Regulatory Blueprint to meet today's customer expectations

Executive Summary

Presented to: vector

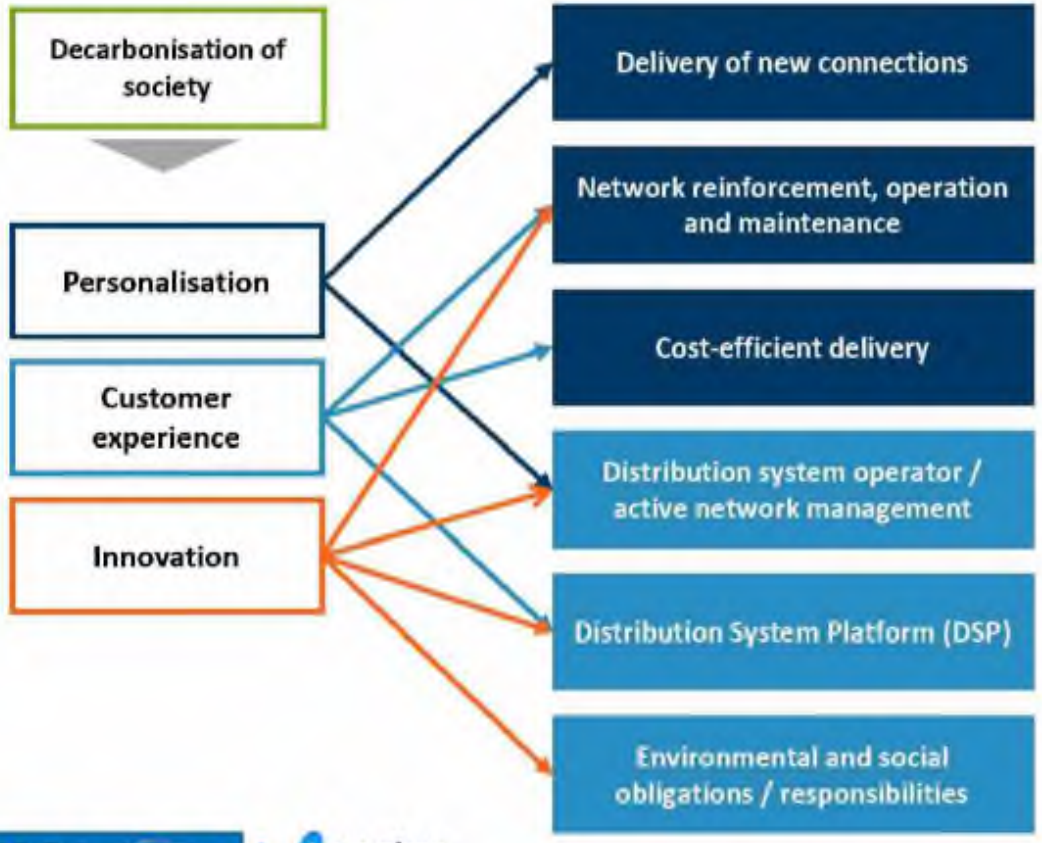
One-page summary: Evolving customer expectations create new roles for EDBs, which can in turn be supported by different regulatory tools

Figure: Application of regulatory tools to EDB roles

Legal requirement to decarbonise society augmented by accelerating technology developments and experience from other industries are creating new customer expectations...

...which drives the need for traditional and new/emerging EDB roles to evolve and adapt to deliver on those expectations.

Not all of the tools reviewed in this report are equally suited to support the individual EDB roles, and no single tool is sufficient to address all the needs. We find that to deliver on all of the EDB roles below, a combination of different tools is likely to be appropriate.



	1 Enhanced reliability	2 Customer satisfaction	3 Innovation mechanisms	4 Uncertainty mechanisms	5 Totex
Delivery of new connections		✓		✓	✓
Network reinforcement, operation and maintenance	✓	✓	✓		✓
Cost-efficient delivery		✓		✓	✓
Distribution system operator / active network management	✓		✓	✓	✓
Distribution System Platform (DSP)	✓	✓	✓		✓
Environmental and social obligations / responsibilities		✓	✓		

Eight-page storyline (1/8): Efforts to decarbonise society, technology developments and new customer expectations create dynamic environment…

Introduction: Decarbonisation , technology developments and customer expectations

The energy sector is currently undergoing period of significant change as New Zealand works towards achieving a Net Zero carbon future. The target of hitting Net Zero by 2050 is enshrined in law and electrification has a lead role to play in decarbonising key sectors which contribute to carbon emissions. Realising this transformative change will require existing electricity networks to evolve and reflect a greater breadth of system interactions and system change requirements to ensure the transition can be met both technically and economically at minimal cost to the consumers.

