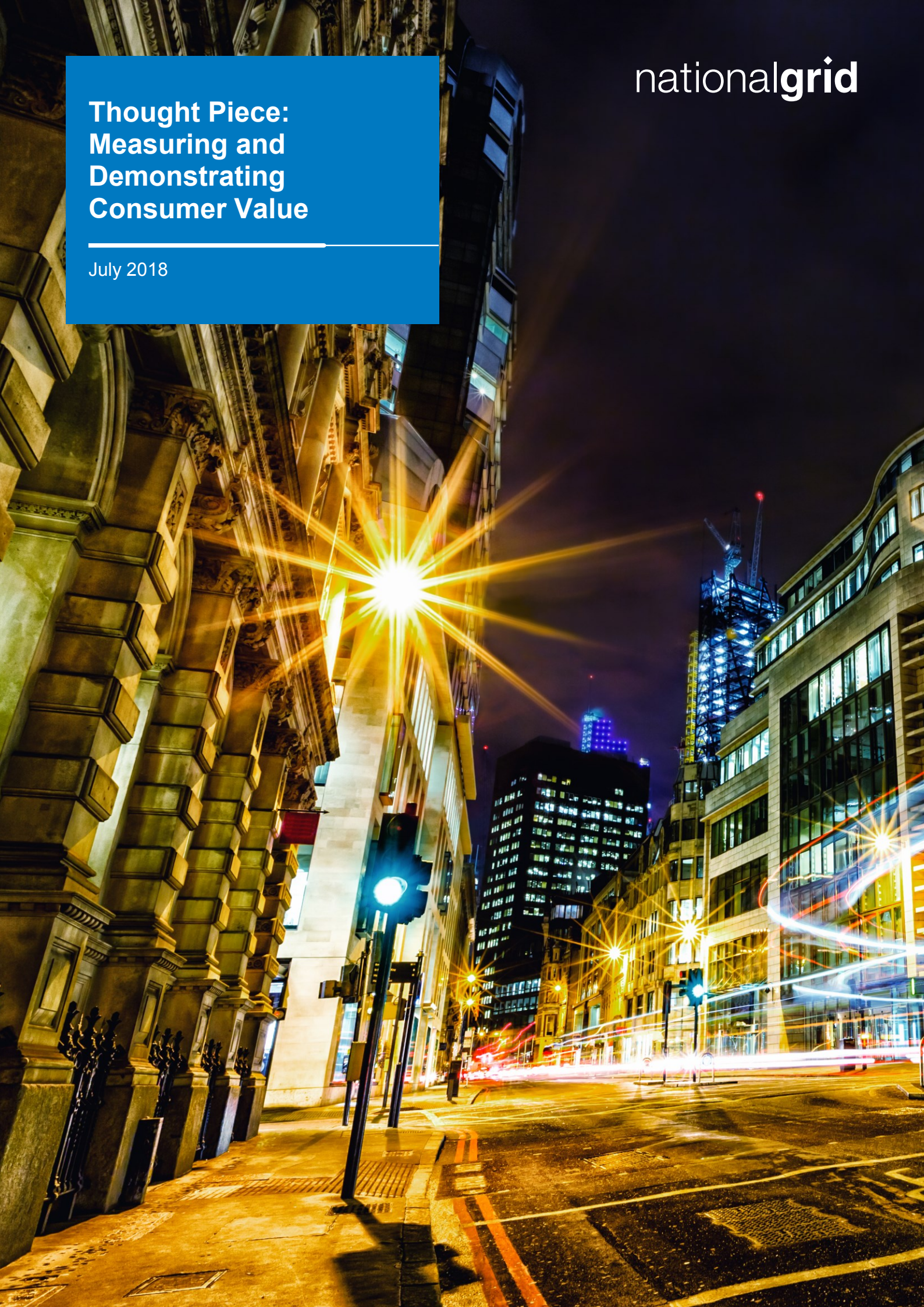


Thought Piece: Measuring and Demonstrating Consumer Value

July 2018



Executive Summary

Our Forward Plan sets out the work we will undertake this year to unlock consumer value today and in the future across our four Roles. This thought-piece describes our proposal for articulating and reporting upon this value.

