for Scottish Ministers, Ofgem, UK Government** and others on an accelerated model for the coordinated delivery of EV and electricity network infrastructure.
5. Support a **collaborative, inclusive, environment** that encourages the sharing of industry best practice and a collective understanding of the challenges of delivering Scotland's EV goals.



What status and value can Strategic Partnerships such as this have in ED2 decision making?



Heat decarbonisation policies

Energy Efficient Scotland

<https://www.gov.scot/publications/energy-efficient-scotland-route-map/>

- By 2040 all Scottish homes achieve an EPC C (where technically feasible and cost effective).
- Maximise social rented homes at EPC B by 2032; Private rented homes to EPC E by 2022, to EPC D by 2025, and to EPC C by 2030 (where technically feasible and cost effective)
- All homes with households in fuel poverty to reach EPC C by 2030 and EPC B by 2040 (where technically feasible and cost effective).
- Our non-domestic buildings will be assessed and improved to the extent this is technically feasible and cost effective by 2040.
- help secure an investment in excess of £10 billion over the lifetime of the programme, bringing numerous economic benefits for Scotland.

Scottish Heat Network Bill

<https://www.parliament.scot/parliamentarybusiness/Bills/114590.aspx>

- Introduced to Scottish Parliament in March 2020.
- Will set regulatory context for Heat Networks in Scotland.
- Will define Heat Network Zones, Permits, Network Asset Wayleaves etc.
- Through these measures will identify zones suitable for heat network development, allow for a single heat network in that area, and allow them to request the right to put heat network infrastructure 'to the door' or potential anchor loads.



Local Heat and Energy Efficiency Strategies (LHEES)

An example of a Local Area Energy Plan?

LHEES is Currently in development:

- Heat decarbonisation and energy efficiency is a Scottish Government devolved policy area.
- (Scottish) National policy frameworks in place including “Energy Efficient Scotland”
- Local Authorities to develop strategies for their own area on how to deliver decarbonised heat and energy efficiency.
- May involve identifying areas for different types of low carbon heating, taking account of:
 - Access to the gas grid
 - Heat density
 - Local waste heat opportunities
 - the possibility of a heat networks
 - Building types and fabric
 - Industrial and commercial heat demand options
- Could involve zoning for particular technologies (e.g. heat networks)

LHEES are an example of Scottish Government asking LAs to help deliver a (Scottish) national policy and in a way that is suitable for their own geography, demography and economy.



Overview

Scottish Government policies and ambitions can be:

- Statutory and clearly devolved
- Be supportive of UK-wide objectives, be consistent with them, or be necessitated by them.
- Have clear Scottish government funding associated with them
- Further devolve delivery of ambition and deliver to Local Authorities
- Make use of devolved powers to influence a wider area of energy system development e.g. through the planning process or building standards.
- Reflect clear democratic ideals of Scotland such as the 'Just Transition' and 'economic development'.

What principles should Ofgem and network companies use to take account of Scottish Policies?



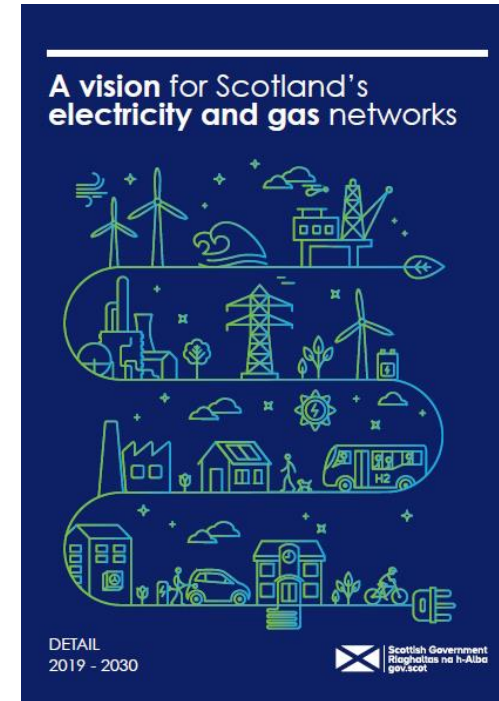
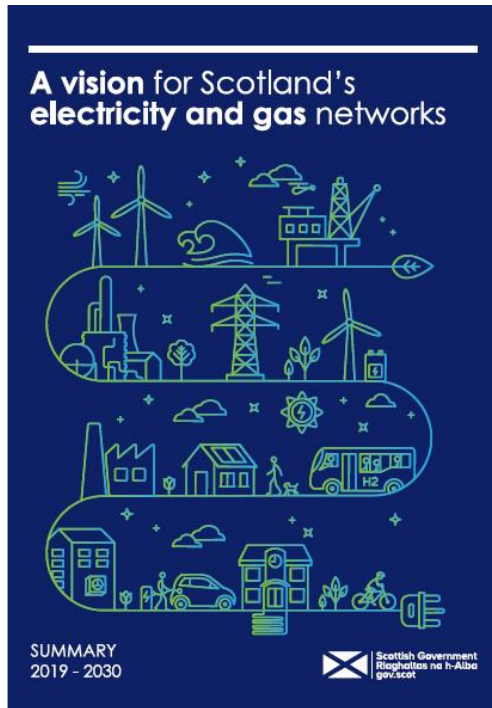
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Thanks



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Scottish Government
Riaghaltas na h-Alba
gov.scot





Handling low carbon uncertainty in ED2

*Discussion pack for the overarching
working group*

19 March 2020

Overview

- This discussion pack sets out Northern Powergrid's views on how to best handle uncertainty in the level and speed of low carbon technology uptake
- It is based on the pack that was discussed at the Flexibility and Capacity Working Group on 1 August 2012
- It covers:
 - The challenge we collectively face
 - The options available for addressing it
 - Full details of the option Northern Powergrid believes is most robust

The challenge: the price control settlement needs to allow for the range of scenarios we face

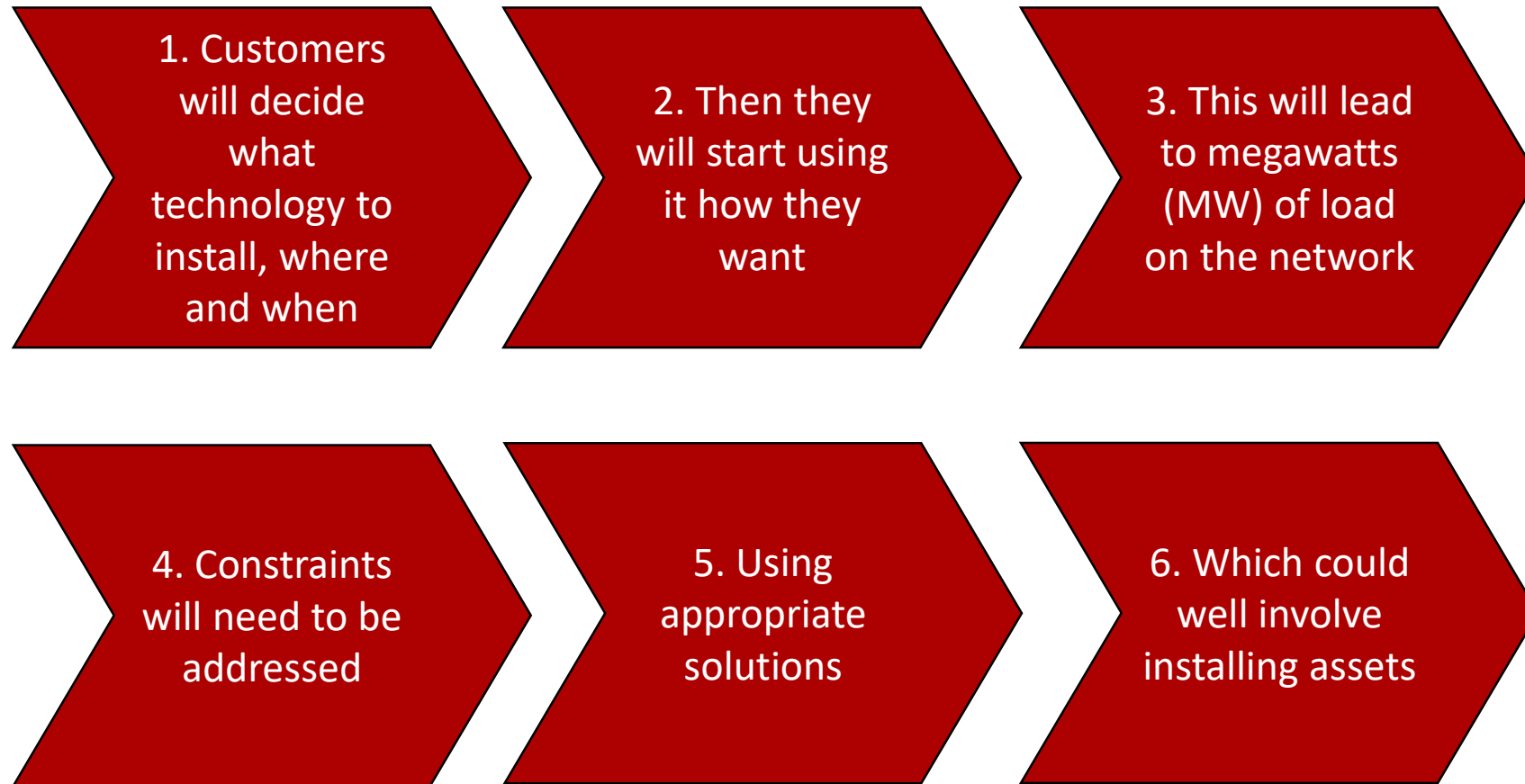
We do not know how quickly low carbon technology will penetrate

- Government policy and technological progress will be central to determining the rate of uptake
- The scenario we find ourselves in might not be balanced across technologies

This must be dealt with while bearing in mind the purpose of RIIO

- Ofgem's decarbonisation plan sets this out well
- The purpose of RIIO is to allow for these changes in the use of energy networks while:
 - maintaining strong incentives for efficiency and value for money (i.e. least cost);
 - encouraging network companies to be innovative; and
 - giving companies responsibility for managing uncertainty (i.e. who takes the risk)

While there are many unknowns, some things are certain



An uncertainty mechanism could be targeted at any stage of this chain

The options: There are several options for how to handle this uncertainty, but only a volume driver seems credible

Option	Strengths	Weaknesses
1. Pass through	<ul style="list-style-type: none"> Allows for different scenarios 	<ul style="list-style-type: none"> No incentives for cost efficiency No incentives for innovation
2. Fixed allowances; no deliverables	<ul style="list-style-type: none"> Strong incentives for cost efficiency Strong incentives for innovation 	<ul style="list-style-type: none"> High risk of windfall gains, or insufficient allowances Likely need to plan greater spend to mitigate risk of a 'high' scenario
3. Fixed allowances; firm deliverables	<ul style="list-style-type: none"> Can fund "investment ahead of need" and managed roll-out Can incentivise unit cost efficiency 	<ul style="list-style-type: none"> No incentive for volume efficiency Weakens incentives for innovation Costly if investment is not needed¹
4. A well chosen volume driver	<ul style="list-style-type: none"> Strong incentives for cost efficiency Strong incentives for innovation Reduced risk of windfall gains or losses 	<ul style="list-style-type: none"> Few weaknesses... ...provided the driver is "well-chosen"

Notes:

1. Northern Powergrid thinks Ofgem should consider this option only if there is very little uncertainty over how net-zero targets will be achieved. Once there is sufficient certainty, Ofgem could require distributors to plan and invest on this basis under the existing framework.

The choice of any volume driver is critical to the behaviours it will encourage

What does a
'good'
volume
driver look
like?

- Responsive to volume demand
- Mirror customers demands of the network, and the associated costs
- The volume driver can be objectively measured
- The unit cost can be estimated up front
- Encourages DNOs to seek the most efficient long term solution
- Interacts with the other relevant funding mechanisms in a clear and transparent manner

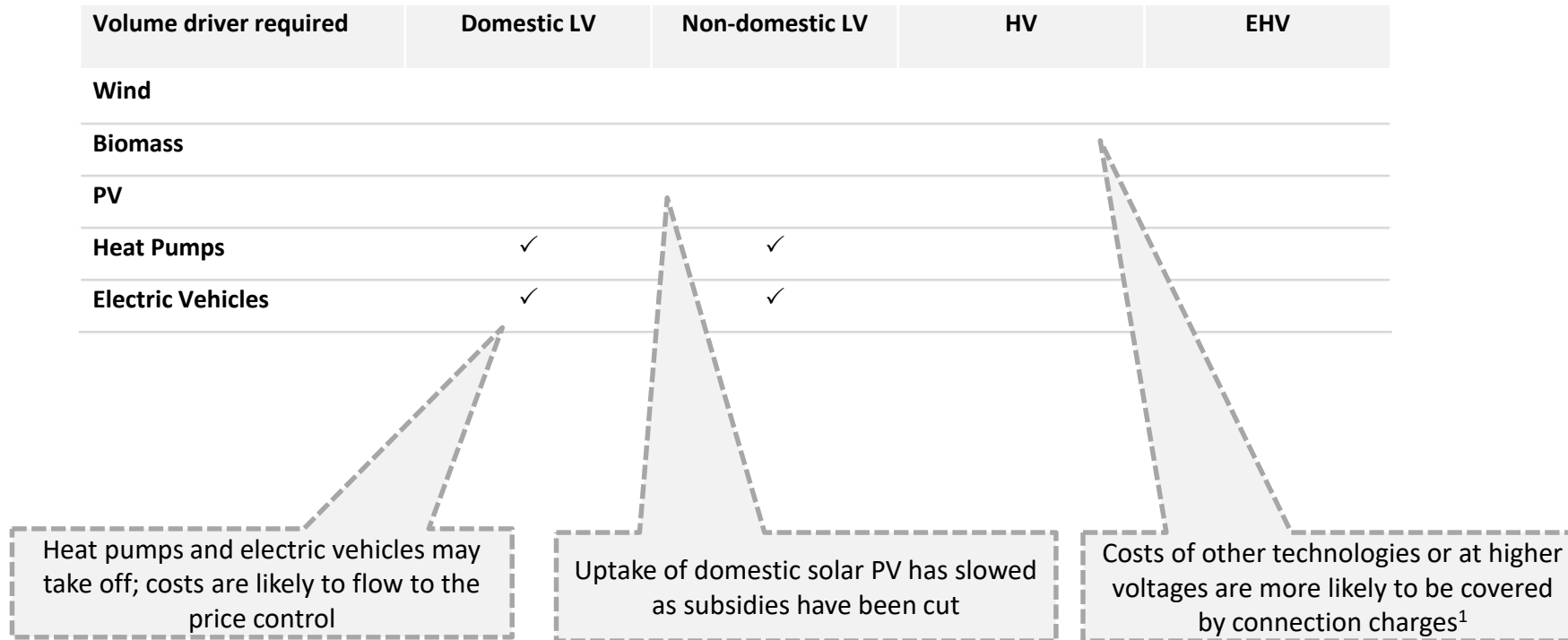
What
efficiency
(least cost)
mean?