Figure: Key drivers of change in energy sector

At the same time, the electricity market in New Zealand are also undergoing significant change driven by **technological advancements** (e.g. smart meters, electric vehicles and storage) and **customer behaviour**. Customers are becoming increasingly directly involved through adoption of electric vehicles, demand response as well as increased social acceptance of the need for a decarbonised society. Their expectations are also increasing and evolving beyond prices due to services they receive from companies outside of the regulated energy space. Our case studies suggest that EDB customers increasingly expect more **personalised services**, **innovation** and a better overall **customer experience**.

In order to deliver the transition to Net Zero in a way that works for consumers, EDBs need to understand what consumers think and how they may behave. EDBs need to proactively engage and embrace changing customer expectations, and to respond quickly to changes in how their networks are used, potentially even ahead of the need to ensure cost effective transition to decarbonised society.

In light of these developments, the roles played by EDBs are changing. As such, the regulatory framework may need to evolve to provide an **environment in which customer-centric behaviour is recognised and incentivised**. EDBs as regulated monopolies may not be able to deliver these outcomes alone (e.g. in the absence of adequate regulatory tools). Therefore, the regulatory framework needs to evolve to support the energy transition and enable EDBs to respond to customer needs better.

The ongoing consultation[1] from Commerce Commission presents a significant opportunity to design and develop **new regulatory tools** that could set the appropriate financial and incentives to **meet the rapidly evolving customer expectations** in New Zealand and deliver a co-ordinated and customer-centric network in a **cost-efficient** manner.

In this context, the energy teams of FTI Consulting LLP and Compass Lexecon (together "FTI-CL Energy") have been engaged by Vector to identify potential regulatory tools to enable New Zealand EDBs to transition to a digital, decentralised, and customer-centric energy future.

1) Commerce Commission Open letter [link]

Eight-page storyline (2/8): which requires traditional EDB roles to change ....

Evolution of traditional EDB roles

The development of the electricity network needs to take account of the decarbonisation pathways for generation and demand, much of which is uncertain. From the perspective of customers, EDBs traditionally delivered new connections and network reinforcements, while minimising costs, driven by incentives that were designed to achieve these objectives. In this framework, the customer has been a relatively 'passive element'.

However, with policy push for decarbonisation and evolving customer expectations, EDBs needs to be equipped to balance an increasingly complex, interconnected and decarbonised electricity network while maintaining focus on core responsibility of maintaining security and quality of supply.

EDBs may need to deliver more within the confines of their traditional roles:

Delivery of new connections

To ensure customer needs are met in a timely fashion and in cost efficient way will require evolution of current system and processes to customer centric, market led and data driven organisation. EDBs are likely to need to constantly develop pre-application support, greater choice and flexibility in the range of solutions offered, as well as effective, timely and proactive communication and support.

Network reinforcement, operation and maintenance.

The design and operation of distribution networks may need to change to ensure that customer objectives can be met in a cost-effective and pragmatic way. For example, with more asset data available, EDBs can better use data to create new customer experiences. While EDBs already provide some information to stakeholders, this process can be enhanced to provide greater upfront visibility of planned spend/activities which in turn will drive efficiency, collaborative innovation and insight-driven decision making. Similarly, a move from condition-based maintenance towards the measurement of total risk across EDBs' asset base could unlock not only more efficient spend, but better tailoring of expenditure to customer needs.

Cost-efficient delivery

What customers consider to be an 'optimal' or 'cost-efficient' service level may no longer be based on the traditional asset-heavy solution and it may no longer be uniform across all customers. On the first issue, EDBs may need to open up the delivery of network requirements to new non-wire solutions and customer-side. On the second issue, customers now have growing expectations that they can choose the price-quality combinations that suit their individual preferences (albeit with geographical differentiation) and EDBs may need to adapt accordingly.

Eight-page storyline (3/8): ...and create completely new roles for EDBs ...

New and emerging EDB roles

The electricity system is becoming increasingly integrated, and the traditional boundaries between energy participants are starting to blur. Power flows are no longer one-directional, making the task of operating them and maintaining reliable supplies more complex and potentially more costly in the absence of new innovative solutions. The challenge in meeting new needs in cost efficient way is very broad from extensive development of data governance, management and engineering practices along with the introduction of new capabilities, processes and information systems.

