

# Adapting electricity distribution regulation for Net Zero

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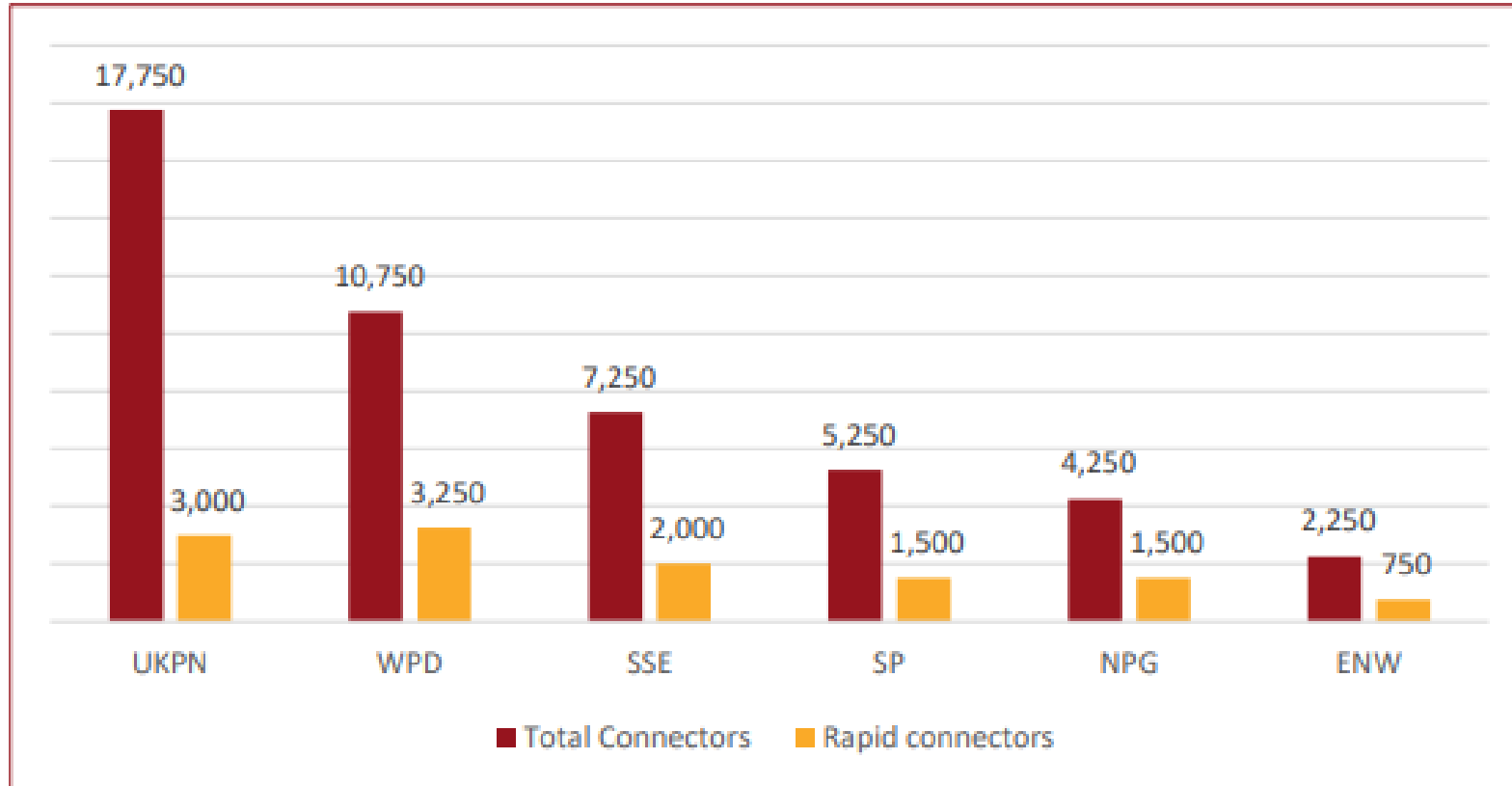
**UK Power Networks**  
Delivering your electricity

# Coverage

1. Context – EV trends & Expenditure strategies
2. Load forecasts
3. UKPN's ED2 Strategy and what this means for expenditure
4. Uncertainty mechanisms to cater for varying Net Zero pathways
5. New for ED2 – Secondary Network Capacity Volume Driver & DSO incentivisation

# 1. Context - Trends in EV growth

Of the six DNO groups, UKPN has the greatest number of charge points deployed, over 17,750 – which is 37% of the GB total. This is more than the combined total installed across SPEN, NpG and ENWL.