- Work is only undertaken that is actually needed
- The cost is low, given the necessary spec
- DNOs invest ahead of need if and only if this is the lowest cost solution
- DNOs innovate, making use of options like demand side management, where these are the least cost in the long term

At ED1 various DNOs proposed various potential volume drivers; some of which would have damaging implications for incentives

	£ per MW connected	£ per MW, actual clustering	£ per problem to solve	£ per intervention
Mirrors demands of network				
Can set unit costs accurately				
Objectively measurable volume				
Encourages efficiency				
Interacts transparently				

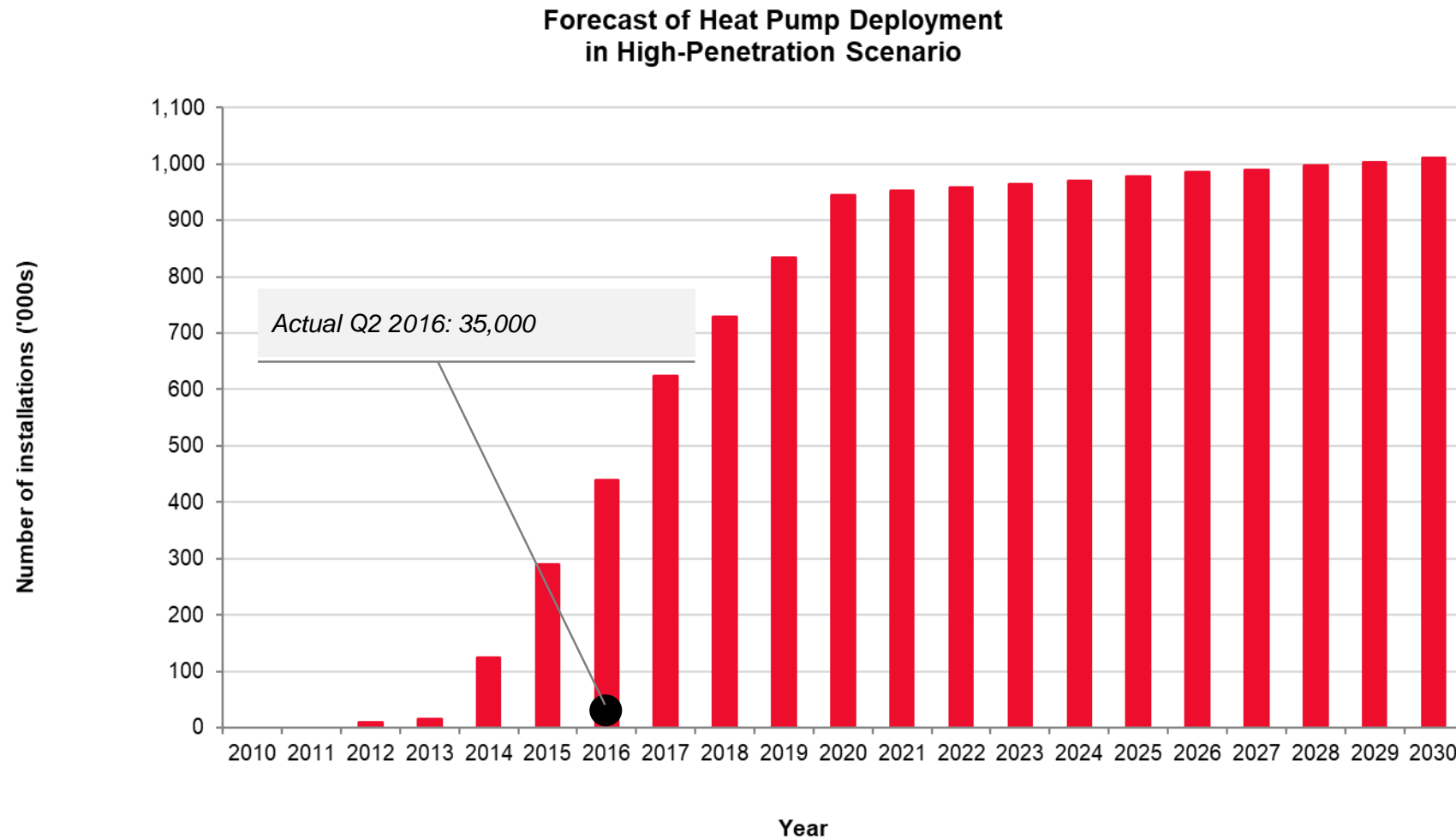
At ED2 we think the biggest uncertainty is uptake of heat pumps and electric vehicles at lower voltages but we also have a white paper coming that could change things significantly



Notes:

1. Subject to the outcome of Ofgem's access review and any future changes to legislation

Heat pumps: rates of deployment are uncertain



Source: Frontier Economics: Pathways to high penetration of heat pumps, Oct 2013

A simple “£ per device” is the most practical volume driver

- Government is likely to know the number of heatpumps and electric vehicles in any region thanks to registration schemes
 - renewable heat incentive
 - OLEV grants etc.
- With a reset possible after five years, it will be reasonable to make assumptions for:
 - Electric vehicle charger types
 - Air vs ground source head pumps

Northern Powergrid's proposal: network companies would forecast the cost of serving low carbon technologies...

Network companies are best placed to establish the cost per device in their business plans

- A “£ per device” is needed to pair with the volumes
- Companies have the best information for estimating the likely efficient costs, using the collateral they think best, including:
 - Models developed through ENA collaboration
 - prioritisation methods; and
 - load index evaluation
- The results of this analysis would be part of a business plan submission
- There might even be some volume companies can ‘handle for free’ based on existing headroom

...Ofgem would then be able to use its standard tools to assess the plans, and encourage challenging forecasts...

Benchmarking and sensitivity analysis could be used to test company proposals

- With company plans that set out a fully calibrated set of costs per device of relevant low carbon technology, this would also define the costs the company is proposing for any given net-zero scenario
- Benchmarking of overall costs in any particular scenarios, relative to other companies, could then be used in the normal way
- Ofgem could also sense check the plan using a range of scenarios, not limited to the main scenarios, to understand sensitivity of the allowances that would result

Challenging cost forecasts could also be encouraged by Ofgem's approach

- Incentives for companies to submit challenging cost forecasts would be required
- With fast-tracking and the IQI already scrapped at ED2, Ofgem may need to consider this area further

...within the price control period the companies would be free to pursue the best commercial solutions...

It would be up to companies to deliver on their promises efficiently and innovatively

- Within the price control period, company allowances would be updated depending on output MW of low carbon technologies connected
- Companies would then need to deliver a network that can accommodate them
 - Failure to deliver outputs would lead to poor performance on the interruptions incentive, customer satisfaction, complaints, and potentially licence breach
 - There would be a marginal incentive to make sure connections are not delayed, since this releases the associated allowances sooner, wherever companies already have the network in place to do so
 - There would be strong incentives to do this cost effectively, using innovative low cost solutions wherever possible, through the efficiency sharing factor

Investment ahead of need would be part of the mix

- There is nothing in this framework to stop investment ahead of need
- In fact, companies would be encouraged to do so in order to contain costs, by accurately forecasting areas where take up will be fastest...
- ...but crucially the companies' own money would be on the line if their forecast turns out to be wrong
- The incentives to do so would be stronger if Ofgem signalled a long term commitment to a benchmarked volume driver allowance

...and extreme outcomes would be mitigated through the return adjustment mechanism

Extreme
outcomes
would be
mitigated by
the RAM

- Extreme levels of outperformance, or companies finding their allowances are insufficient, should be much less likely under this approach than under a simple fixed allowance
- But they cannot be ruled out, especially if innovation or out-turn customer behaviour means the cost to serve a given level of low carbon technology uptake changes
- The return adjustment mechanism proposed for ED2 should give Ofgem the confidence to maintain strong cost incentives through a volume driver...
- ...without the need for additional mechanisms like the current load related reopener, which have abrupt thresholds and damage efficiency incentives

To sum up

- We face uncertainty over the level of uptake of low carbon technologies
- Policy is flux, but likely to become clearer over 2020
- Finding a way to allow companies to respond to this is fully consistent with the objectives of RIIO
- Northern Powergrid believes that the most robust option, which would mitigate the biggest areas of cost uncertainty, is to **establish allowances drivers based on the number of heat pumps and electric vehicles**
- This would be practically implementable, and would allow the RIIO framework to meet its objectives
 - The volume driver could be objectively managed
 - Ofgem could transparently compare one plan with another
 - Developing the cost forecasts would be the responsibility of the company...
 - ... they would then have responsibility for delivering on their commitments...
 - ...while facing strong incentives to do so efficiently and innovatively

Proposal for regulatory treatment of Load Related Expenditure in ED2

Overarching Working Group

March 2020



Problem statement

- How to set price controls which provide networks with sufficient funding and flexibility to facilitate the move to a low carbon economy, provide capacity required and manage network constraints without risking ex-ante allowances being set at levels which may increase charges to customers unnecessarily
 - Uncertainty is likely to increase in ED2; driven by low carbon transition, economic growth, regional differences, flexibility market depth, therefore a new approach to managing this uncertainty is needed to continue to provide both companies and customers the necessary protection and flexibility
 - Current Load Related Expenditure has served its purpose well for ED1 with the Load Related Reopener uncertainty mechanism protecting both customers and companies on demand change during the period to provide an additional funding/clawback opportunity

Background

- Initial proposal for a capacity mechanism (form of uncertainty mechanism) for ED2 was developed by Electricity North West but has rapidly moved into a multi DNO and Ofgem detailed discussion of a possible new mechanism for ED2.
- Developed further by DNOs at two workshops held in February and March 2020, attended by:



Principles and aims for proposed approach to developing a mechanism for ED2 load related expenditure

Protect

- Against unnecessary investment
- Against forecasting risk
- Removes the risk of windfall gains/ losses
- Avoid perceived high ex-ante allowances
- Avoids double-counting

Enable

- LCT adoption
- Anticipatory investment, noting timing of capacity created and utilised
- Provides networks with sufficient revenue to meet customers' needs
- Enable Net Zero by 2050 "at the latest"
- Public understanding

Flexible

- Reflects evolving needs in a timely manner
- Reduce reliance on closeout assessment/reopeners
- Proportionate assessment
- Rules-based in nature with flexibility built in
- Consideration of regional differences

Underpinned by transparency, metrics and published reporting

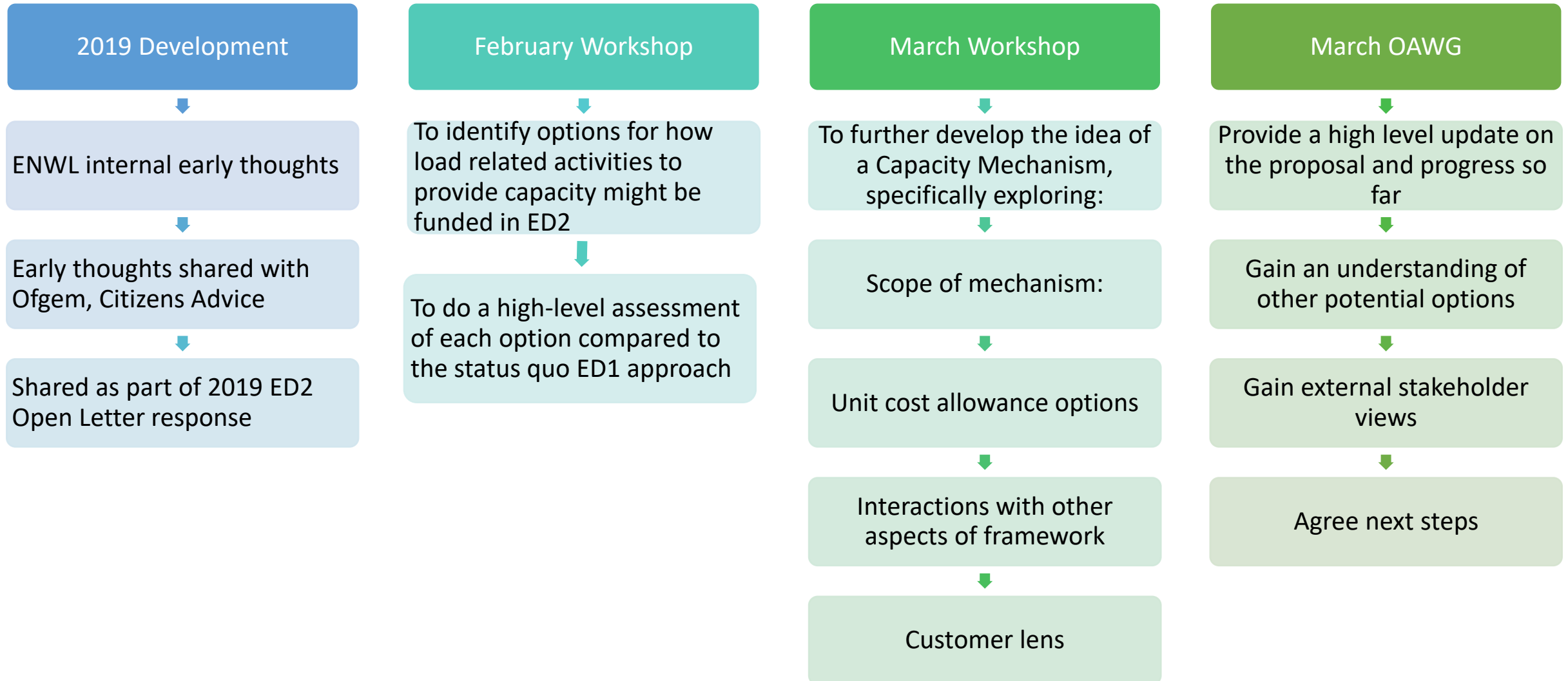
Desired outcomes for proposed approach to developing a mechanism for ED2 load related expenditure