It may no longer be sufficient for EDBs to deliver solely on their three 'traditional' roles, but rather the **range of activities and roles that EDBs may need to play in the future may need to expand** to deliver customer expectations and to transition cost-effectively to a low-carbon energy system.

We have identified three such roles for EDBs:

Distribution system operator ("DSO")

Traditional boundaries between different players across the electricity system are being blurred and EDBs may need to expand their roles, acquire new tools and skills to quickly respond to the evolving customer needs. A smarter and reinforced distribution grid that integrates new market participants (e.g. EVs, decentralized rooftop solar and local flexibility sources), and plays a significant role in consumer empowerment through managing local congestions and redispatch, security of supply and grid resilience issues. As DSOs, EDBs could take on an extended role in directly procuring services (e.g. flexibility) to support their operation of the distribution grid. We have identified four potential areas that may need to be considered: the transmission – distribution interface; a more 'active management' role; a market 'architect' role; and a more coordinated relationship between EDBs and secondary networks.

Distribution system platform ("DSP")

EDBs are likely to evolve towards platform business models which integrate new and innovative energy resources. The path and investments required to reach full decarbonization will not be uniform and will depend on local conditions and clustering of consumer categories. In this role, EDBs could act as enablers for market participants to connect with each other and compete on a level playing field but achieving this goal will require investing in technology platforms and ensuring it is aligned to a digital way of working.

In the new DSP role, EDBs could also facilitate the development of neutral markets for more efficient whole system outcomes – effectively enabling other market participants to connect to each other (although customers may still expect to "trust" EDBs who may therefore need to provide quality control). To achieve this goal, EDBs needs to be empowered to embark on a journey of digital transformation to ensure data is being shared in the proper channels and formats to empower customers and promote new partnerships required to deliver system wide change.

Environmental and social obligations

How and when consumers interact with the networks is changing. Customers may increasingly expect EDBs to provide an enhanced level of information on their approach to conducting business ethically and with sensitivity towards social, cultural, economic, and environmental issues to enable a future net zero energy system characterised by digitalisation and democratisation. EDBs need to be enabled to carry out more local community activities and invest more on improving our existing assets or public spaces to deliver better services for energy customers.

Eight-page storyline (4/8): …and create new roles for EDBs, both of which require the regulatory framework to adapt.

The need for evolution of regulatory framework

Electricity networks have a leading role to play, by connecting greater levels of renewable energy and providing the infrastructure and technology required to decarbonise society. Tackling climate change will require decisive action and significant investment and innovation. The existing regulatory framework was designed for very different environment to the one currently facing society and it is reasonable to consider evolving some aspects where required. There are significant **uncertainties** on the road to a carbon free economy, with important policy decisions still to be made in areas including electrification of transport and heating. Regulation does not exist in isolation to policy and regulatory framework needs to adopt to ensure cost efficient delivery.

There is no single 'best' regulatory practice, and regulators need to apply judgement to determine an appropriate mix of regulatory components (such as base revenue, capitalisation rate, weighted average cost of capital and incentive rewards) to use in particular circumstances. However, regulators typically aim to ensure that efficient companies are able to finance their regulated activities. At the same time, regulatory framework will need to build in significant **flexibility** so that they can adapt as the future network requirements become clearer.

To meet this objective, it is generally not appropriate for regulators to consider individual regulatory tools in isolation. Rather, it is necessary to consider the different elements of the price control package **"in the round"** — as part of a balanced approach to the overall settlement to enable energy system to become more decentralised, decarbonised and digitalised, while ensuring that the interests of consumers are protected throughout this transition.

Figure: Key consideration for evolution of regulatory framework

Regulatory frameworks can be mapped out on a spectrum ranging from: traditional **input-based frameworks** with a limited set of customer-centric objectives; to **output-based frameworks** with a stronger focus on delivering outcomes that matter the most to the end customers. Input based frameworks are designed to encourage cost-efficiency, subject to achieving a certain level of service quality (e.g. through SAIDI/SAIFI measures). While this approach has been generally successful in reducing total costs, it is now becoming insufficient **to meet evolving customers expectations and enable cost efficient decarbonisation**.

The two frameworks are **not mutually exclusive**. Rather, the transition from an input-based to an output-based regulatory framework can be seen as an evolution of the traditional framework that includes additional and complementary output-based regulatory tools, such that the overall regulatory outcomes are focused on customers.