In March 2018, we published our Forward Plan FY18/19 as part of the new ESO Regulatory and Incentives Framework. The framework looks to create a broader, more 'evaluative' approach across the ESO's four Roles and seven Principles, details of this can be found in Ofgem's The Electricity System Operator Reporting and Incentives Arrangements: Guidance Document. Our plan is evaluated per Principle across five key criteria:

- a) Evidence of delivered benefits
- b) Evidence of future benefits/ progress against longer term initiative
- c) Stakeholder views
- d) Plan delivery
- e) Outturn performance metrics and justifications

During quarter 1, we have been working on proposed approaches for articulating and reporting upon delivered and future benefits delivered by our Forward Plan, as detailed within this document. We will reflect on the responses to this discussion document and work with stakeholders to develop our approach to determining and articulating consumer benefit, publishing our approach and the value associated with the work we are doing across our Principles.

This thought-piece sets out our emerging thinking on our proposed approach and asks for your input in validating the approaches ahead of reporting on delivered consumer value later this year.

Question:

What is your feedback on the information and approach we have set out in this document?

Please send responses to Box.soincentives.electricity@nationalgrid.com
Please send us your feedback by the end of August.

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Our Consumer Value Methodologies

We want your feedback on our consumer value methodologies that we will use to develop a robust, transparent view of our contribution to consumer value.

The Electricity System Operator (ESO), sits at the heart of the energy industry in Great Britain, we make sure homes and businesses have access to the electricity they need. The energy industry is experiencing significant change driven by increasing amounts of renewables and decentralisation, which means we need to think more holistically, longer term and at the whole system to enhance network and market access for all parties. We want to ensure we do all this in the best interest of consumers and to be able to demonstrate this to stakeholders.

Our Forward Plan published in March 2018 set out our long-term vision for the ESO which thinks across networks, plays a more active part in the energy system and helps to shape frameworks for markets. In our own role, we will be transparent in our decisions and actions and promote increased use of markets in place of bespoke bilateral action. Alongside this, we will also continue to run the electricity system safely, securely, sustainably and efficiently.

This approach will benefit consumers in several ways. It will enable efficient price signals to drive investments, ensure effective markets to encourage innovation and identify new approaches to meet society's changing needs. Over the next three years we will support this vision across our four Roles:

- Managing system balancing and operability
- Facilitating competitive markets
- Facilitating whole system outcomes
- Supporting competition in networks

The broader, more 'evaluative' scheme evaluates our plan across the seven Principles against five criteria:

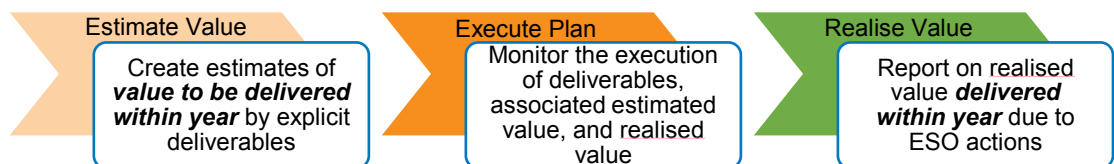
- a) Evidence of delivered benefits
- b) Evidence of future benefits/ progress against longer term initiative
- c) Stakeholder views
- d) Plan delivery
- e) Outturn performance metrics and justifications

To support the evaluation of criteria of evidence of delivered benefits and of future benefits, during quarter 1, we have developed two methodologies for articulating how our actions deliver consumer value today and in the future as we lay foundations for an optimised electricity supply future now, as timescales on investment, design and construction decisions can take decades to come to fruition. The current benefit methodology will look for explicit, tangible value which we expect to deliver within the current year, whereas the future benefit will look at how the ESO is contributing to the industry-wide transformation to a low-carbon system.

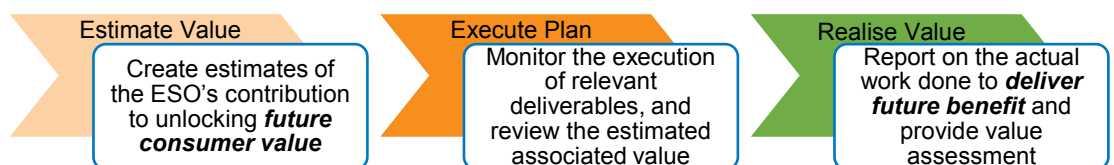
Your Feedback is Needed

This document sets out our proposed methodologies and asks for your feedback which we will use to ensure we develop an approach which is seen by stakeholders to be transparent and robust. By Q3 this year we will publish the approach together with the estimates of value per principle which we believe we can deliver.