Source: Zap-Map



**825,000**

EVs sold in  
the UK

**27%**

on our  
networks

**2.6 million**

EVs forecasted to be connecting  
to our networks in 2028

We are already dealing with mass EV uptake across our networks – how this translates into capacity requirements is not linear

# 1. Context - ED2 Strategies

Context is important - Historic spend per customer (2020/21 prices)

**Spend per customer (2020/21 prices)**

	DR4	DR5	ED1 to date	ED1 full period	ED2 forecast
ENWL	£ 106	£ 119	£ 108	£ 108	£ 141
NPG	£ 98	£ 117	£ 118	£ 116	£ 151
WPD	£ 111	£ 132	£ 130	£ 132	£ 164
UKPN	£ 106	£ 109	£ 97	£ 99	£ 116
SP	£ 124	£ 144	£ 148	£ 146	£ 185
SSE	£ 111	£ 119	£ 144	£ 147	£ 206
<b>GB</b>	<b>£ 109</b>	<b>£ 122</b>	<b>£ 121</b>	<b>£ 122</b>	<b>£ 155</b>

**% Change in spend per customer relative to DPCR4**

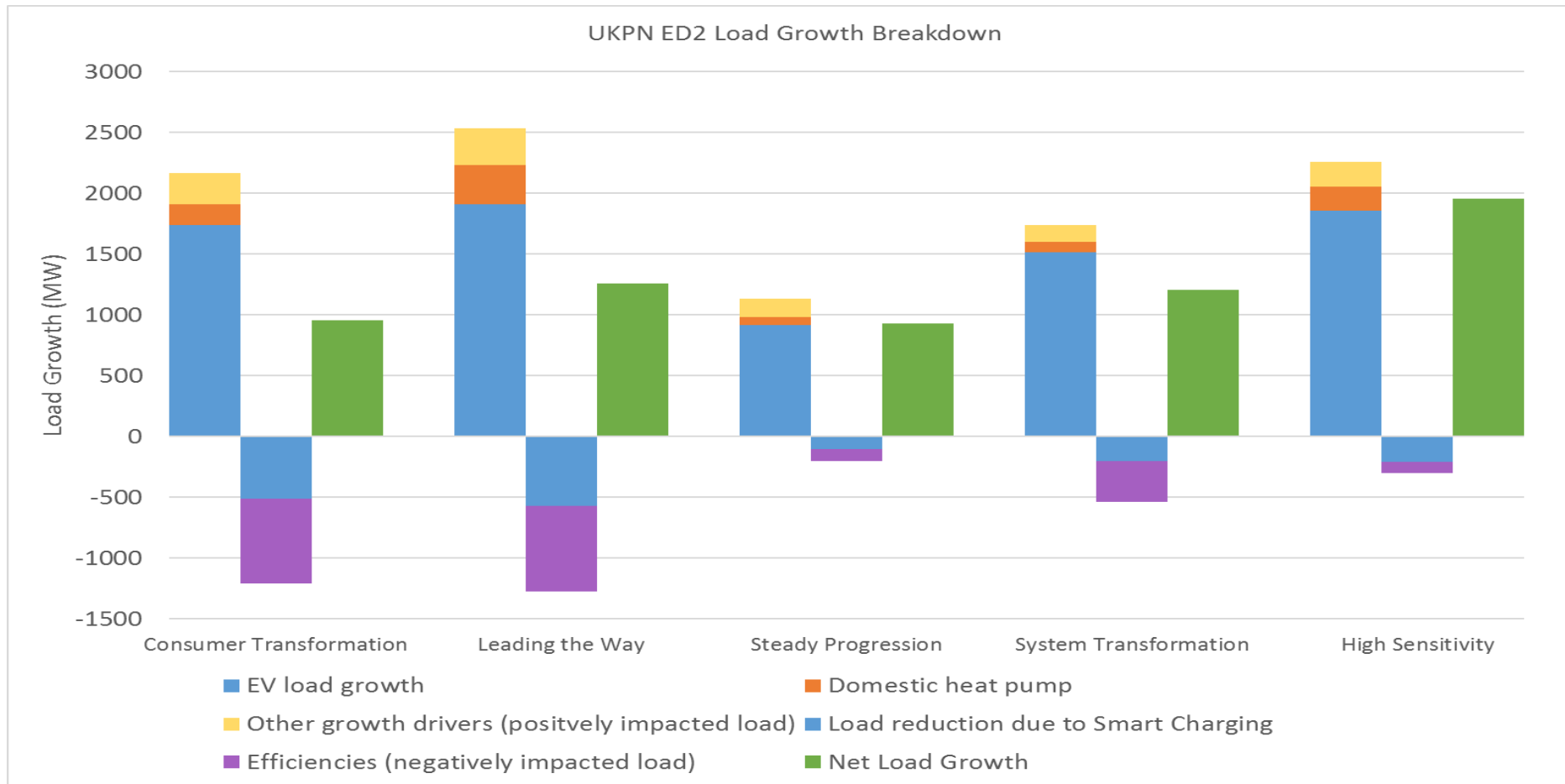
	DR4	DR5	ED1 to date	ED1 full period	ED2 forecast
ENWL		12%	2%	2%	33%
NPG		19%	20%	18%	53%
WPD		19%	17%	19%	48%
UKPN		3%	-9%	-7%	9%
SP		16%	19%	17%	49%
SSE		8%	29%	33%	86%
<b>GB</b>		<b>12%</b>	<b>11%</b>	<b>12%</b>	<b>42%</b>