The analysis in our report considers whether (and where) **elements of an output-based regulatory framework might be attractive** to promote decarbonisation and economic development for potential implementation in New Zealand.

Eight-page storyline (5/8): Case studies identified five regulatory tools, assessed against principles of good regulation.

Consideration of regulatory tools

Good regulatory practice relies on the key principle that the **risks should be allocated to the party best able to manage them**. Building from this principle, there are range of possible tools that can be used to address a range of risks. In this report we focus primarily on the issues related to the **risks that are fully and/or partially controllable by EDBs** (rather than pass-through costs for non-controllable risks), as these are less straightforward to design than pass-through costs.

In our analysis of individual regulatory tools we therefore assess the overall balance of risks allocated to consumers as opposed to the regulated entities (noting that the overall quantum of risk does not change).

Spectrum of regulatory tools

Regulatory tools can be designed and deployed in a variety of ways, and the selection of the most appropriate one(s) depends on regulatory/policy objectives, availability of data, desired risk allocation and the type and 'sharpness' of incentives the regulator seeks to use.

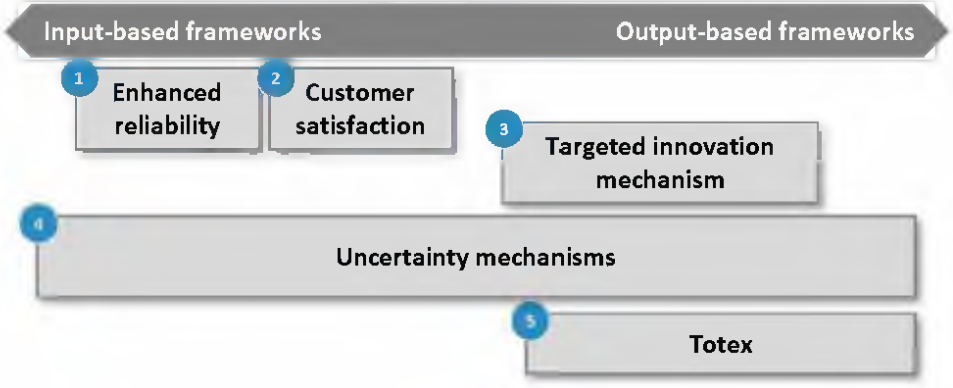
The tools we have selected and analysed represent, in broad terms, an **evolution from a pure input-based model towards a fully-fledged output-based framework** (although in some cases the tools are not "sequential" along this path) and thereby indicate a **potential pathway** for regulatory tools that potentially **over the course of several price control periods**.

In this report we have focused on following five tools and associated case studies:

1. **Enhanced reliability** Energimarknadsinspektionen Swedish Energy Markets Inspectorate
2. **Customer satisfaction** Ofwat
3. **Targeted innovation mechanisms**
4. **Uncertainty mechanisms (case study: GB-Ofgem – RIIO)**[1]
5. **Totex**

Spectrum of regulatory tools

The figure below summarises where, on a spectrum between input-based and output-based frameworks, the five regulatory tools can be placed.



Assessment criteria for regulatory tools: four key principles

We assessed the regulatory tools based on the following principles of good regulation:

Transparency: The tool needs to be based on outcomes that are measurable and observable, with sufficient and accurate information available to set the key tool parameters.

Efficiency: The outcomes targeted by incentives need to effectively target specific customer expectations which are clearly within a given EDB's control.

Proportionality: The intensity, level of effort and timescales of the tool needs to reflect customer preferences and to be relatively straightforward to implement and monitor.

Simplicity and consistency: The outcome and the incentive must be sufficiently simple and consistent to allow customers to recognise its value, to be practical to implement, and to avoid 'gaming' by EDBs.

Building from these four key principles we have adopted a **traffic light rating system** to indicate alignment with our criteria. The definition of the scores is intuitive: with green representing full alignment of the tool with the principle of good regulation and red representing a significant deviation from the defined key principle.

1) *Ofgem is the energy regulator in Great Britain. RIIO is the regulatory framework and stands for Revenue = Incentives + Innovation + Outputs*

Eight-page storyline (6/8): Based on the assessment, we identified the range of potential short-term and long-term changes.

Assessment of regulatory tools

Enhanced reliability metrics, where necessary and appropriate, can be implemented as an **"add on" to the existing framework in New Zealand**. This could represent simple design changes (e.g. the inclusion of **new metrics** such as Customers Experiencing Multiple Interruptions). More complex variants that allow for **price-quality differentiation** would need to take into account customer interests, and are likely to only be suitable for implementation in the medium term.