Current Value Methodology



Future Value Methodology



Our Proposals for Defining Consumer Value

We have already published initial estimates of the value we are delivering and unlocking in our forward plan, and are now developing this further.

Overarching Framework

It is important to understand what benefit for the consumer actually is. Ofgem articulate this concisely in the overview of their recent Consumer Impact Financial Report¹:

1. Lower bills than would otherwise have been the case.
2. Reduced environmental damage both now and in the future.
3. Improved reliability and safety.
4. Better quality of service, appropriate for an essential service.
5. Benefits for society as a whole including support for those struggling to pay their bills.

With this understanding, we must be able to identify how delivery of our plan will contribute to these benefits, and to quantify the value of that contribution.

How our Forward Plan delivers Consumer Value

Within the Forward Plan document suite², we published estimates of the consumer value we believe our Forward Plan can deliver today and in the future per Principle. We detailed the areas where we believe value can be released, and estimated the magnitude of value we associated with those Principles. To create the estimates in the Forward Plan, we looked at areas such as:

- Lowering service prices through information transparency
- Reduction in risk premia
- Using market mechanisms to replace bi-lateral balancing services contracts
- Technology diversity in provision of balancing services (can increase security and environmental benefit) through reducing barriers to entry
- Efficiencies due to better forecasting, e.g. control room holding less contingency products
- Facilitating carbon reduction
- Balancing cost reduction
- Widening access to Balancing Mechanism (BM) participation
- ESO sponsoring code changes which benefit the consumer
- Ensuring the right balance between network and operability solutions
- Early identification of operability issues

Detail of these estimates can be found in the ESO Performance Metrics document p38-40³.

Quantifying the value of our contribution to consumer benefits

We view the consumer value we create through the three lenses of the energy 'trilemma':

- Affordability: Direct cost to the consumer of their energy.
- Security of Supply: Providing the consumer with safe, reliable energy.
- Sustainability: Playing our part in the transformation to a low-carbon energy system.

These lenses align with Ofgem's view of five categories of consumer value described previously, with quality of service and societal benefit spanning across the lenses.

Within each of these lenses, we articulate benefit to the consumer using the following categories:

¹ <https://www.ofgem.gov.uk/publications-and-updates/consumer-impact-report-financial-year-2017-18>

² <https://www.nationalgrid.com/uk/about-grid/our-role-industry/future-electricity-system-operator>

³ <https://www.nationalgrid.com/sites/default/files/documents/Performance%20Metrics%20Definition.pdf>



- Value created – generating new and additional benefit for consumers
- Avoided costs – finding solutions which will not financially impact consumers
- Costs saved – applying solutions to manage spend downwards
- Costs controlled and cost reduced – managing existing requirements efficiently and driving down existing spend

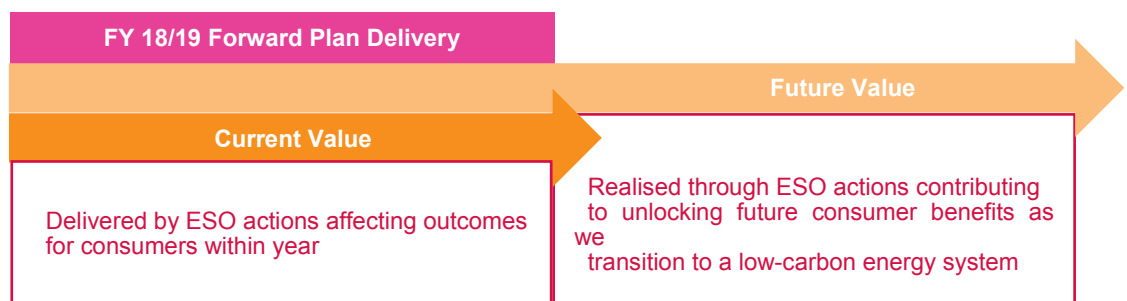
We will endeavour to describe this value in monetary terms where possible. Benefit in the form of security and sustainability can be monetised if, for example, we think in terms of Value of Lost Load⁴ and carbon costs respectively.