- Ensure the appropriate balance of risk between customers and networks
- Deliver the most efficient solution for networks and customers
- Ensures customers only pay for capacity created / released
- Ensures networks are not unduly short or long-termist in their planning
- Allows networks to assess flexibility options
- Uses existing data within ED1 RIGs or data that can be collected in the remainder of ED1

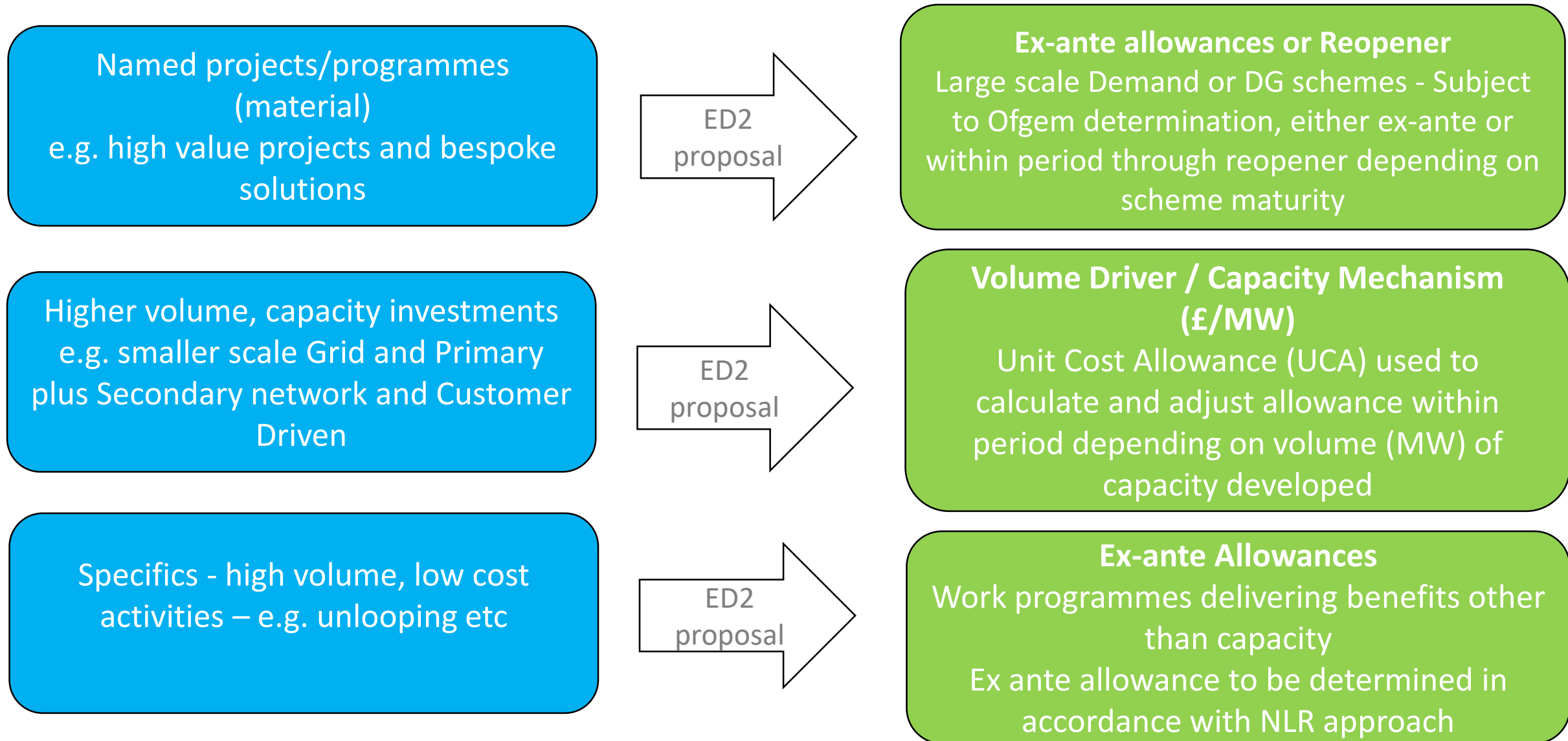
Any proposed approach should :

- Be stress-tested against a range of defined scenarios
- Be tested for unintended consequences
- Use historical data to inform mechanism design
- Be shared with and reviewed by stakeholders and CEGs
- Ensure a level playing field

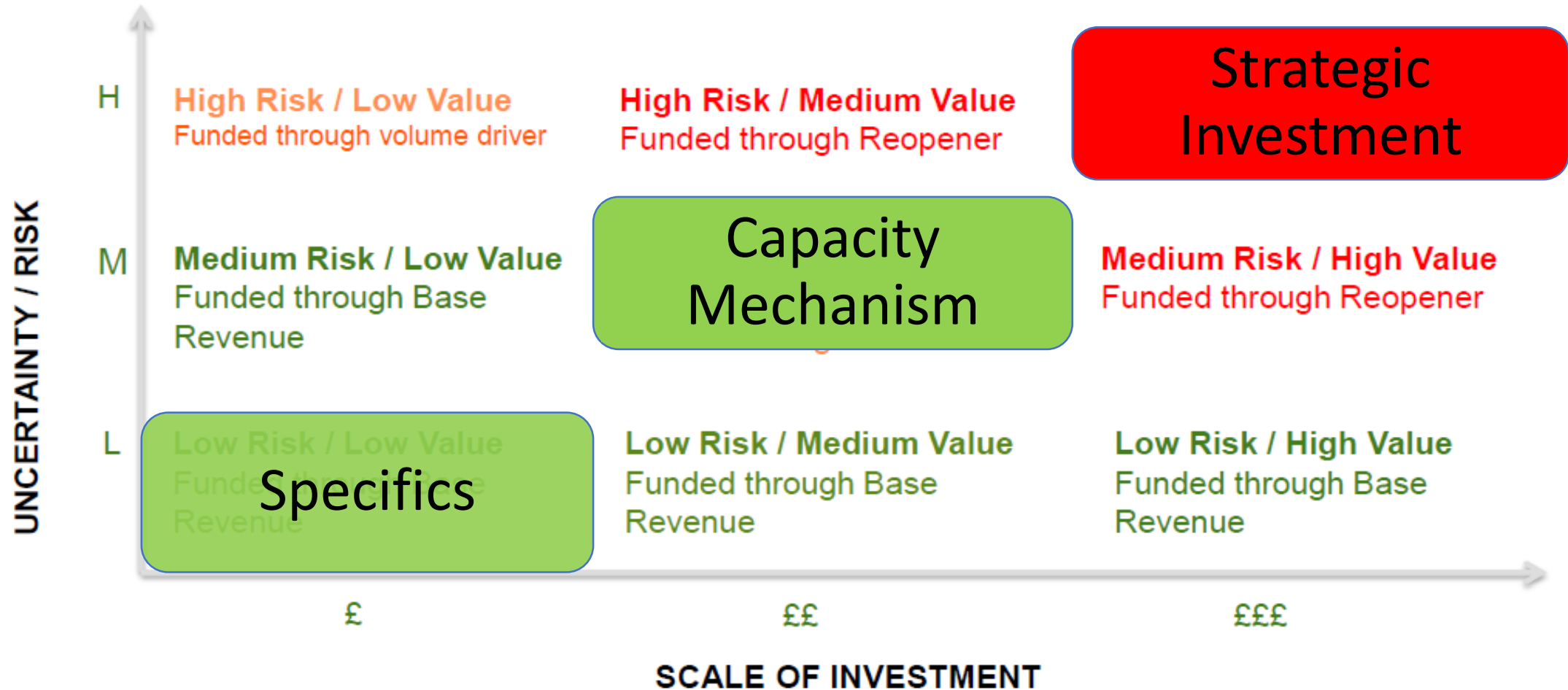
Workshop Process



Proposed scope of Capacity Mechanism



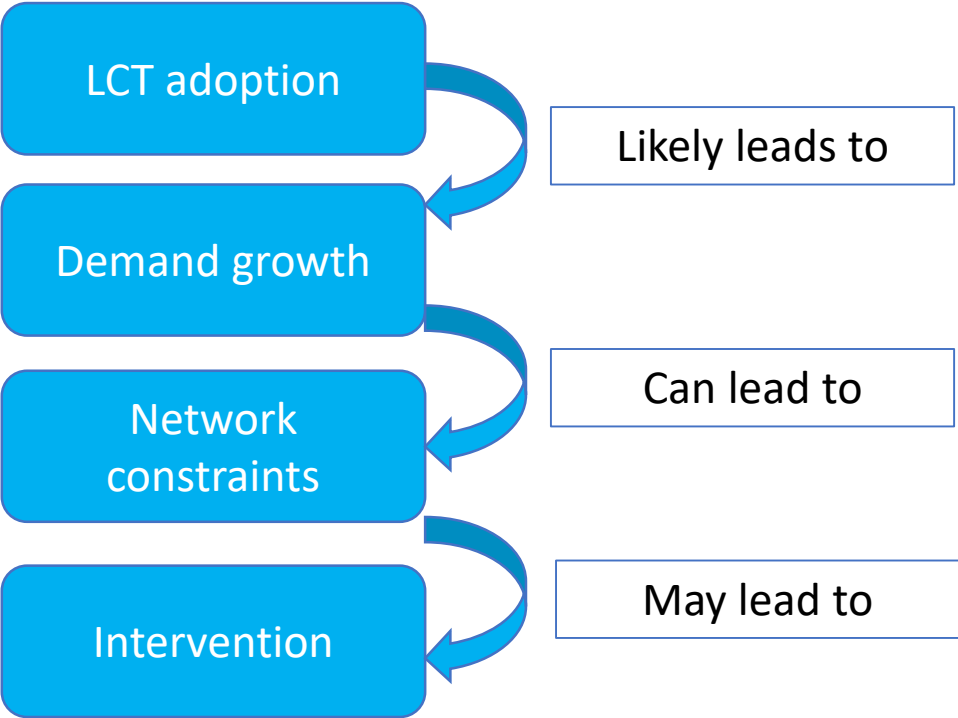
Overlay of SPEN/SSEN's analysis with Capacity Mechanism approach



Capacity mechanism options for ED2

At what level should the mechanism apply?

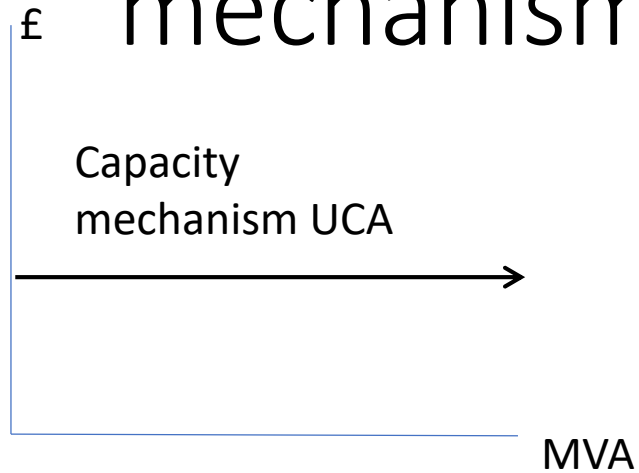
Initial view of options (2019)



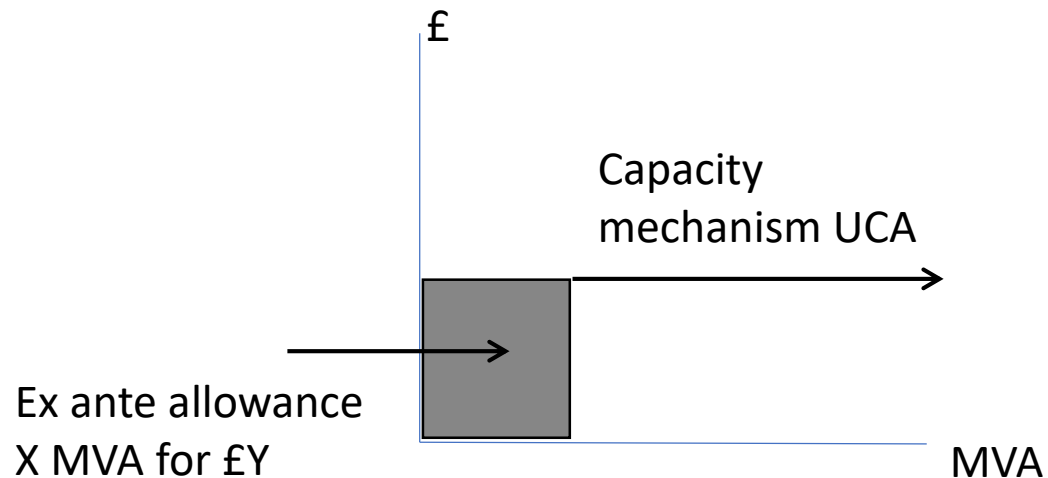
Measure	Pros	Cons
No. devices	Linked to prime driver Scalable	Data sources Doesn't acknowledge latency & diversity Lagging indicator Difficult to reflect long-term nature of decisions
MW	Linked to network measure	Needs additional calculation Other factors affect demand
Location count (defined by LIs?)	Linked to actual effect	Subjectivity Complexity
£ incurred	Directly reflects financial impact	Difficult to judge efficiency Weaker incentives of cost pass through

Group recommendation is the measure used is MW created

Funding arrangements for capacity mechanism



or



- Allowance for all investment under the capacity mechanism driven by UCA

or

- Fixed ex ante allowance of £Y for X MVA and then capacity mechanism driven by UCA once threshold is reached
- Adjustments to be made automatically via PCFM, so need to consider impact of 2 year lag and whether RIGs used to release allowance on the basis of forecast with true-up at end of period based on actual capacity realised

Options for Unit Cost Allowances

Aspect	Pros	Cons
Mechanism based on historic actuals	<ul style="list-style-type: none">• Solid basis as based on historic actuals• Based on RIGs data on consistent basis	<ul style="list-style-type: none">• Historic costs may not be an accurate forecast of future (up or down)
Mechanism based on forecast	<ul style="list-style-type: none">• Forecast costs used therefore should be better indicator	<ul style="list-style-type: none">• Costs based on generic 500MW model
Single £/MVA value	<ul style="list-style-type: none">• Simple to administer• No issues of attributing capacity to constraint voltage level• Creates consistent incentive for all capacity	<ul style="list-style-type: none">• Costs incurred may differ if work mix changes
Disaggregated £/MVA values	<ul style="list-style-type: none">• Closer alignment with costs and capacity created	<ul style="list-style-type: none">• More complex• More sensitive to categorisation of capacity created

Three options are being explored – using RIGS data, CDCM, disaggregated

Customer Lens

- Removes the volume forecasting risk from both customers and networks
- Incentivises companies to find timely and efficient solutions to capacity requirements, rather than hit spend levels – including options of least regret over the short, medium and long term
- Creates a level playing field for network and flexibility-based solutions, helping deliver efficiency
- Simplifies the submission process and removes the need for a complex and lengthy closeout process or multiple reopeners mid period
- Clear and transparent process
- Facilitates delivery of net zero
- Any outperformance/unit cost trends captured for the future fully to customers in resetting for ED3

Conclusions

- Group feels this option would be workable and has further detail behind the proposal outlined today
- We welcome input now and consider this approach of a Capacity Mechanism could be consulted on by Ofgem (alongside other options)
- Group is able to continue work on the mechanics, carry out further analysis and work through options if stakeholders consider more detail is needed/merited.