- Spend per customer has moved significantly over time
  - We have managed our costs tightly over successive controls
  - But not at the expense of reliability – where our actual CI performance is 15% better than the industry benchmark and customer service – where we are ranked No.1 in the industry
- The RIIO-ED2 forecasts for other DNOs indicates further major increases in costs to be shouldered by customers
- We have taken affordability and the use of an agile framework seriously

The key challenge is how does the RIIO-ED2 price control avoid realising the mantra that the “more you spend, the more you get rewarded?”

## 2. Load forecasts - Key components of peak demand

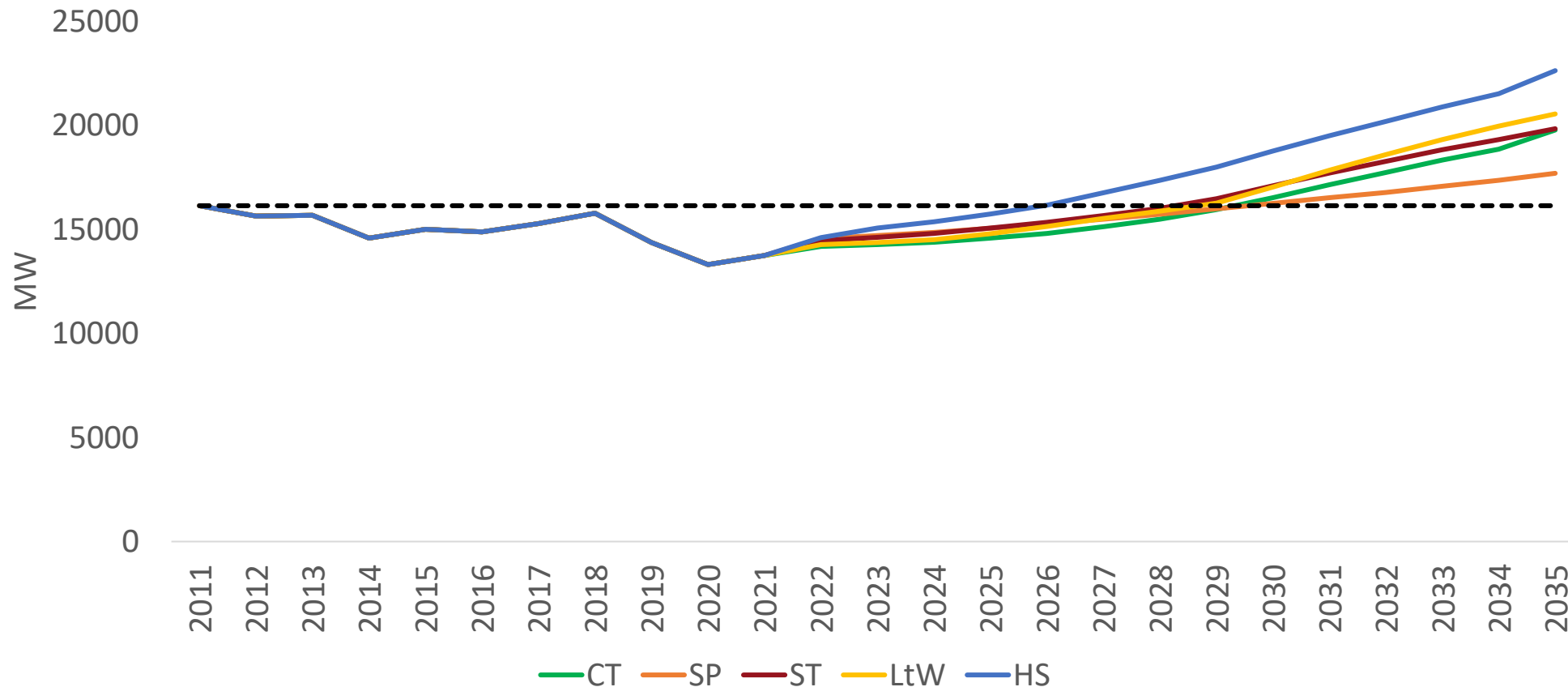
Totex = [Background load growth] + [Low carbon load growth] – [Energy efficiency & Flexibility] – [Existing network capacity]



This explains why investment levels can significantly change despite LCT volumes being similar

## 2. Load forecasts

By the end of RIIO-ED2 network peak demand is in line with 2011 values but this masks impact on secondary network



Due to the current level of capacity headroom available the impact of demand uncertainty is more significant at the low voltage level

# 3. Strategy - UKPN's ED2 Strategy

## Pathway to Net Zero uncertain

- Has required us to use assumptions co-developed with stakeholders to define a credible range of pathways
- The ESO's FES and the CCC's analysis for the Sixth Carbon Budget have been key to informing the scenarios we have modelled

## Agility to enable any scenario

- Must be able to quickly adapt to any credible scenario that materialises instead of focusing on a single scenario
- Protecting consumers from unnecessary bill increases by only including high confidence investments in ex-ante that are required in all scenarios
- Factoring in potential of energy efficiency and flexibility to "right size" capacity requirements