Current Value and Future Value

Under the new regulatory scheme we are asked to provide evidence of:

- Evidence of delivered benefits - this is “current value”
- Evidence of future benefits / progress against longer term initiatives – this is “future value”

The difference between current and future value



In our view, to establish our contribution to **current value**, we examine actions being taken by the ESO which are affecting outcomes for consumers and other stakeholders within year, for example:

- Driving changes to embedded generation protection settings to avoid taking commercial actions within current year to manage fault risks
- Increasing the transparency of our commercial actions in order to facilitate better functioning markets
- Providing forecasts of the carbon intensity of the generation mix in order to help consumers make well informed consumption decisions

Examples of areas where there is significant consumer benefit in future years:

Challenges such as incorporating significant amounts of renewable, intermittent, and embedded generation

Facilitating new technologies

Accommodating changing consumer consumption patterns

When developing our thinking around how to best express **future value**, we examined how other industry stakeholders are looking at this topic⁵ by reviewing relevant publications, papers and reports which model and analyse future energy system states and outcomes. For example, the National Infrastructure Commission Report “Smart Power” finds that there are potential savings for consumers of up to £8 billion a year by 2030 if industry can deliver a more flexible electricity system. We found common areas within the influence of the ESO, which if addressed, could deliver significant cost benefits for the consumer in the coming years.

Further detail on our initial literature review and outcomes of this are in Appendix 1.

⁴ <https://www.ofgem.gov.uk/ofgem-publications/82293/london-economics-value-lost-load-electricity-gbp.pdf>

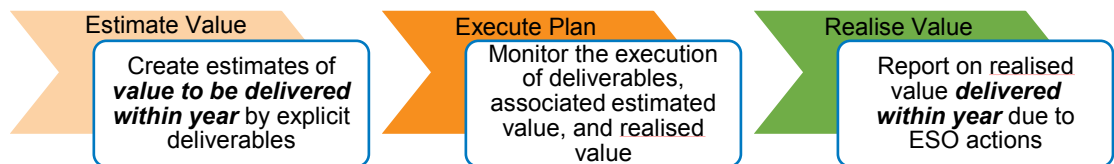
⁵ <https://www.gov.uk/government/publications/smart-power-a-national-infrastructure-commission-report>
<https://www.nic.org.uk/wp-content/uploads/Delivering-future-proof-energy-infrastructure-Goran-Strbac-et-al.pdf>
https://www.theccc.org.uk/wp-content/uploads/2015/10/CCC_Externalities_report_Imperial_Final_21Oct20151.pdf

Our Proposals for Current Value and Future Value Methodologies

We propose two methodologies: one to account for current value, and one to account for future value. We will use the methodologies to create estimates and report on the value realised against those estimates.

Matching the evaluation criteria, we propose two methodologies for calculating and reporting on current benefits and future benefits; Figure 1 provides an overview of the methodologies.

Current Value Methodology



Future Value Methodology

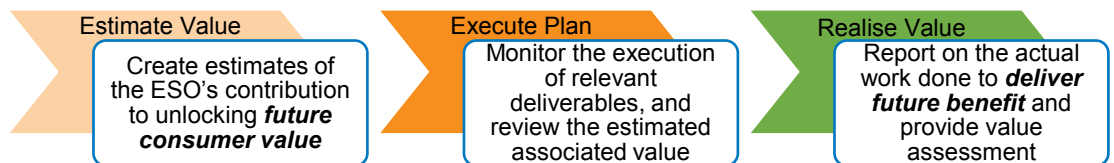


Figure 1 – High-level Methodologies

Current Value Methodology

The method by which we will determine current value is shown diagrammatically following the path of: Estimate value, execute plan, realise value. It is a ten-step process

Estimated Value: Creating estimates of value to be delivered within year

As detailed in Figure 2, Step one, we will identify per principle how our actions deliver consumer value against our three lenses: affordability, security of supply and sustainability. Step two, using these lenses, we will quantify these benefits using the following categories: value created; avoided costs; costs saved, costs controlled and reduced. Step three, if there are cases where the outcomes of a deliverable are not explicitly tangible, perhaps for example when looking at areas such as the benefit to consumers of greater ESO information transparency, then we may use proxies to estimate value.