LUNCH

RIIO-ED2 Overarching Working Group

Approach to managing net-zero in ED2



OFG1161

19 March 2020

Existing

**RIIO-1: High Value
Projects & Load
related reopener (+/-
20% of allowance)**

Enables, but doesn't
incentivise anticipatory
investment; totex
incentives & risk of
disallowance in reopener
may actively discourage it

May lead to delays in
LCTs being connected

Proposed approaches

**Capacity mechanism
(£ per unit of
capacity provided)**

Enables, but doesn't incentivise anticipatory investment,
but DNOs are not disincentivised

May encourage over-
provision of capacity &
consumers carry full risk
of asset stranding

**Upfront funding to
meet forecasted
demand**

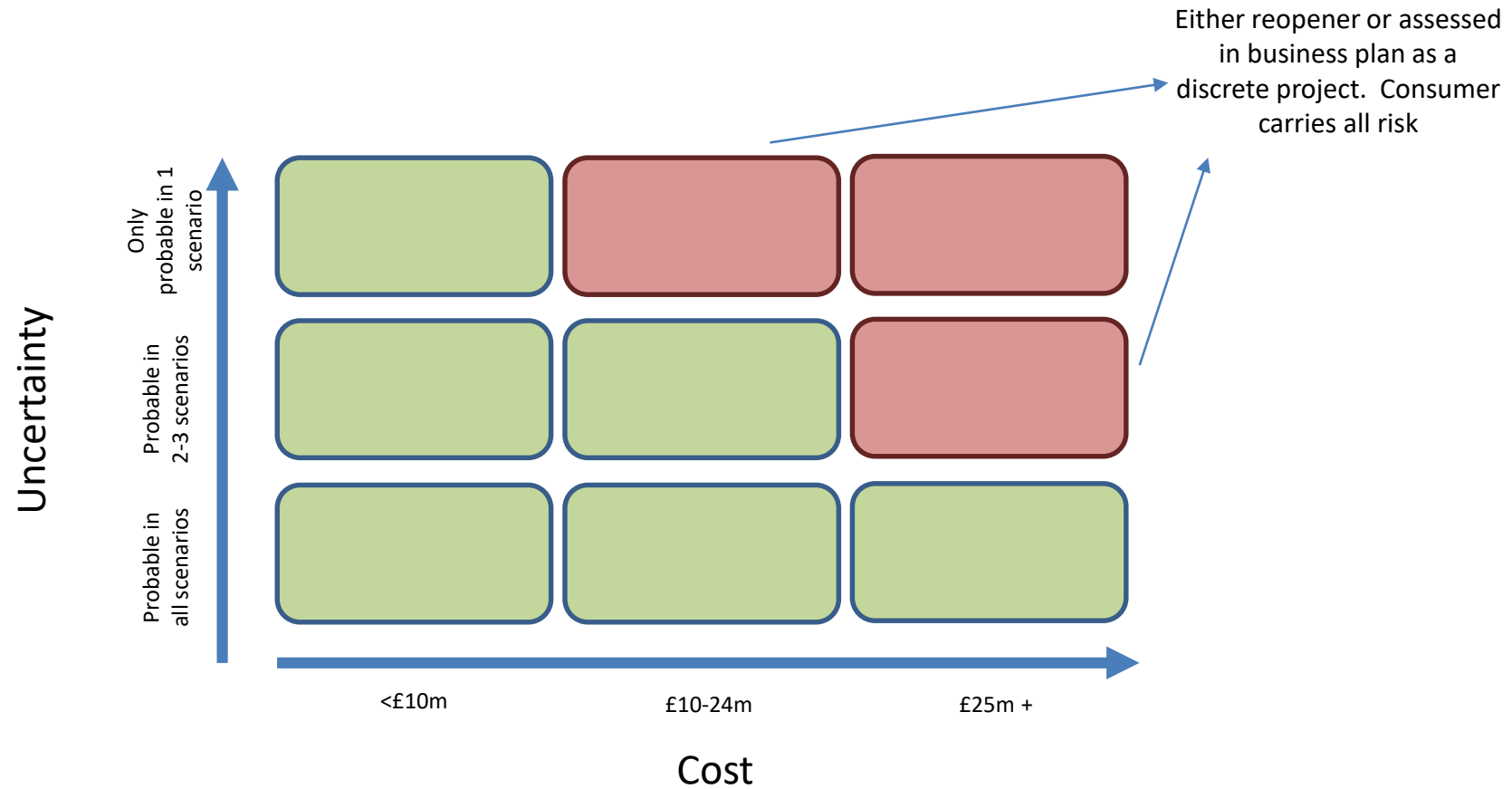
May encourage over
forecasting and
underspending or over
provision of capacity &
consumers carry full risk
of asset stranding risk

**LCT volume driver (£
per LCT connected)**

Enables anticipatory
investment for LCTs not
requiring new
connections

May lead to delays in
LCTs being connected

Seeking an approach that enables anticipatory investment, while reducing risk to consumers of
asset stranding and/or companies earning profits from over-forecasting



How do we create the flexibility to accommodate lower risk/lower value investment ahead of need?

- Exposing DNOs to rewards and penalties based on whether the infrastructure built gets used would share the stranding risk and may mitigate (over)forecasting
- But DNOs would rightly be concerned at being exposed to risks outside of their control (volumes of LCTs)
- However, this risk exposure could be minimised and in exchange for sharing risk stronger upside incentives could be offered – although these would increase risk to consumers of windfall profits
- While DNOs do not control LCT volumes, they do have influence on the forecast they use to set the plan, the profile of expenditure they subsequently incur and an understanding how their investment might drive growth

An LCT incentive: Upfront funding with revenues and incentives linked to LCTs connected

**DNO forecasts 10 LCTs @
£10 per unit**

**£100 included in baseline
allowances**

Upfront funding allows for anticipatory
investment

**Volume driver for
higher/lower uptake**

Adjusts revenue in line with actual demand &
expenditure to mitigate risk of forecasting error

**Sharing factor applies to
expenditure against
volume driver adjusted
revenues**

DNO/Consumer share risk of stranding and
benefits of underspending where this leads to
higher volumes

**Deadband applies to
revenue adjustment for
lower volumes than
forecast in baseline**

Reduces risk to DNO of spending in line with
baseline forecast by protecting them from a
level of deviation in forecast volumes.

**Additional incentive on
LCTs connected**

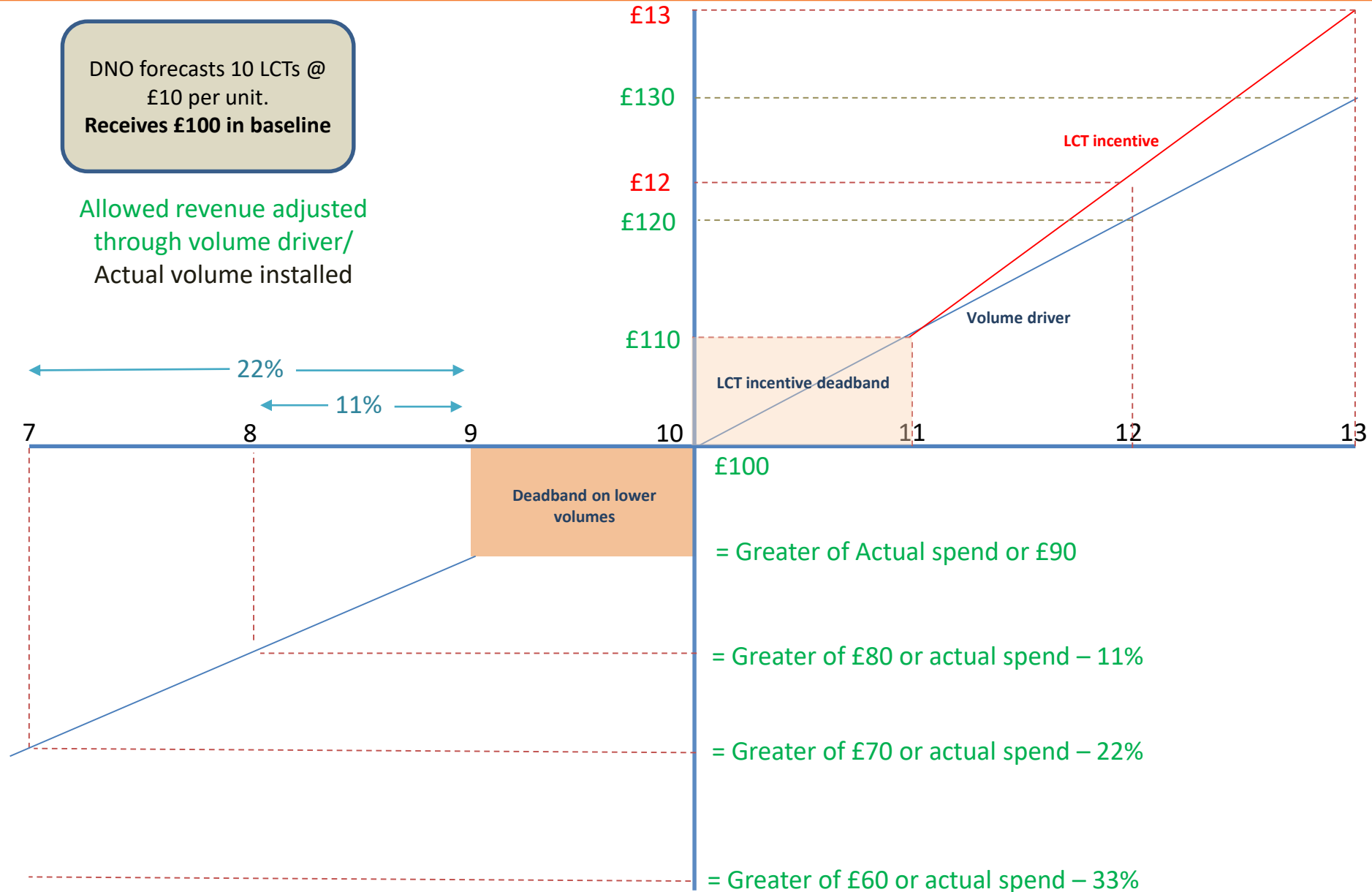
Incentive for DNO to take on stranding risk of
further anticipatory investment on top of
allowance included in baseline

**Symmetrical deadband
applies for LCT incentive
on higher volume**

How much downside protection a DNO wants
will influence how much additional incentive
they have for driving higher volumes

DNO chooses deadband

Decides the risk/reward profile they want
based on their assessment of forecast
credibility & impact of further investment



Worked examples (assume 10% deadband, 50% totex incentive rate)

Scenario 1: DNO overforecasts and spends in line with baseline

DNO spends £100 and 8 LCTs connect

= £89 revenue

Equates to £11 overspend x totex incentive rate = **£5.50 loss to DNO**

Scenario 2: DNO overforecasts but underspends baseline

DNO spends £80 and 8 LCTs connect

= £80 revenue (no loss/profit)

Scenario 3: DNO marginally overforecasts and spends in line with baseline

DNO spends £100 and 9 LCTs connect

= £100 revenue (no loss/profit)