## Accelerative investments where justified

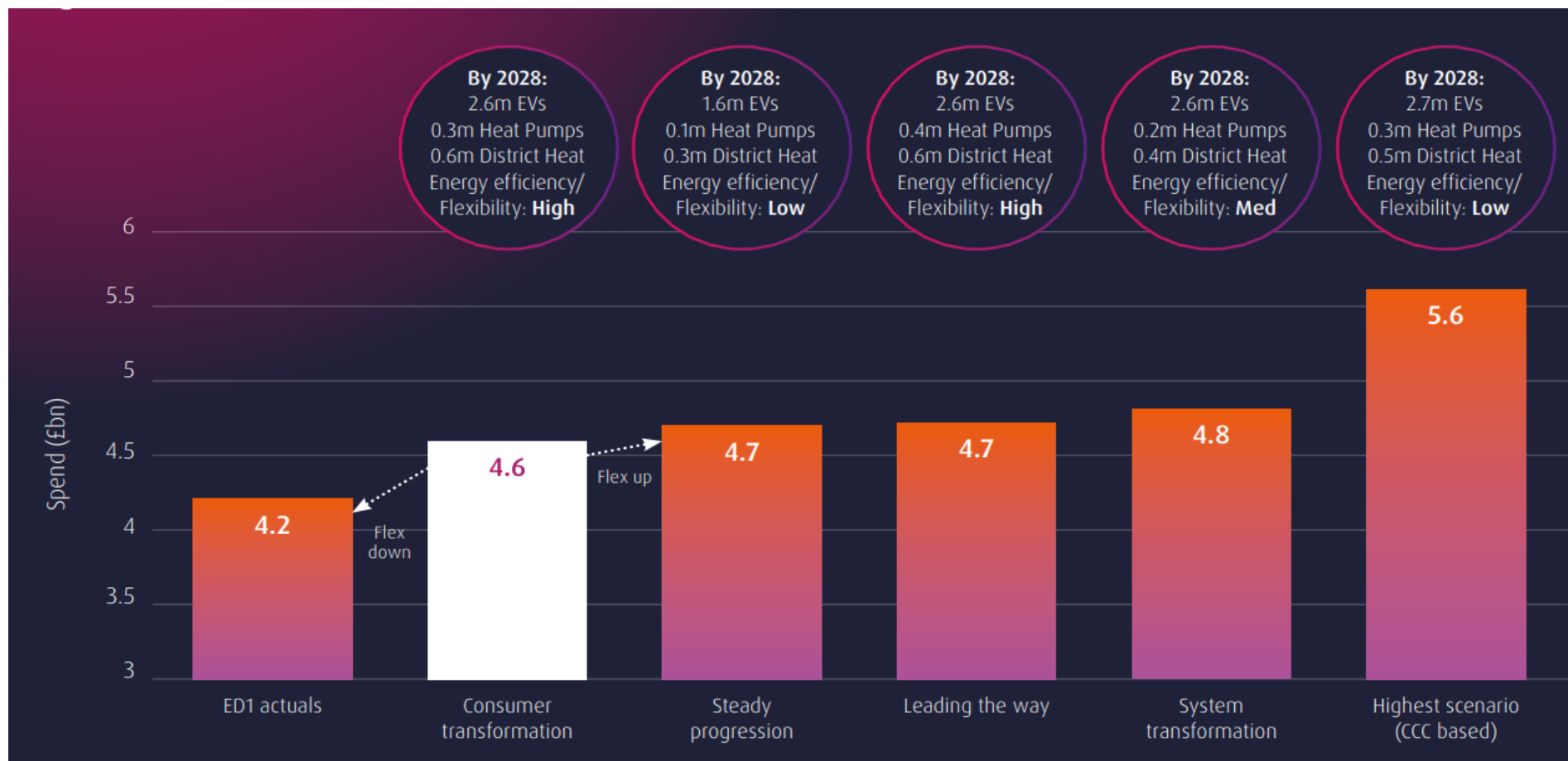
- Our plan includes strategic investment in off-gas grid areas where we know that to meet Net Zero households must switch to electric heating
- Recognising local and regional climate plans e.g. London's 2030 target we will use a robust new framework to identify well-justified proposals to unlock investment for local area energy plans

## Uncertainty mechanisms to flex up to highest scenario

- Investment requirements in RIIO-ED3 will increase but uncertainty mechanisms will manage volume risk; bringing investment forward if required
- Our highest scenario is based on the highest level of LCT uptake in the CCC's Widespread Engagement pathway and takes a conservative view on energy efficiency and flexibility
- Our uncertainty mechanism expenditure is based on this high scenario

# 3. Strategy - An overview of our ED2 expenditure

- Our strategy is focused on facilitating Net Zero at the lowest cost
- For this to be achieved we must make bold steps to drive up the use of flexibility as well as investing in smart grid technology



Our baseline plan will deliver a 15% bill reduction in real terms over ED2 and even under our Highest scenario, we have the lowest increase in expenditure of all DNOs



# 3. Strategy - Ambitious and quantifiable targets for flexibility

## 1. Our ex-ante requests include a significant volume of flexibility at all voltage levels

- This is why our requested allowance for reinforcement expenditure is not as high as others
- We want to work with you and others to stimulate the domestic flex sector

## 2. We have only included allowances for network capacity we are confident will be required

- We know consumers are particularly sensitive to bill increases; our use of UMs is about being agile and demand-led – we will minimise risk of misdirected/over investment

## 3. A new legally separate DSO will aim to deliver £410m of benefits through increased competition

- We have a detailed operating model developed and will start implementation from 2022.