Step 4, we will aggregate the value of deliverables to their parent Principle, and group the total value into categories of high / medium / low, noting that the purpose of this exercise is to capture the magnitude and significance of the ESO's contribution to consumer value, not to attempt to use counterfactual theory to produce detailed accounting, as this would be neither accurate nor practical.

Finally, Step five, we will publish and consult on the information we produce, to gain feedback from stakeholders regarding the credibility of the data and assumptions.

Execute Plan and Realise Value: Monitor work delivered and report on realised benefits

In this section of the process we will manage and monitor the progress of our deliverables, and we will report on our progress through the regular reporting⁶ process which is part of the incentive scheme (Step 6). The reports are published on our website and progress is discussed monthly with Ofgem. Performance is examined six-monthly by the Panel.

Step 7, we will accrue the deliverables' estimated value (and re-visit and re-validate the estimates if necessary), rolling-up that value into the parent principles, and again categorising the actual value we believe we have delivered into high / medium / low (Step 8). In Step 9 we will refine the data to ensure where possible we are not double-accounting value across multiple Principles.

Finally, in Step 10, we will produce a robust narrative to explain how we have added value for consumers in the current year, and to justify the quantification that we have provided.

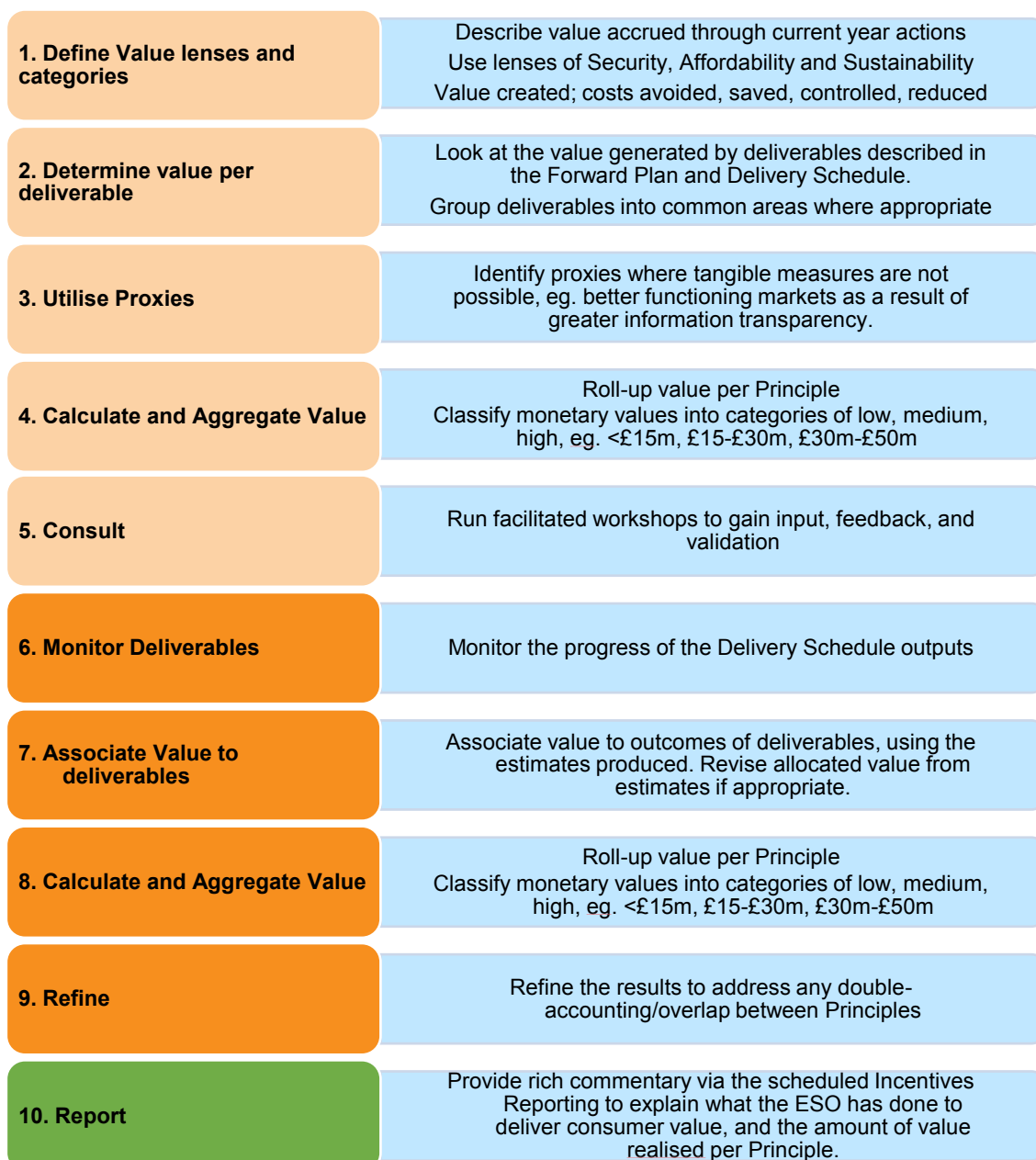


Figure 2 - Current Benefit Process

⁶ <https://www.nationalgrid.com/uk/electricity/system-operator-incentives/eso-incentive-performance-and-reporting>

Incorporating Existing Formal Methods

Where we employ existing accepted formal methods for cost benefit analysis, such as the Network Options Assessment (NOA) process, we will use these within the relevant thought pieces to construct the consumer benefit for the particular Principle.

Future Value Methodology

The method by which we will determine future value is shown diagrammatically following the same path of: Estimate value, execute plan and realise value. It is a ten-step process.

Estimate Value: Creating estimates of future value to be delivered

Steps one and two of this process are one-off activities to create a common view on how we can describe consumer value to be realised in the future. There are many papers, reports, analyses and publications looking at the challenges faced by the electricity system of the future, and how these could impact consumers. We will identify key literature; review what common themes flow through it. In Step three, we will map these themes to the deliverables and principles described in our Forward Plan.