Scenario 4: DNO underforecasts and spends to drive higher volumes

DNO spends £120 and 12 LCTs connect

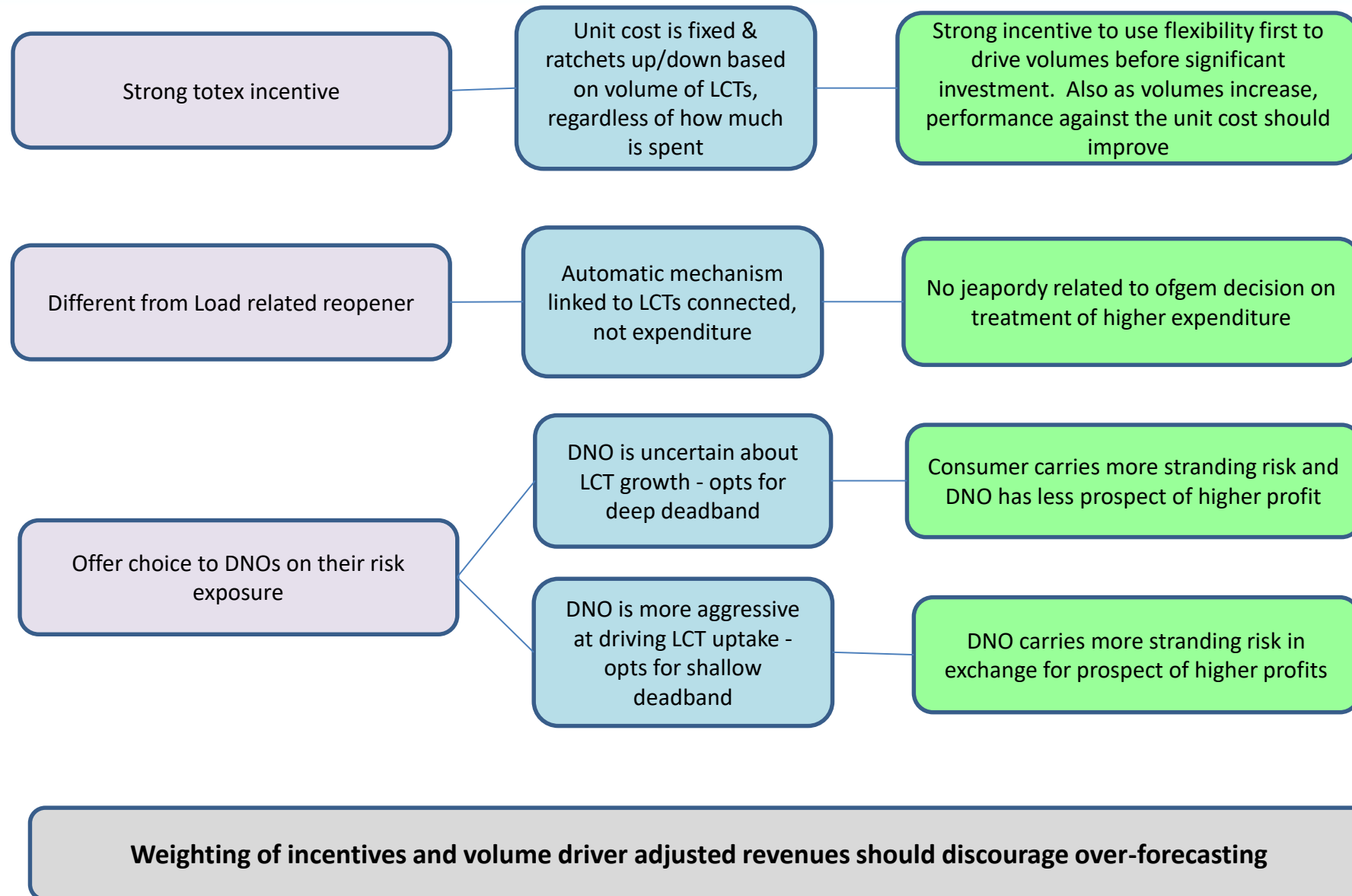
= £120 revenue + £12 LCT incentive = **£12 profit to DNO**

Scenario 5: DNO underforecasts and has higher volumes, without spending above baseline

DNO spends £100 and 12 LCTs connect

= £120 revenue + £12 LCT incentive

Equates to (£20 underspend x totex incentive rate) + £12 LCT incentive = **£22 profit to DNO**



	RIIO-1 approach	Capacity mechanism	Upfront funding	LCT volume driver	LCT incentive
Provides infrastructure needed to meet LCT demand					
Minimises stranding risk					
Minimises risk of windfall profit					
Minimises risk of windfall loss					
Is straightforward to implement					

Our core purpose is to ensure that all consumers can get good value and service from the energy market. In support of this we favour market solutions where practical, incentive regulation for monopolies and an approach that seeks to enable innovation and beneficial change whilst protecting consumers.

We will ensure that Ofgem will operate as an efficient organisation, driven by skilled and empowered staff, that will act quickly, predictably and effectively in the consumer interest, based on independent and transparent insight into consumers' experiences and the operation of energy systems and markets.

Energy Networks Association

OFGEM RIIO-ED2 OAWG DSO Sub Group

Evaluating price control mechanisms for DSO considerations

17 March 2020

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As part of the Ofgem process for involving stakeholders in a range of areas pertinent to the upcoming RIIO ED2 regulatory review, five working groups have been established. Under the Overarching Working Group, a sub-group on DSO considerations has been asked to advise on what DSO functionality DNOs can and should provide in ED2 and what appropriate regulatory mechanisms could be proposed in the RIIO-ED2 sector methodology. This is the first report of the data sub-group to the OAWG.

How to set price controls for DSO considerations (from Ofgem Commissioning presentation Slide 4, ED2 Overarching Working Group, 17 January 2020). We want to hear and understand your suggestions, and assessment of proposals, for methodological changes that could better achieve these goals, for instance:

1. Do we need to change how we evaluate costs and benefits?
2. Do we need new uncertainty mechanisms?
3. Do we need to remove outputs and incentives or introduce new outputs?
4. Do existing incentives (such as on totex) drive the appropriate behaviour? If not, what would we need to change?

In undertaking this analysis, the DSO sub-group has focused on the ED2 outputs required by electricity distribution network operators and the requisite functionality to support those activities.

The Ofgem DSO position paper effectively changed the definition moving away from the concept of a DSO as an entity.

DSO (Distribution System Operation) is a set of functions and capabilities that in combination allow the flexing of demand and generation to be used to optimise the operation of networks. This provides:

- Optionality in network investment decisions.
- Greater utilisation of existing and new network assets.
- Market facilitation
- Security, sustainability and affordability.

DNOs will be accountable for a significant number of these DSO functions and capabilities.

*Maybe we should distinguish between a **dSO** (distribution System Operators - DNOs in the new world) and **DSO** (Distribution System Operation - the wider range of functions that could be performed by dSOs **and** 3rd parties)*

dSO Outputs (*above and beyond DNO core functions*)

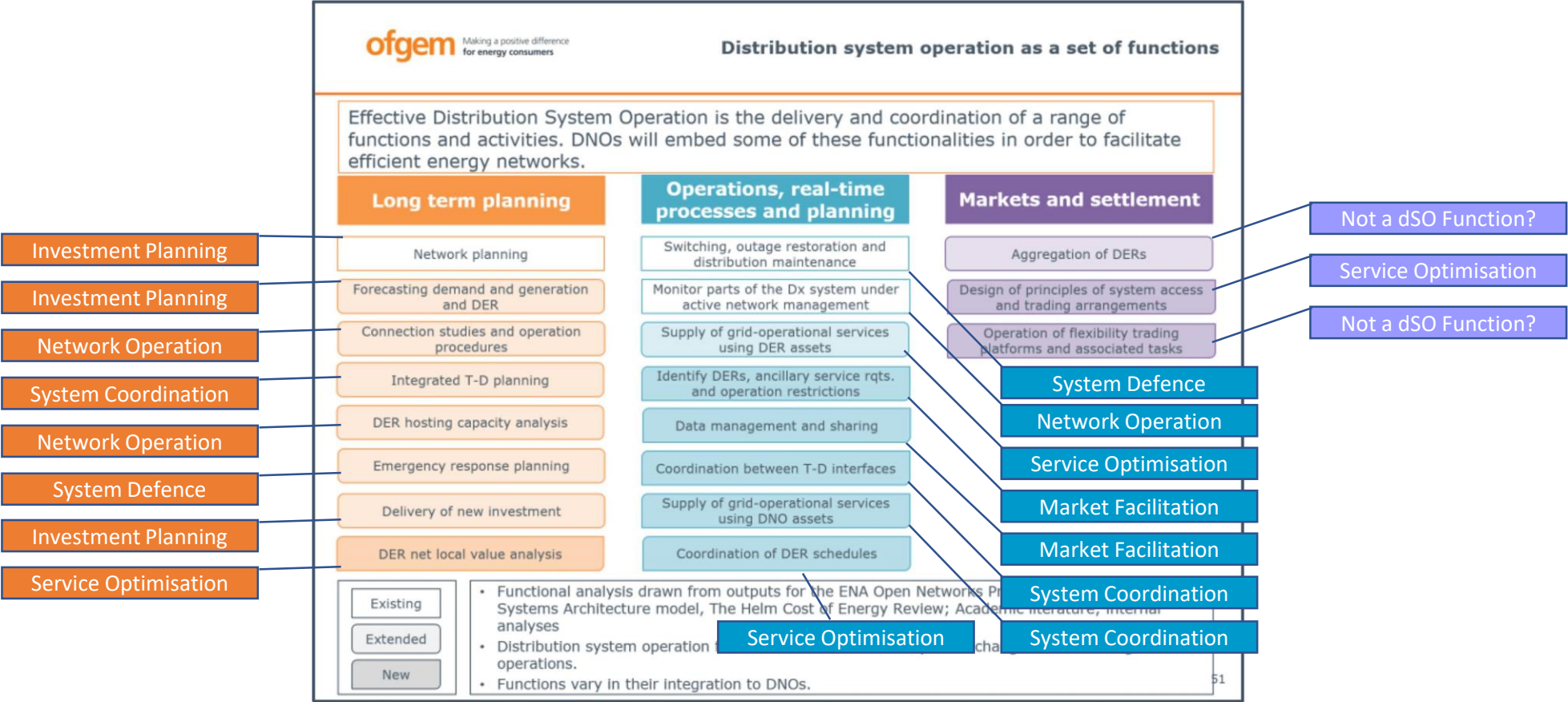
1. Facilitate development of (and encourage participation in) transparent and competitive flexibility markets (*maps to Ofgem's 2nd strategic outcome of competitive markets and Clean Energy Package*)
2. Deliver network operational services (*balancing?*, voltage control, constraint management etc) at least-cost through transparent neutral tendering to deliver a resilient system (*maps to Ofgem's 3rd strategic outcome of neutral tendering and Clean Energy Package*)
3. Enable all LCT connections in a timely and cost effective manner, utilising flexibility where appropriate, such that the network operation is not a barrier to net zero (*similar to ESO's running a net zero system by 2025 strategic outcome and Clean Energy Package*)
4. Work with other dSOs and the ESO to develop whole system governance/process/priority (*maps to Ofgem's 4th strategic outcome of whole system and Clean Energy Package*)
5. Ensure DSO functionality is not embedded within DNOs to the point that it could never be cost effective to separate the DNO/dSO at a later date (should this prove to be necessary) (*maps to Ofgem's 1st strategic outcome of clear boundaries*)
6. Develop planning options for all timescales considering all network and non-network options with transparent selection criteria for each option (*similar to ESO's NOA though not sure if this isn't a function and maps to Clean Energy Package*)
7. Ensure network visibility at all voltage levels such that network operational and forecasting data can be made available to all existing and potential market participants (*to fit with Energy Data Taskforce recommendations*)

- This is a top-down view to identify the relevance of the Distribution System Operator (DSO) functions to the ED2 price control (2023-28)
- It has been created to provide input to the ED2 price control review to support
 - **Design of regulatory mechanisms** that are required for distribution system operation in this period; and
 - **Business plan guidance** for DSO
- The structure of this thinking mirrors the detailed analysis taking place in parallel in the Energy Networks Association Open Networks project – a bottom-up implementation plan is being created that seeks to answer the same question and is planned to be complete in [July 2020]
- The eight functions of DSO are taken from the earlier Open Networks product (see link below)
- For each of the functions, a view is offered for:
 - **Timing of the value for customers** from DNOs carrying out these functions - will this deliver significant value in the ED2 period or is this preparing the way for later value with higher volumes of distributed energy resources and flexibility in the system
 - **Change of role** – compared to DNO duties in the ED1 period is this a low, medium or high change for DNOs taking on new responsibilities for distribution system operation
 - **Outputs and costs** – what kind of activities would we expect to see in DNO plans

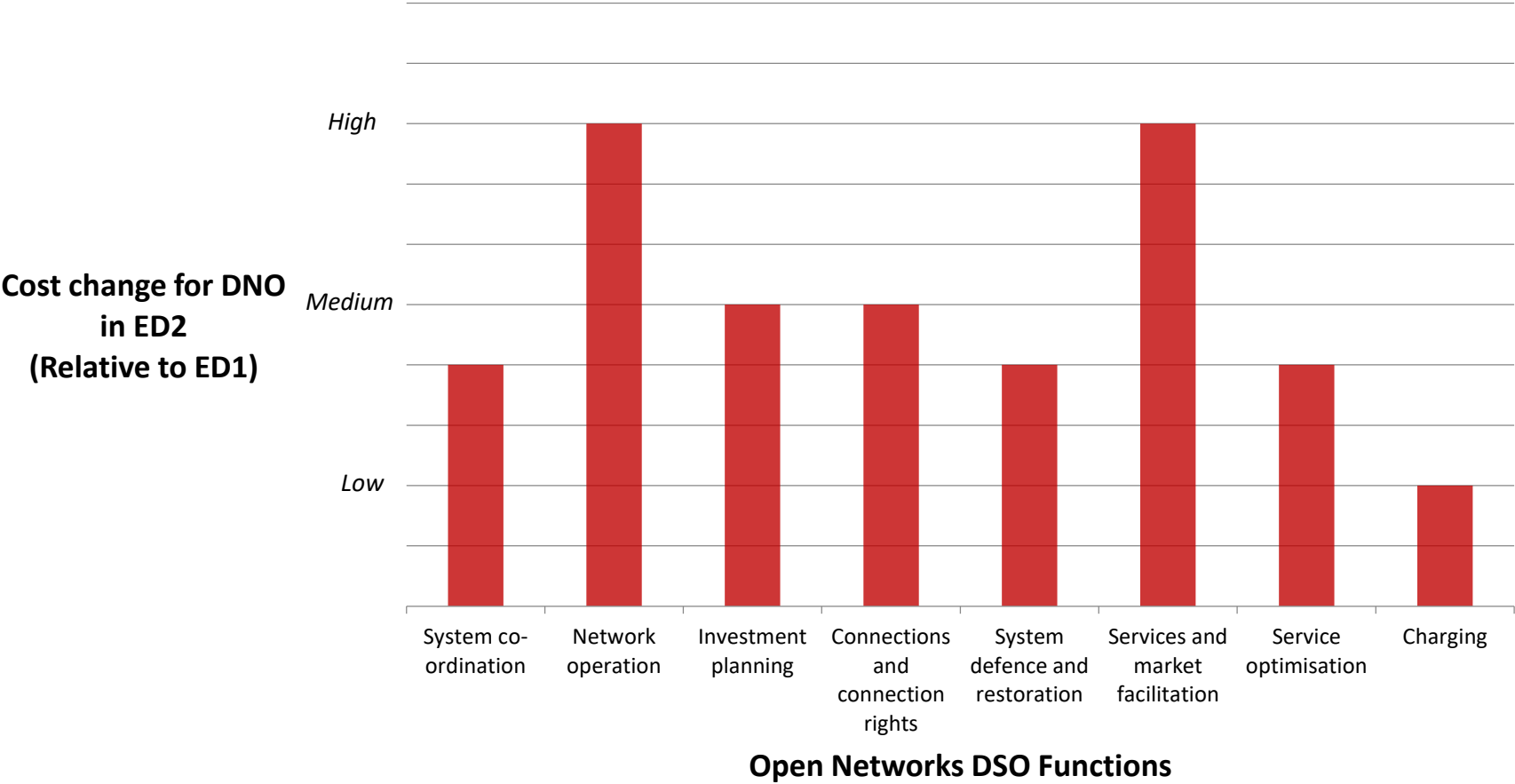
ENA Open Networks DSO functions:

<https://www.energynetworks.org/assets/files/ON-WS3-P2%20DSO%20Functional%20Requirements.pdf>

dSO Functions - Ofgem DSO Functions v Open Networks



dSO Functions - Most change for DNOs (ED2 vs ED1) is in the areas of network operation and market facilitation



Although there are no existing activities that are called out within RIIO ED1 as DSO activities there are several which start to explore the future activities of a dSO:

Activity	Description
Flexibility Services	<ul style="list-style-type: none"> • The procurement of flexibility services to date has been focused on addressing Load Related network issues and as such most DNOs have funded this activity through either network innovation (early trials) or through their Load Related allowance in lieu of conventional reinforcement. • There are existing challenges in how the purchase of Flexibility Services interacts with the Load Related 80% Safety Net which need to be resolved given the disparity of costs between a short term solution (1-4 year) and conventional reinforcement (45 year). • As part of the ENA Open Networks workstream 1b is developing a consistent methodology for the valuation of flexibility services.
Active Network Management	<ul style="list-style-type: none"> • In RIIO ED1 Active Network Management (ANM) has focused on the management of connected generation within network limits via commercial terms and agreed (static) principles of access. • This enabling technology had been funded through either Innovation funding (NIC and IRM) or as an alternative smart connection funded through a combination of customer contributions and network reinforcement. • Actions are justified with the associated benefits (e.g. carbon abatement) using a “whole life costing” approach and CBA. • DCP 348 outlines charging arrangements for ANM connections which significantly puts the cost of ongoing O&M onto the DNO and ultimately socialised through DUoS. These costs must be considered as part of our RIIO ED2 plans and also a changing mix of CAPEX vs OPEX solutions.
Efficient Use of Assets	<ul style="list-style-type: none"> • Assets are paid for by customers and DNOs have an obligation to use them efficiently and effectively • New and innovative ways of using these assets to provide grid services should be explored within the regulatory mechanism to avoid distortion of the market • Ofgem have an open consultation on the treatment of DNOs providing direct services to the ESO with CLASS used as a key example (Open 10th Feb, Close 23rd March).

Possible dSO Regulatory Arrangements for ED2

Component	RIIO ED2 Requirements	ED1 Regulatory mechanisms
Provision of whole system services	<ul style="list-style-type: none"> The outcome of the CLASS regulatory treatment consultation will inform the regulatory treatment for all direct service provision elements for ED2. 	<ul style="list-style-type: none"> Directly Remunerated Services
DSO related investment and non-capex costs	<ul style="list-style-type: none"> It would be worthwhile to explicitly identify costs that support the development towards DSO even if they also support the transition to Net Zero. This would enable any future decisions to implement DSO separation to account for all costs incurred to date in 'building' a DSO. The scale of DSO ambition will dictate the level of planned expenditure but will be related to individual DNOs LCT uptake forecasts and DSO transition aspirations. ED2 cost benchmarking methodology needs to deal with regional differences and forecast costs that are new or increased on historical levels in order to deliver meaningful outcomes. To operate and maintain a 'smart' network it should be expected that OPEX costs increase whilst CAPEX costs reduce. Although the RIIO mechanism accounts for the trade off between CAPEX and OPEX activities this may result in cash flow challenges for DNOs without historical trends to guide forecast Fast pot/Slow pot split. 	<ul style="list-style-type: none"> Totex Interruption Incentive Scheme Business Carbon Footprint Losses Discretionary Award
Enhanced Network Monitoring, Control & ICT	<ul style="list-style-type: none"> At the heart of any future DSO will be enhanced Network Monitoring & Control. These investments will support the transition to Net Zero and are likely to be in excess of historic Network Monitoring and Control expenditure. There are existing concerns about Flexibility vs ANM type control - these should not be seen as competing options when in reality ANM might be an enabler for network Flexibility (Open Networks Workstream 1a considering) To understand the network and the challenges implicit in LCT uptake we need to improve our visibility of the network, particularly at LV and HV voltages. At the heart of any future DSO will be enabling Telecoms and IT infrastructure. These investments will support the transition to Net Zero and are likely to be in excess of historic IT/Telecoms expenditure. 	<ul style="list-style-type: none"> Totex Directly Remunerated Services
Flexibility services and connections	<ul style="list-style-type: none"> To date Flexibility services have been used to defer or avoid Reinforcement expenditure, in RIIO ED2 this could extend to other investment categories. It is essential that we record the expected costs that will be incurred, the investment that is deferred/avoided and demonstrate that it represents lowest overall cost for customers. The cost to run tenders, schedule, dispatch and settle with Flexibility providers should also be included in Flexibility costs. Forecast Flexibility costs should be included within the TOTEX allowance with the associated investment driver explicitly identified. 	<ul style="list-style-type: none"> Totex Broad Measure of Customer Service Average Time to Quote & Connect Incentive on Connections Engagement Complaints Stakeholder Engagement & Consumer Vulnerability

Summary Conclusions: How to set price controls for dSO considerations

- 1. Do we need to change how we evaluate costs and benefits?**
 - Probably, but initially the focus is on defining what would fall under dSO rather than major changes to the evaluation process
- 2. Do we need new uncertainty mechanisms?**
 - Potentially, however, core allowances and outputs should be able to drive a lot of the change required
- 3. Do we need to remove outputs and incentives or introduce new outputs?**
 - Probably, starting point is to look at how existing outputs and incentives could be enhanced as required
- 4. Do existing incentives (such as on totex) drive the appropriate behaviour? If not, what would we need to change?**
 - Currently yes, but they may not when local flexibility markets are mature

- 1. MoSCoW Analysis**
- 2. dSO Functions**

MoSCoW analysis of DSO outcomes

RIIO ED2 OAWG DSO Considerations



Author
TT.MM.JJJJ



DSO Outcomes applicable to RIIO ED2

DSO Outcomes from a DNO perspective i.e. which DSO outcomes are suitable for DNOs to retain	
Must	<ul style="list-style-type: none">• Provide open access to operational network data that is important to markets (e.g. constraint heatmaps)• Offer traditional reinforcement into flexibility markets/dNOA (flexibility of last resort)
Should	<ul style="list-style-type: none">• Manage the new connection process (including setting charges?)
Could	<ul style="list-style-type: none">• Own/operate open access flexibility trading platforms• Ensure whole system operational optimisation with other DSOs/ESO• Be responsible for long term planning and forecasts e.g. dFES, dNOA• Assist new entrant flexibility providers (though not act as an aggregator)• Collect revenue from suppliers to pay for flexibility services
Won't	<ul style="list-style-type: none">• Own or operate non network assets for use within national or local flexibility markets e.g. storage• Own/design selection criteria/algorithms for choosing flexibility solutions in auctions• Design and maintain rules for flexibility markets• Run auctions or tenders to deliver necessary flexibility at least cost• Be responsible for system emergencies/stress events rules and procedures• Contract management and payment to providers for delivery of services

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DSO Outcomes

- Open and transparent planning and forecasts (dFES, dNOA) over all timescales
- Design of market rules and maintenance of market processes/contracts/T&Cs
- Run auctions and tenders with transparent selection algorithms/rationale
- Ensure markets deliver necessary flexibility at least cost to customers
- Open and transparent rules to tackle system emergencies/stress events (though not the identification of stress events)
- Ensure whole system benefit is maximised by working closely with other DSOs/ESO to identify priority governance
- Lower barriers to entry by assisting new entrant flexibility providers (though not act as an aggregator)
- Pay/settle providers for delivery of services

DSO Considerations



Must	Should	Could	Won't
<ul style="list-style-type: none">• Produce DFES through stakeholder consultation• Visible load forecasts• Transparent Investment Methodology• Transparent procurement, dispatch and settlement processes• Facilitate peer to peer market – constraints, capacity & energy• Optimise T and D• Manage network access• Maintain system resilience	<ul style="list-style-type: none">• Support regional planning bodies in whole system decisions• Make efficient and effective use of assets• Offer open data• Deploy a mix of long term flexibility, short term flexibility and reinforcement• Coordinate with ESO• Be a clearly identifiable function within Network• Pay providers of network services	<ul style="list-style-type: none">• Operate flexibility platforms• Be builder of last resort in flexibility market• Coordinate services for ESO• Balance the network up to GSP level	<ul style="list-style-type: none">• Own flexibility assets (e.g. generation/storage)• Act as a commercial aggregator

A. Co-ordination with GB System Operator
B. Co-ordination with other DSOs and Distribution Networks (including IDSOs)
C. Co-ordination with local energy systems including industrial networks, community schemes, smart cities etc.
D. Co-ordination of networks to enable cross vector energy exchanges.
E. Co-ordination of local network services.

Value for customers in ED2 or ED3+

- Improved co-ordination between buyers of flexibility in ED2 reduces barriers to entry and transaction costs for sellers
- Co-ordinated processes lead to more efficient outcomes generating consumer value
- Consistent approaches and markets will lead to greater participation and therefore market fluidity
- Effective ED2 bilateral contracting that establishes knowledge to develop enhanced multilateral co-ordination in ED3+

Changes from ED1 DNO role (Medium -)

- New activities to share energy system data
- Extended whole system co-ordination between DNO and ESO associated with customer flexibility procurement

Outputs and costs

- Joint DNO flexibility processes and systems – GB standardisation for DNO flexibility products
- Data sharing to provide flex market development
- Innovation to target ED3+ co-ordination that is whole energy system and/or multilateral electricity actions

A. Operate network within thermal ratings
B. Operate network within voltage limits
C. Operate network to maintain dynamic stability
D. Operate network within fault level limits
E. Operate network to meet other power quality criteria
F. Operate network taking account of ongoing asset
G. Operate network to minimise losses
H. Enable network outages to provide access to assets and
I. Optimised use of assets and dispatch of services

Value for customers in ED2 or ED3+

- Continued security of supply
- Increased efficiency of network operation reducing the need for additional investment (for example driven by EV demand increases)
- Appropriate operational tools support efficient use of flexibility services

Changes from ED1 DNO role (High)

- More active management of LV networks
- Using LV data to plan and operate networks
- Use of third party data to better forecast and operate networks
- Management of increasingly active higher voltage networks with higher levels of variability and utilisation

Outputs and costs

- Investment in control and monitoring equipment (using third party equipment where possible, e.g. smart meters)
- Forecasting tools to support efficient system operation
- Appropriately trained people to operate increasingly active and digitalised networks

A. Traditional investment planning
B. Whole system planning
C. Non-traditional investment planning
D. Security of supply (D&G)

Value for customers in ED2 or ED3+

- Efficient investment decisions utilising a range of network and customer solutions
- Identifying long term flexibility needs to ensure efficient market development
- Providing transparency in decision making
- More informed investment decisions - particularly at lower voltages

Changes from ED1 DNO role (Medium)

- Additional resources (IT and people) to undertake robust and transparent CBA
- Maturation of DFES processes and outputs including whole system alignment
- Data driven investment processes particularly at lower voltages
- Collating and publishing of large data volumes and associated data manipulation

Outputs and costs

- Investment plan for accommodating increasing volumes of DERs with blend of customer and network solutions
- IT analysis packages including need for CBA
- Additional economic analysis skills base
- Ability to collate, publish and analyse large data volumes

Value for customers in ED2 or ED3+

- Efficient connections for customers

Changes from ED1 DNO role (Medium)

- Greater use of flexible connections
- More innovation in connections
- Incorporating changes to network access review
- Increasing volume of DER connections

Outputs and costs

- IT infrastructure for flexible connections – increasingly shared with equipment to manage operation of customer contracted flexibility and other smart grid services
- Increased resourcing within connection teams

A. Connection agreements
B. Connection access rights/principles/ information
C. Queue management/priorities
D. Commercial arrangements for constraints

A. Loss of Mains & other Protection Arrangements
B. Network Contingency Planning for High Impact Low Probability (HILP) Events
C. Resilience (Voltage Reduction, LFDD, HFGD)
D. Resilience (Islanding)
E. Black Start

Value for customers in ED2 or ED3+

- New sources of revenue to provide flexibility through 'response' type services that reduces system risk
- Increased system resilience from changes to generator run-through arrangements
- Changes to emergency services provided to ESO for low frequency events
- Reduced ESO operational costs through Loss of Mains completion

Changes from ED1 DNO role (Medium -)

- Greater volume of tools available to support distribution system defence
- Innovation in provision of black start capability from DERs in the distribution system

Outputs and costs

- Additional resources to undertake emergency event contingency planning
- Innovation projects to explore improving security of supply in an increasingly distributed energy system

A. Define distribution network service requirements including scope, timescale and locational aspects.

B. Assess value and facilitate services to utilise flexibility sources to support distribution network operation.

C. Facilitate the operation of Distributed Energy Resource Management systems (DERMs) and Local Energy Markets (LEMs) that are transparent.