## 4. We will drive accountability and transparency through a new DSO Supervisory Board and reporting against a suite of KPIs

- Our proposals have already lifted the bar for the sector benefitting all GB customers

DNO	Customers	LRE spend	Flex spend	% of flex vs total LRE	% of LV flex vs secondary reinforcement
UKPN	8.4m	£583m	£66.4m	11%	14%
SPEN	3.5m	£444m	£7.5m	2%	<1%
ENWL	2.4m	£160m	£2.8m	2%	0%
SSEN	3.9m	£528m	£6m	1%	<1%
WPD	8.0m	£1,020m	£10.9m	1%	<1%
NPG	3.9m	£560m	£1.8m	<1%	0%

- Whilst all the Business Plans talk about “flex first” we are spending over twice the amount on flex than all the other DNOs combined and the most at secondary level
- We will market test our LRE spend during RIIO-ED2 to ensure our decisions reflect the latest market developments
- Despite their modest levels of spend on flex procurement, some DNOs have included striking targets on the capacity they will release via flex procurement – e.g. one DNO is claiming it will release 5GW using flex over ED2
- We are advocating that a consistent and transparent methodology is established to enable meaningful comparisons of the cost & volume associated with a DNO’s flex procurement on a like for like basis
- DNOs should be required to link their interventions to asset network utilisation levels such that reinforcements are only undertaken where necessary
- Flex should be treated on an equivalent basis to reinforcement i.e. **interventions should be defined in terms of network capacity and the £/MW should be the same for all options**

# 4. Uncertainty Mechanisms

- Our ex-ante Plan includes £4.6bn of expenditure – the following UMs could lead to us requiring up to £5.6bn as detailed below

The CVD is a Key innovation for ED2

Uncertainty Mechanism	Overview of operation	Additional totex in high scenario	
“Capacity” volume driver	<ul style="list-style-type: none"> <li>Covers interventions required on secondary HV and LV networks (high volume, low value interventions)</li> <li>Assets are categorised into utilisation bandings at the start of RIIO-ED2</li> <li>A £/MVA unit cost for interventions is developed based on historic costs and ongoing efficiencies</li> <li>A unit cost scalar is applied per utilisation band to disincentivise reinforcement ahead of need</li> </ul>	£333m	Load Related Expenditure
Re-opener for Primary Level infrastructure	<ul style="list-style-type: none"> <li>A streamlined approach for investments less than £10m based on robust utilisation data via the Load Index mechanism (tracks utilisation at the Primary network level)</li> <li>Would provide a flexible response to public policy demands which support Net Zero and that are justified and cost-effective on a whole systems basis</li> </ul>	£283m	
“Services” volume driver	<ul style="list-style-type: none"> <li>Covers high volume activities needed to connect LCTs (fuse upgrades, service alterations)</li> <li>Operates similar to smart meter interventions in RIIO-ED1. Ex-ante totex includes an assumed intervention rate. This flexes in period based on actuals</li> </ul>	£45m	
Connections within Price Control	<ul style="list-style-type: none"> <li>Under current arrangements when a non-domestic customer connection request triggers reinforcement they are required to contribute a share of the cost</li> <li>The rest of the reinforcement cost is paid for via price control allowances, which creates uncertain costs</li> </ul>	£86m	Non-load
Diversions	<ul style="list-style-type: none"> <li>Diversions work is required when third parties request network assets to be moved and re-routed; this re-opener is required due to the uncertain requirements we face</li> </ul>	£181m	
<b>Total</b>		<b>£928m</b>	

**Our Uncertainty Mechanisms enable us to be more ambitious on the role that flexibility will play – without them we would have less agility and would be driven to a more conservative ‘reinforcement’ led approach**