We will be exploring opportunities to develop our value narrative and methodology through working with a broad range of stakeholders, including consumer advocacy groups and industry associations. ***Please contact us if you would like to work with us to develop our approach at Box.soincentives.electricity@nationalgrid.com.*** In Steps four and five, through collaboration with interested parties, we will build on this work to show how the outcomes we are delivering against each of the principles will deliver value in the medium and longer term, and allocate financial value to the ESO's contribution to the future state⁷.

Finally, Step 6, we will publish and consult on both the view of future value to be realised, and our estimate of how we will contribute to that with the current year's Plan to gain feedback from stakeholders regarding the credibility of the data, our assumptions and subsequent analysis.

Execute Plan & Realise Value: Monitor achievements and report

In this section of the process we will manage and monitor the progress of our deliverables (Step 7). Step 8, we will use the narrative produced together with the progress of delivering the outcomes and outputs of each principle to determine the ESO's contribution to future realised value. We will report on our progress through the regular reporting⁸ process which is part of the incentive scheme. The reports are published on our website and progress is discussed monthly with Ofgem. Performance is examined six-monthly by the Panel.

In Step 9, we will categorise the impact of our contribution to the future consumer benefit per Principle into high / medium / low, noting that the purpose of this exercise is to capture the magnitude and significance of the ESO's contribution to consumer value, not to attempt to use counterfactual theory to produce detailed accounting, as this would be neither accurate nor practical.

Finally, Step 10, will produce a robust narrative to explain our future value-add realised from the work we have done within-year.

⁷ Where we employ existing accepted formal methods for cost benefit analysis, such as the Network Options Assessment (NOA) process, we will use these within the relevant thought pieces to construct the consumer benefit for the particular Principle.

⁸ <https://www.nationalgrid.com/uk/electricity/system-operator-incentives/eso-incentive-performance-and-reporting>



Figure 3 - Future Benefits Process

Question for Stakeholders

We would be grateful if you could respond to the following question, and free-form responses are also welcome.

What is your feedback on the information and approach we have set out in this document?

Please send responses to Box.soincentives.electricity@nationalgrid.com
Please send us your feedback by the end of August.