D. Interaction with aggregators and other non-traditional actors.

E. Support the implementation of nontraditional market models for local energy supply.

F. Service conflict mitigation/resolution.

G. T-D co-ordination for transparent and consistent whole system outcomes

Value for customers in ED2 or ED3+

- Greater access for customers to distribution flexibility markets
- Standardised GB approaches increasing market liquidity
- Open data availability supporting efficient customer decisions
- Bilateral contracting with enhanced co-ordination (particularly with ESO) informs policy direction for a potentially more significant 'future world' changes in ED3+
- Facilitation of both peer to peer markets and markets for distribution system needs

Changes from ED1 DNO role (High)

- Maturation of flexibility services end to end functions
- Increased IT infrastructure to support assessment, procurement and settlements processes
- Compliance testing and DER monitoring capabilities

Outputs and costs

- Increased IT infrastructure to support end to end facilitation process
- Increased commercial resource within DNOs to manage process

A. Smartgrid network flexibility

B. Service access management

C. Service selection

D. T-D co-ordination

E. Conditions/process of market failure

F. Regulation & competition frameworks

Value for customers in ED2 or ED3+

- Transparent decision making process
- Efficient T-D co-ordination allowing appropriate revenue stacking

Changes from ED1 DNO role (Medium -)

- New flexibility services deployed to match customer need – e.g. LV customer flexibility to accommodate EV charging
- Increased use of distribution services to support ESO needs (e.g. CLASS, reactive power or high volts)
- Maturation of processes developed in ED1 – increasing use and normalisation

Outputs and costs

- Additional IT infrastructure aligning with ESO and third party systems
- IT systems and people to publish data to provide transparency on system needs and services deployed
- Resources to deploy increased scope and scale of services

A. Distribution Use of System Charges

B. Determines Point of Connection

C. Determines Whole system reinforcement charges

D. Exit Charging (dependent on size, variations and apportionment)

Value for customers in ED2 or ED3+

- More cost reflective charging and access means more efficient behaviour reducing consumer bills

Changes from ED1 DNO role (Low)

- Reforms delivered from Ofgem’s Forward Looking Charging and Access review
- New charging arrangements for provision of data – universal service or paid by those using the data?

Outputs and costs

- IT infrastructure to support revised charging and billing processes

Energy Networks Association

OFGEM RIIO-ED2 OAWG Data sub group

Evaluating price control mechanisms for a big data environment

March 2020

- Terms of Reference
- Explanation of why network operators will be increasingly data dependent during ED2 as well as users
- Significant benefits could be realised from big data but there are practical requirements for network operators to resolve
- Example model for the management of data requests
- Evaluation of possible cost recovery mechanisms
- Evaluation of investments against possible pricing mechanisms
- Outcome of Data Sub Group's evaluation and considerations for Ofgem when determining appropriate mechanisms
- Summary Conclusions: How to set price controls in a big data environment

As part of the Ofgem process for involving stakeholders in a range of areas pertinent to the upcoming RIIO ED2 regulatory review, five working groups have been established. Under the Overarching Working Group, a sub-group on data has been asked to advise on how DNOs can and should provide network data and what appropriate regulatory mechanisms could be proposed in the RIIO-ED2 sector methodology. This is the first report of the data sub-group to the OAWG.

How to set price controls in a big data environment (from Ofgem Commissioning presentation Slide 4, ED2 Overarching Working Group, 17 January 2020). We want to hear and understand your suggestions, and assessment of proposals, for methodological changes that could better achieve these goals, for instance:

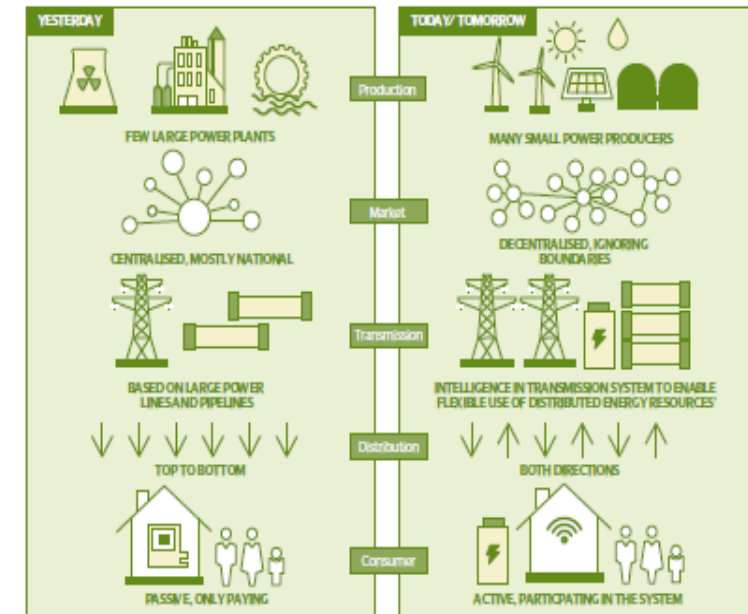
1. Do we need to change how we evaluate costs and benefits?
2. Do we need new uncertainty mechanisms?
3. Do we need to remove outputs and incentives or introduce new outputs?
4. Do existing incentives (such as on totex) drive the appropriate behaviour? If not, what would we need to change?

In undertaking this analysis, the data sub-group has focused on the changes required by electricity distribution network operators. However, the data sub-group recommends that a “whole system” approach to the management of data should be taken to consider the wider aspects of the energy system required to facilitate the decarbonisation agenda.

To avoid disruption and support the transition to a greener, smarter energy system parties will be increasingly dependent on data during ED2

The RIIO-ED2 price control period will be a time of unprecedented change and uncertainty for the energy system because:

- Low carbon technologies will change the energy flows on the lower voltage networks
- Demand for electricity is expected to rise significantly
- Government policy will increase local generation and the amount of electric used for transport and heating
- Electricity demand will be more unpredictable and drive flows on Low Voltage networks
- Customer behaviours will be influenced by new services from DNOs along with energy retailers and ESO, etc. e.g. demand side response
- Network operators need to be able to understand and accommodate customers' needs and changing behaviour to avoid the energy revolution stalling due to network constraints
- Complexity can be understood through modelling and access to data, e.g. monitoring and load flow analysis to identify network constraints
- Data will be required to inform key asset management decisions on investment, network operation or the application of DSO services



Passive customers and centralised generation will be replaced by increased local generation and storage resulting in more unpredictable, and much greater, demand

Significant benefits could be realised from big data but there are practical requirements for network operators to resolve

The Energy Data Taskforce was established to provide BEIS, Ofgem and Industry with a set of recommendations of how data can unlock opportunities. At the core of the Taskforce recommendations, published in June 2019, are the principles that the sector should be Digitalising the Energy System and that, in order to maximise the value, Energy System Data should be Presumed Open.

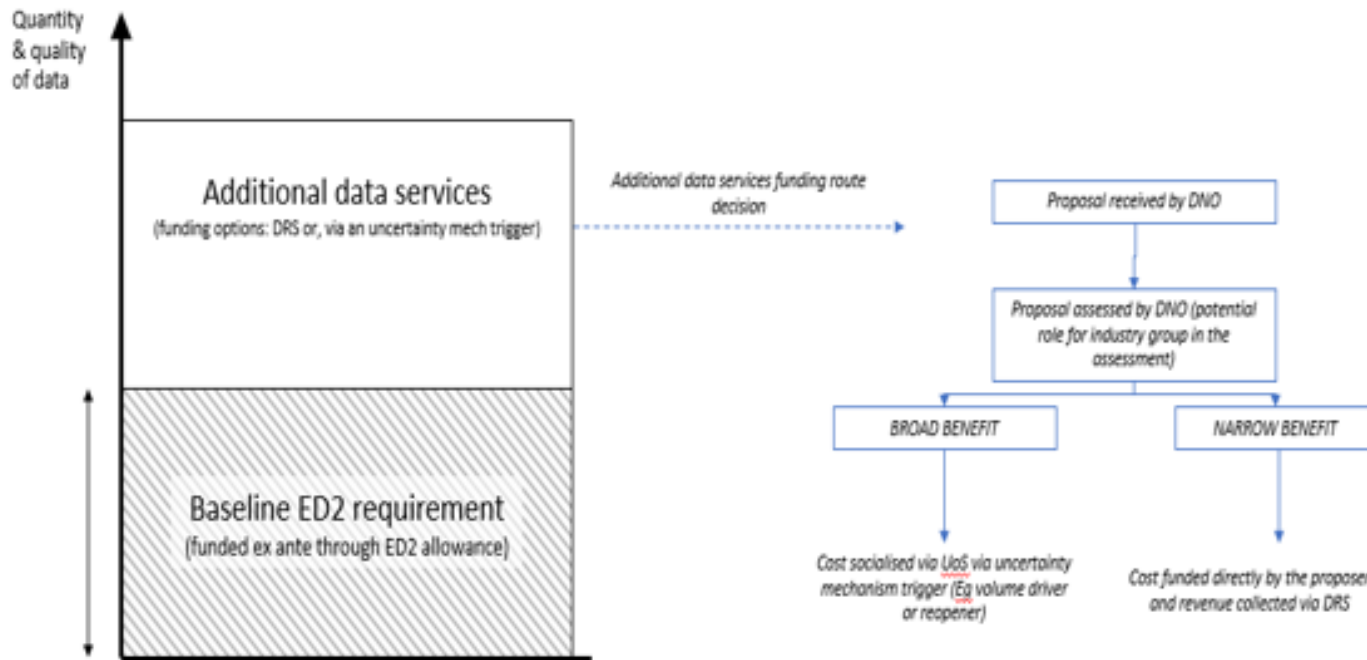
Potential benefits from increased usage of data include operational improvements and new activities that would improve services provided by network operators and societal benefits or opportunities for innovation and creation of new markets.

New activities and skills that network operators will need in ED2 include :

- An interoperable data structure – data catalogue, data dictionary, meta data, data triage
- An industry wide data model, e.g. migration to more cloud services, active multi-sector external stakeholder engagement
- Investment in the capture, recording, analysis and sharing of new data – monitors, sensors, telecommunications, etc.
- Data quality controls and framework for data collection and storage, ongoing governance with increasing data literacy
- Scalable data portals and interfaces to enable open data - to provide data and information to the market as part of a neutral facilitation service that enables competitive market providers to deliver services to customers
- Appointment of data scientists, stewards and business data owners with deployment of supporting data tools
- A shift in culture to be data-driven, leaders have time to consider data, updating business decision making processes
- Incrementally addressing legacy data to ensure it is up to this new standard appropriate for external commercial use
- A shift to more agile working to ensure skills to be better tailored to tasks

Example model for the management of data requests

The following framework would allow users to request a network operator undertakes ‘bespoke’ activities and/or services



The ‘core/baseline’ set of activities and/or services would be agreed and made widely available. The funding for these would be agreed ex-ante and funded through baseline allowances, recovered via UoS charges.

The DNO assesses whether the proposals provides benefit to a broad or narrow set of customers/stakeholders, against a set of agreed principles:

- If the proposals are assessed as providing narrow benefit: then the customer/stakeholder who makes the request could fund it directly with the revenue being recovered via a Directly Remunerated Service (DRS) category (DRS8, DRS9, or a new category).
- If the proposals are assessed as providing broad benefit: then this could be funded via the price control (subject to further agreement).

Evaluation of possible cost recovery mechanisms

Option	Description	Considerations
Base Revenue	Funded through base revenue, allow network operators to evolve gradually, guidance from Ofgem required (funding arrangement)	Network operators could implement Energy Data Taskforce's recommendations according to their own cost benefit analysis
Layering Approach	Combination of base revenue, volume drivers and reopeners (investment)	Complex modelling required
Reopener	Ensures due consideration is given to all factors e.g. triggered for specific events and at specific points in time (funding arrangement)	Drivers for Big Data initiatives would be required, may not be triggered by network operators
User or Stakeholder Commitment	Tool to help reduce risk, commitment can take many forms, e.g. ICE type or SECV like engagement (investment)	Ownership on network operators to identify data stakeholders and beneficiaries of data access, then understanding their needs in the short, medium and long term
Volume Driver	Incentivise by published data or demonstration of use of Big Data, release revenue in increments as need becomes clearer and risk reduces (funding)	Measures could be complex, quality definition and relevance tests would be required to avoid low quality, high volume

Evaluation of investments against possible pricing mechanisms

Investment	Description	Possible Pricing Mechanism
Interoperable data	Development of data catalogue, data dictionary, meta data, data triage	Base revenue – ongoing requirement
Data capture	Deployment of monitors, sensors	Volume driver – reasonably well understood unit costs but scale of coverage is yet to be determined
Data transfer	Deployment of telecommunication infrastructure	Base revenue – ongoing requirement
Data quality and relevance	Introducing rigorous processes, checks and addressing legacy issues	Layering approach – complex process with a range of drivers
Data governance	Ensure that good data governance is implemented throughout the company	Base revenue – ongoing requirement
Interfaces for sharing data	Development of the interfaces and the ability to surface data	Reopener/Stakeholder commitment – driven by external beneficiaries, the scale of collecting new data for this driver is unknown
Embedding data culture	Educating, training and introducing new skills and personnel around Big Data	Base revenue – ongoing requirement

Outcome of Data Sub Group's evaluation and considerations for Ofgem when determining appropriate mechanisms

During the RIIO-ED2 Consultation DNOs commented specifically on the size of the challenge and associated investment needed to deliver the recommendations set out by the EDTF. They also cautioned of the detrimental impact of regulatory micro-management in matters related to data. Given the complexity and fast moving pace of technology, this arena will need careful consideration of the incentive mechanism to achieve the desired outcome.

- Data infrastructure will be a key enabler this must be covered by base revenue
- The costs of data collation and provision, should they be fairly distributed – where they are for general good costs should be socialised but where they are for specific third parties consideration should be given to a cost targeted approach
- Mechanisms need to ensure the right skills are in organisations
- The framework must consider the timescales of the data investments, when the benefits will be realised and the interdependences
- Mechanisms need to ensure there is a clear link between investment and benefit, even where beneficiaries are wider stakeholders
- A new category needs to be added to the CV tables for data experts/scientists
- Track the up-skilling of employees through training and increased data responsibility

Summary Conclusions: How to set price controls in a big data environment

1. Do we need to change how we evaluate costs and benefits?

Yes, costs will be incurred solely by network operators for data provision and data quality but benefits will be realised within DSO services and by users. Data can help drive competition, provision of services and improved efficiency.

2. Do we need new uncertainty mechanisms?

Although upfront funding is required for new activities being conducted by network operators uncertainty mechanisms are likely to be required.

3. Do we need to remove outputs and incentives or introduce new outputs?

No price control outputs or incentives specifically exist for this aspect of big data provision. While new measures need to be established they need to be proportionate, recognising uncertainty in this area.

4. Do existing incentives (such as on totex) drive the appropriate behaviour? If not, what would we need to change?

For a step change of enabling data, the investments required are front loaded to address the skills and culture initially, followed by the technical enablers. Then there is the ongoing provisioning. Due to the unconventional spend profile and diverse range of spending totex alone will not be well suited and additional funding mechanisms need to be considered.