# 5. New for ED2

## How the CVD operates at an asset level

		2023/24	2024/25	2025/26	2026/27	2027/28
<b>Ex ante allowance (Option A)</b>		£0	£0	£20k	£0	£0
<b>Ex ante capacity released (Option A)</b>		0	0	100	0	0
<b>Year ahead forecast of loading (kW)</b>		400	420	440	615	620
<b>Year ahead forecast of utilisation</b>		80%	84%	88%	123%	62%
<b>Actual utilisation from Option A</b>		80%	84%	88%	48%	55%
<b>Option B: Reinforcement</b>	Capacity released - net (kVA)	0	0	0	500	0
<b>Volume driver capacity</b>	Capacity released - net (kVA)	0	0	-100	+500	0
<b>Volume driver funding</b>	Option B (Reinforce)	£0	£0	-£20k	+£100k	£0
<b>Capacity Volume Driver allowances (on net basis)</b>	Going from Option A to Option B					+£80k

- Example on left shows a GMT that originally was signposted for flexibility (Option A) in the Business Plan, but due to additional demand materialising requires reinforcement (Option B)
- Reinforcement provides a larger volume of MVA output, whereas flex provides a smaller, incremental volume. This is why flex provides option value and can lead to deferral benefits
- If a Flex tender is unsuccessful the CVD should provide allowances for the delta between the flex MVA volume and the reinforcement MVA volume if intervention is still required

- **Importantly in the above example of going from flex (Option A) to reinforcement (Option B) customers will not have paid more compared to if the licensee opted for reinforcement in its Business Plan (ex-ante)**

### CVD forecast updating

- The CVD should work in a similar way to the current smart meter mechanism by flexing revenue using updated forecast data every year
- The initial forecast will be determined by the ex ante allowance, but ahead of each delivery year we will update the forecast based on latest actual data
- Our annual updated forecast would assess in particular:
  - Projected numbers of EV and HP sales
  - Expectations of the proportion of such sales giving rise to a request for a home charger connection
  - Latest evidence on the intervention rate for service alterations on those connections

## 5. New for ED2

# Assessment of the options proposed for ED2 against evaluation criteria

Below is a high level assessment of the options for an Uncertainty Mechanism on Secondary reinforcement in ED2

Criteria	Option 1: A Mid Period Review	Option 2: The Capacity Volume Driver
Supports proactive and targeted interventions to ensure networks can facilitate LCTs	1	2
Leads to a fully transparent and efficient investment strategy	0	2
Level of data required to support operation of mechanism	1	1
Encourages the utilisation of existing network capacity	1	2
Is output based and within the DNO's control	0	2
Encourages enhanced network visibility and use of network data	1	2
Encourages efficient use of market based flexibility	1	2
Reduces the risks associated with forecasting errors	0	2
Encourages a touch it once approach to reinforcement	1	2
Promotes a common approach between DNOs that supports benchmarking	0	2
Ability to flex allowances to reduce risk of cashflow issues or unjustified outperformance	0	2
The level of administrative of burden on DNOs and Ofgem	0	1
<b>Total score</b>	<b>6</b>	<b>22</b>

**The Capacity Volume Driver will encourage more agile regulation that will help both Ofgem and DNOs better respond to uncertainty**

## 5. New for ED2 - Valuing the DSO ODI

- The financial incentive linked to the DSO must be proportionate to customer benefits
  - our view is that it should be the second most valued ODI after IIS

Incentive	RIIO-ED2 Basis
IIS	+/-5.3% base revenue
<b>DSO</b>	<b>+/- 2% base revenue*</b>
BMCS (CSS)	+/- 1% base revenue
Complaints	-0.5% base revenue
Stakeholder Engagement & Consumer Vulnerability	Removed
Vulnerability	+/-0.5% base revenue
ICE	Removed
Major Connections	+/-0.2% base revenue
ATTQ/C	+/- 0.4% base revenue

\*This is based on an annually operated incentive

- Incentive based regulation has been a hallmark of the UK's success in regulating the electricity distribution networks since privatisation
- Well targeted and calibrated incentives can drive the innovation and change needed to meet the Net Zero challenge by placing the focus on Management teams to deliver
- There needs to be "skin in the game" both to reward frontier performers and also to penalize laggards

Sizing the incentive package for RIIO-ED2 will be crucial in the journey to Net Zero

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# Questions