Next Steps

Once we have collected the feedback to this discussion document, we will reflect upon it and modify our approach as required.

We will then use the agreed methodologies to state the estimates of consumer value we will realise through delivering the forward plan this year. We will also begin to report on what value we have contributed, as some of our actions are completed, or are making significant progress. We will consult on these initial reports, to ensure our stakeholders are confident that the agreed methodologies are generating credible information.

We will incorporate the methodologies into the cycle of the regulatory incentives framework going forwards as shown in Figure 4

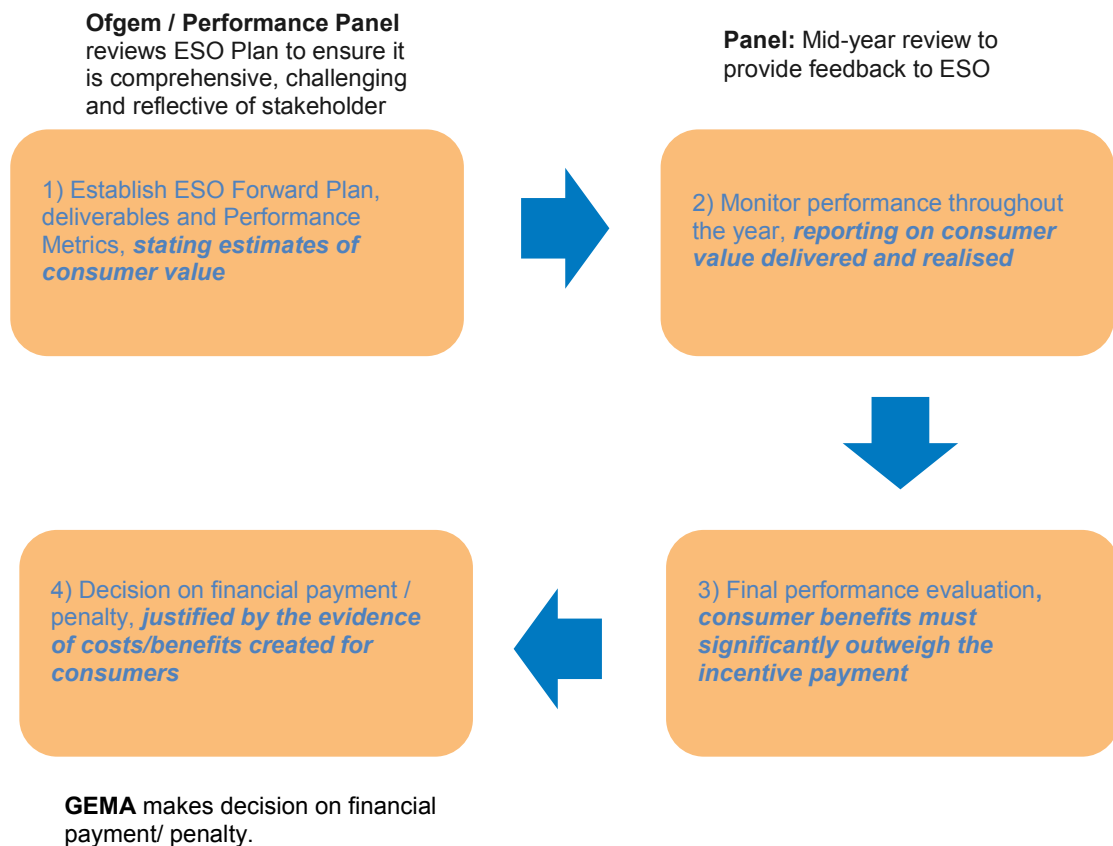


Figure 4 - Regulatory Incentives Cycle

Appendix 1

Supporting information for future value approach.

Our initial literature review supports our proposal to determine and articulate future value.

Figure 5 - Initial Literature Review, illustrates key problems identified, modelled, and discussed in some key publications. We recognised themes around solutions to these problems, which we have grouped into four areas in the diagram, also illustrating specific actions recommended to address the challenges. Within the reports some actions have also been modelled to show financial cost/benefit to consumers, and where this is the case we have included the values in the diagram.