Customer satisfaction directly encourages EDBs to serve their customers better, and has the potential to provide the **appropriate level of funding for meeting evolving customer expectations**. There are a number of well established precedents can could be used as a starting point for the design of this tool in New Zealand. In addition, the conceptual objectives are straightforward to articulate and explain to stakeholders.

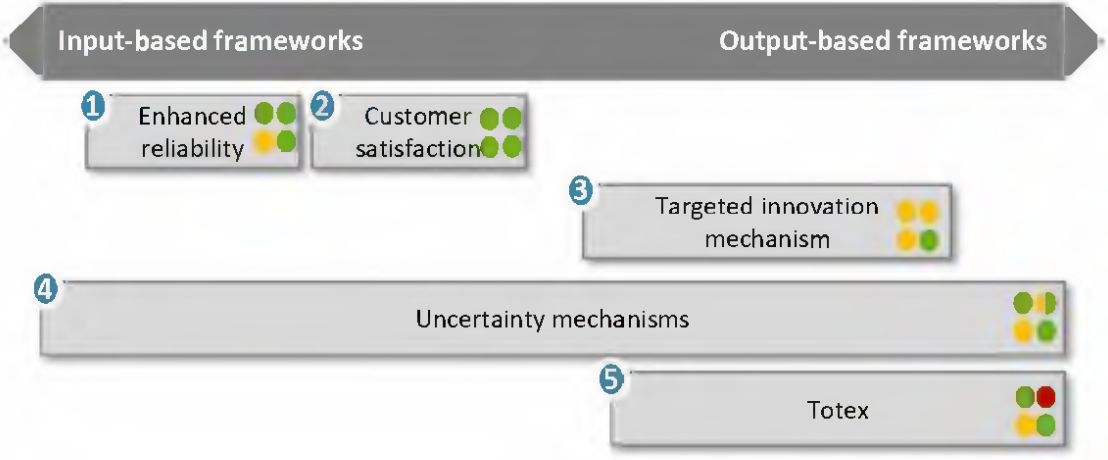
Targeted innovation mechanisms represent a purpose-built tool to deliver the sole **objective of increasing the level of innovation** within the industry. Innovation, in tandem with digitalisation is key to capture the benefits of the Net Zero transition for consumers. This tool is relatively broadly focused – by its nature, innovation can deliver improved customer outcomes both in the current EDB roles (e.g. innovation in the delivery of new connections of network operation) as well as the new and emerging EDB roles (e.g. innovation in the DSO role and DSP role). Some of the simpler variants are relatively straightforward to implement in the short run, but more complex variants (e.g. competition among EDBs for a fixed pot of innovation funding) may be more suitable for the long term.

Uncertainty mechanisms **("UMs")** introduce **flexibility to deal with identified uncertainties** by balancing the risks between customers and EDBs. Given the uncertainty around decarbonisation, UMs can enable EDBs to efficiently respond to range of consumer or policy-driven requirements and flex their spending to support a transition to low carbon society. This tool is highly versatile and can be applied to manage a wide spectrum of risks with varying levels of complexity. Volume driver adjustments, for example, are relatively narrow-focused and are most suitable for outcomes related to the delivery of specific level of output where high uncertainty is observed (e.g. uptake of electric vehicles). More complex uncertainty mechanisms would require extensive consultations to be undertaken, but **could be considered for the long term**.

Totex is a relatively novel regulatory tool that (excluding GB) has not been tested extensively by regulators and is not, as yet, part of the 'standard' regulatory toolbox. It **places the onus on EDBs to select the optimal set of solutions**, and as such is likely to be highly effective in enabling EDBs to deliver on their traditional roles. However, due to the **limited international precedent** we consider that a Totex approach **could be considered in the long term**, but not in the short term. Experiences for some jurisdictions (see case study for Italy) shows that there is long lead-in period to implementing Totex, with a number of preliminary activities that need to be initiated well ahead of the actual implementation date.

These five regulatory tools (and the potential implementation timelines) are summarised in the figure below.

Figure: Spectrum of regulatory tools and recommendations



Eight-page storyline (7/8): Changes in customer expectations and EDB roles drive Blueprint levers: recommendations for New Zealand

Implications for Regulatory Framework in New Zealand

Regulatory framework in New Zealand is largely an input-based framework with basic network reliability incentives, as well as some simple uncertainty mechanisms (such as indexation and re-openers in relation to catastrophic natural events).