ED2 Overarching Working Group

Subgroup - Achieving Net Zero including Strategic Investment

Update on work in progress to 19 March 2020 Full OAWG



Llywodraeth Cymru
Welsh Government

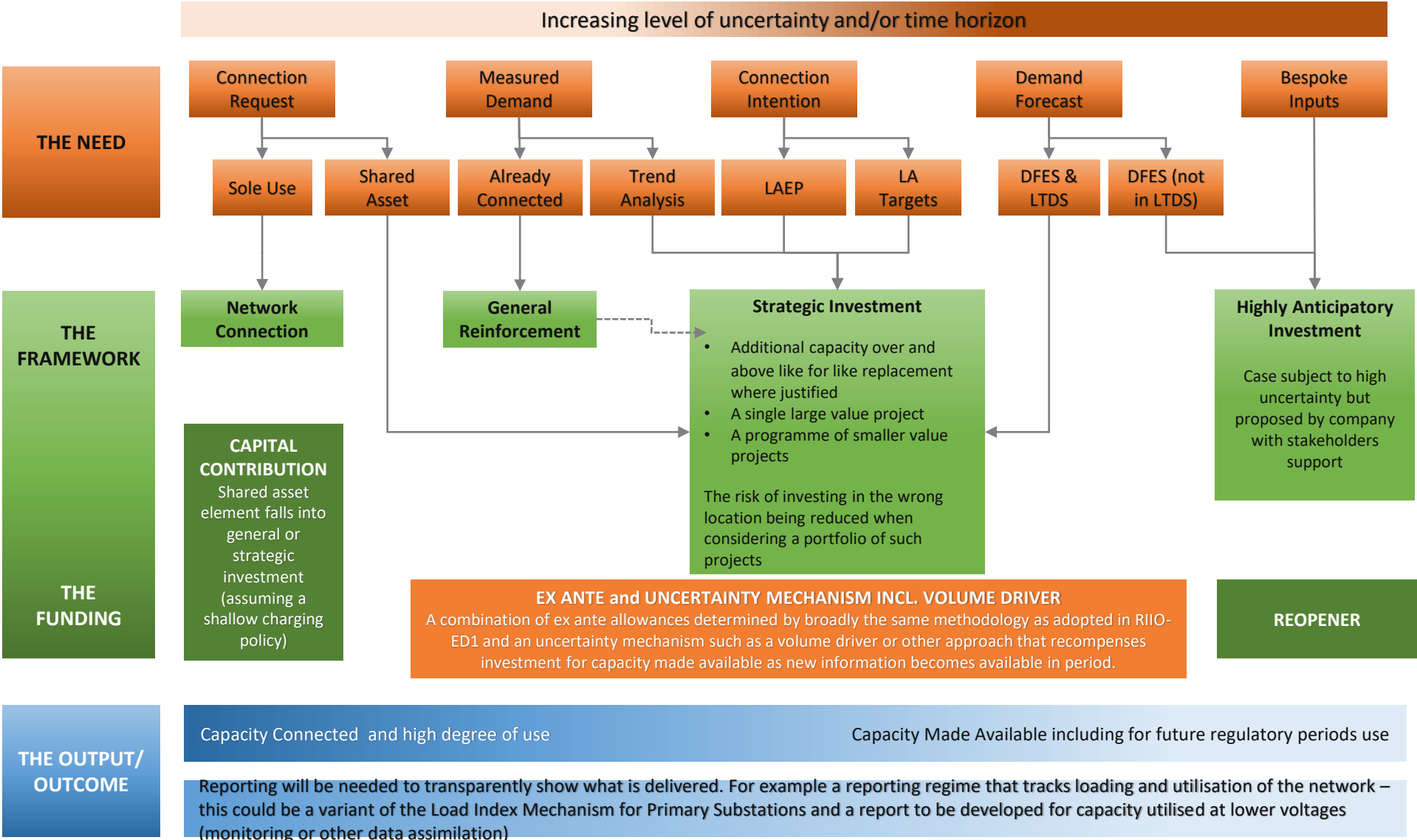
Summary

- This sub group has met three times including two F2F sessions since being set up;
- The word document (shared) sets out the problem statement this group coalesced around and the scope the group set;
 - Most areas of scope are progressing already ;
- As priority topics have emerged they are added (e.g. funding mechanisms);
- We have active input from Welsh Government and Eon as well as most DNO's;
- This session provides findings to date for wider discussion and seeks OAWG input to the scope and next steps reflected in actions

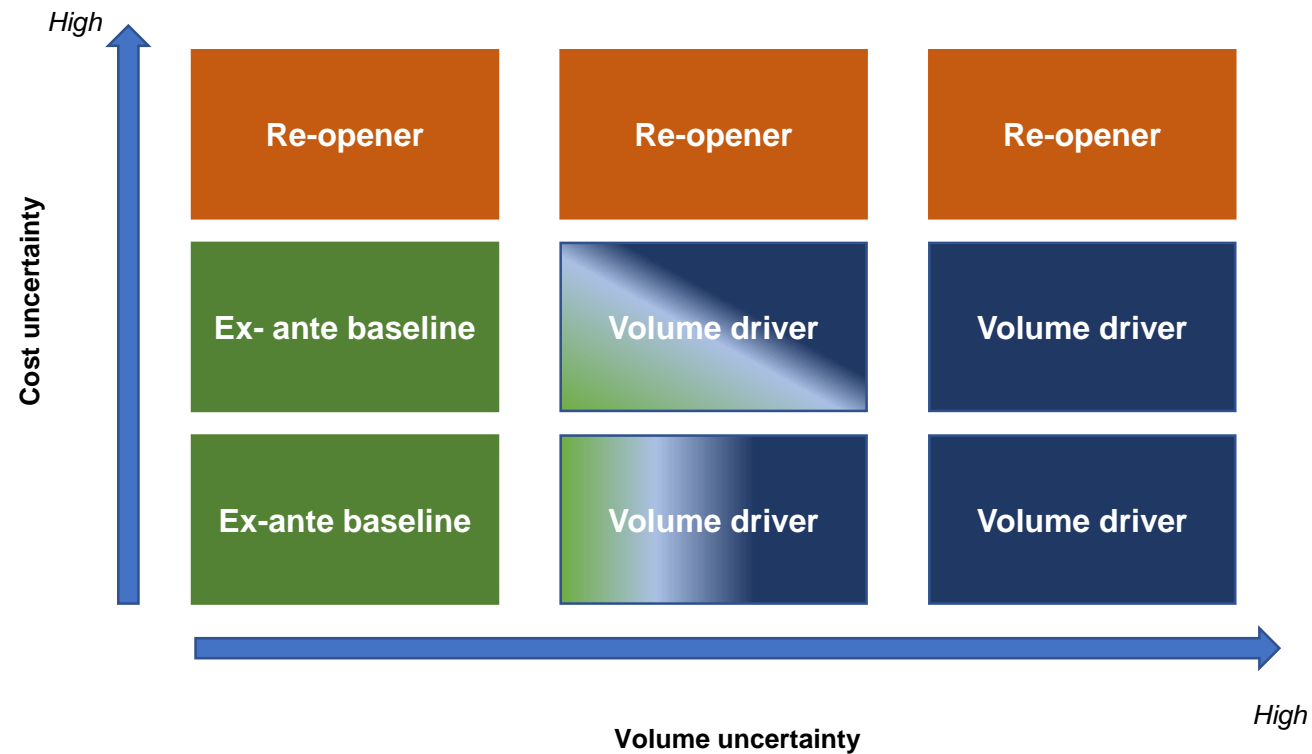
Scope

- Strategic investment – what is it? what causes it? How is it different to BAU? Examples?
- Common decision making and transparent methodology – need for clarity of decision making rules at outset (including any close out mechanism) for decision making for investment in capacity provision.
- Increased transparency of network needs - To enable markets to develop capacity solutions, a move to increase transparency of potential need of strategic and other investment may be needed.
- Networks themselves may need different/more information and new capabilities to manage decarbonisation. For example could LV monitoring itself be a strategic investment need? DSO capabilities more widely?
- Funding mechanisms – some developments to existing or brand new mechanisms might be required. (added 4 March meeting)

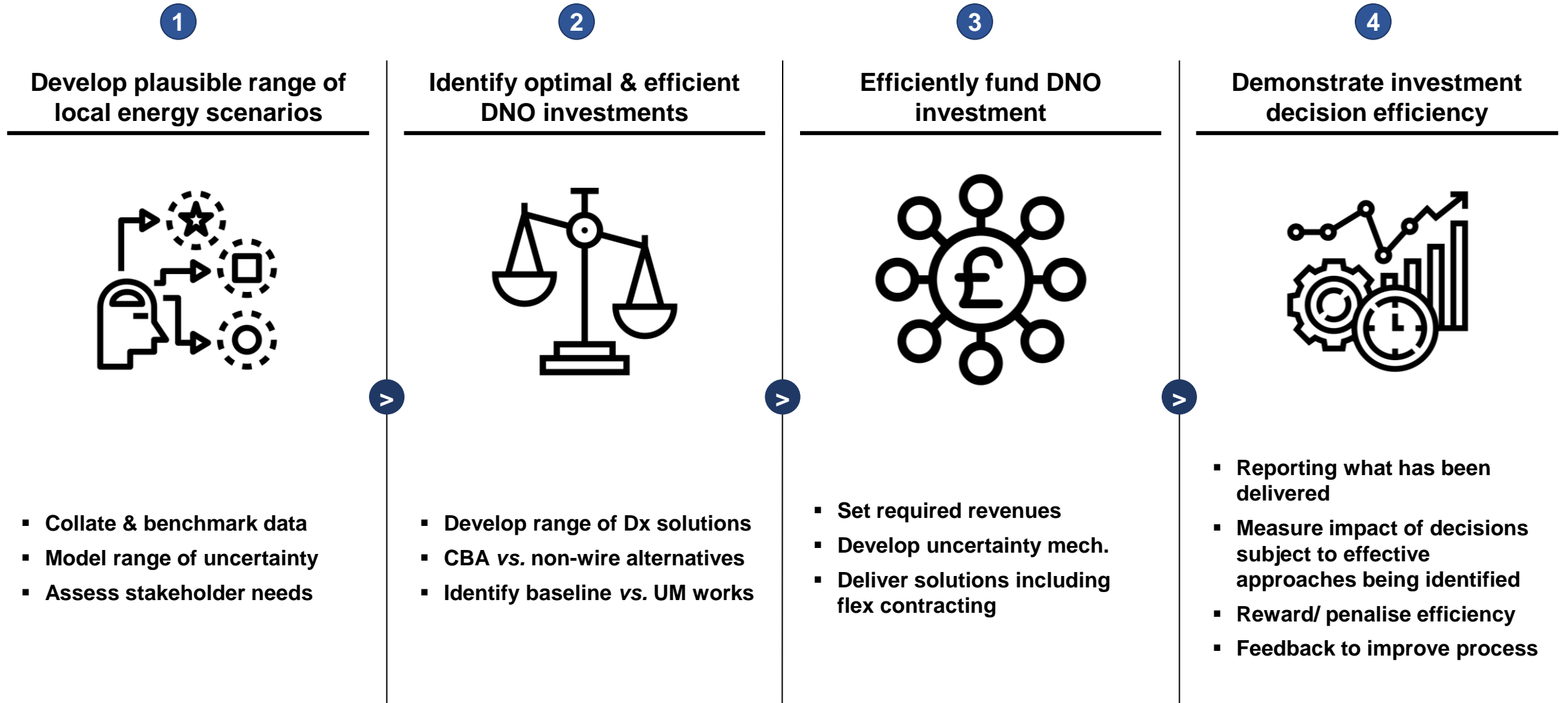
Strategic investment – what is it? what causes it? How is it different to BAU? Examples?



The funding approach will need to be suited to different types of Strategic Investment certainty



Four stage Strategic Investment framework for RIIO-ED2



Work in progress

Deep dive on UM types

Underlying uncertainty	Uncertainty groups	Uncertainty Mechanism	How the Uncertainty Mechanism works
<ul style="list-style-type: none"> Net-zero policy directives Outcome of whole system assessments Technology developments Brexit & other political uncertainty Industry policy & codes development Pace of decentralization Growth in the wider economy <p>(non-exhaustive)</p>	Supply & demand uncertainty	Volume driver	<ul style="list-style-type: none"> Volume drivers used when there is relative unit cost certainty in the asset to be delivered, but volume uncertainty exists Adjusts revenue up & down by a <u>Unit Cost Allowance</u> (UCA) ensuring consumers pay for only what is efficient to deliver The adjustment is automatic (£/unit), based on the actual volumes of pre-defined “output”, such as the amount of overhead line or capacity Proposed pre-deal by companies bespoke to uncertainty faced
	Whole system uncertainty		
	Externally driven uncertainty	Re-opener	<ul style="list-style-type: none"> Re-openers used when there is uncertainty around both costs and volumes at the start of the price control Requires a separate funding application to be submitted, reviewed and approved by Ofgem before our allowance is adjusted Types of determinations and timing for re-opener proposed by companies and agreed with Ofgem before start of price control
	Market uncertainty	Index	<ul style="list-style-type: none"> Indexes used when evolution of prices is uncertain
		Cost pass through	<ul style="list-style-type: none"> Used for costs outside our control & prudent to pass onto consumers Small number of these mutually agreed & largely unchallenged

Uncertainty Mechanisms benefit both consumers & investors by creating future options to adjust revenues as the needs of consumers change

Conclusions and Next Steps

- Progress made in a number of areas by this group;
- Identified opportunities to potentially leverage Open Networks work – this is being explored;
- Group is able to continue work on the mechanics, carry out further analysis and work through options if stakeholders consider more detail is needed/merited.

Scope by scope next steps

- Strategic investment – further discussion envisaged reflecting on today's full meeting input;
- Common decision making and transparent methodology – may be linkage to Open Networks. Current group action open to assess and progress through group if needed;
- Increased transparency of network needs – Working group is in progress reviewing Ofgem LTDS consultation responses. **Would any other particularly non-network stakeholder like to share their response?;**
- Networks themselves may need different/more information and new capabilities to manage decarbonisation. – Working group is in progress collecting data from DNO's on what monitoring is currently done and is being developed.
- Funding mechanisms – further discussion is anticipated. Detailed working up of a volume driver capacity mechanism is related.