Based on the analysis in this report, we consider that there are **opportunities for new and additional regulatory tools to be introduced** that would support cost efficient decarbonisation reflect evolving customer expectations and wider changes in the New Zealand energy market.

It is unlikely to be appropriate for all of the proposed regulatory tools to be introduced at the same time – some of them are more suitable for the near term (as they require relatively limited preliminary activities and consultations), while others require extensive public consultation and careful design to be implemented.

In any event, each of the recommendations proposed below needs to be considered in the context of the wider regulatory framework, to ensure that the detailed design complements the existing features of the regulatory framework in New Zealand and the regulatory settlement works well **"in the round"**.

However, New Zealand appears to be **well placed to consider a wider regulatory toolkit** now while the opportunity is there, including **customer satisfaction** (with designs that can be 'borrowed' from other jurisdictions), **UMs** and **enhanced reliability** (both facilitated by smart meter data), and some of the simpler variants of targeted innovation incentives. In addition, **groundwork could be initiated in the short term** to set the industry on a path towards more complex output-based regulation (e.g. more complex UMs, innovation incentives and Totex).

Key recommendations

The five regulatory tools assessed in this report should be introduced, supporting different customer expectations of personalisation, customer experience and innovation.

Based on the analysis in this report we recommend the following:

1) Consider introducing **enhanced reliability** incentives to encourage EDBs to deliver reliability outcomes that are more tailored to customer preferences, thus supporting customer expectations of **personalisation** and **customer experience.**
2) Develop **customer satisfaction** incentives, based on a combination of qualitative and quantitative metrics, to encourage EDBs to collect, analyse and respond to information on customer preferences. This could support the evolving expectations of better **customer experience.**
3) Consider introducing **simple targeted innovation-focused incentives** (e.g. an allowance subject to cost-benefit analysis) in the short term, to support customer expectation of **innovation** but also to improve **customer experience.** Reserve more complex innovation tools (e.g. competition for funding) for the longer term, so that EDBs have time to prepare and to avoid undue regulatory disruption in the industry.
4) Build on existing experience with uncertainty mechanisms to introduce **volume-based mechanisms**, e.g. those that link directly to customer-driven uncertainty (such as deployment of EVs or DER), to support customer expectations of better **customer experience** and deliver more **innovation.**
5) Consider preparing the industry for a **transition towards a Totex output-based regulatory model**, by introducing new data collection requirements in the short term, but reserve the full introduction for the longer term. The implementation of Totex in the long run could support customer expectations of **personalisation**, **customer experience** and **innovation.**

Eight-page storyline (8/8): To implement the Blueprint EDBs need to deliver appropriate outcomes: this report presents illustrative metrics

Implications for traditional and new/emerging EDB roles

We have identified in the table below some **examples of potential metrics** that can be applied to help more efficient development of a future net zero system and assess the performance of EDBs in their different roles, subject to a detailed consideration by the regulator and consulted on appropriately to ensure that their implementation aligns with the needs of New Zealand customers.

EDB roles	Suitable regulatory tools	Example metrics
Delivery of new connections	■ Customer satisfaction ■ Targeted innovation ■ Uncertainty mechanisms	■ Speed of connection ■ Proactive communication using preferred medium ■ Customer satisfaction score
Network reinforcement, operation and maintenance	■ Enhanced reliability ■ Targeted innovation ■ Totex	■ Reduce number of "worst served" customers ■ Speed of reconnection ■ Automated notifications ■ Quantifiable target for consideration of non-wire solutions
Cost-efficient delivery	■ Totex	■ Price-quality differentiation ■ Customer bill itemisation ■ Ex-ante Totex sharing factor e.g. 45% of any underspend is retained by EDB
Distribution system operator / active network management	■ Targeted innovation ■ Uncertainty mechanism	■ Number of new services/products/markets offered (e.g. flexibility service, demand reduction) ■ Customer-specific approach to monetising assets (e.g. PV)
Distribution System Platform (DSP)	■ Customer satisfaction ■ Targeted innovation ■ Targeted incentives	■ EDBs' customer details enabling timely communication (% of customers 'up to date') ■ Third party flexibility services ■ Mandate the use of data to meet the pre defined expectations
Environmental and social obligations / responsibilities	■ Targeted innovation	■ Diversity and inclusion metrics ■ Mandatory Environmental Action Plan ■ Simple metrics to set targets and track progress in reducing waste and emission of CO_2 & SF_6

Legend – customer expectations

Personalisation
Customer experience
Innovation