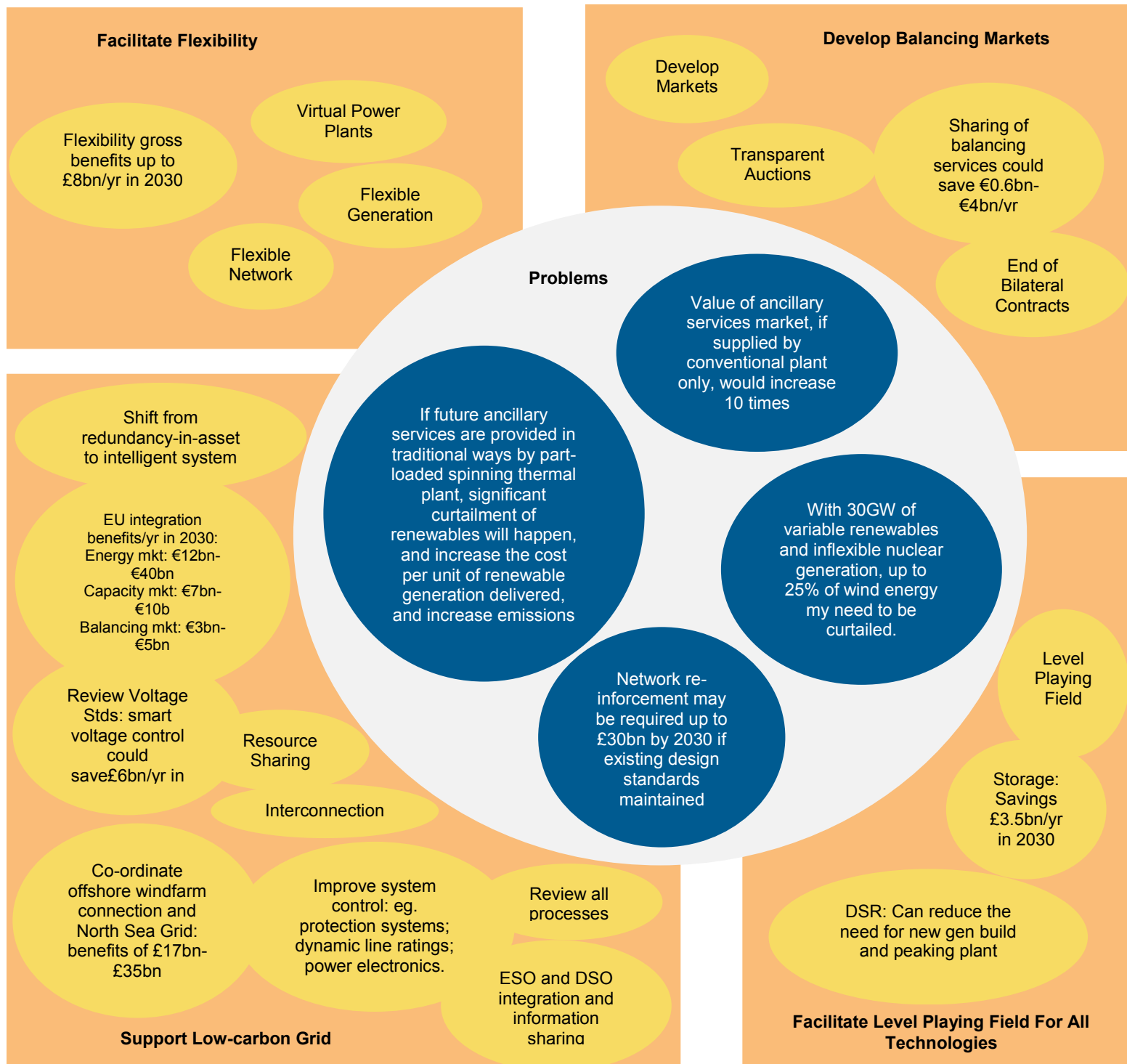


Figure 5 - Initial Literature Review

Figure 6 shows how we have mapped the ESO principles to identified themes. There appear to be clear linkages between particular Principles and certain themes. Therefore, if we pursue the proposed approach to determining future value, this linkage should help us associate value discussed in industry publications⁹ and analysis to our Principles and areas of work and deliverables.

Principle	Theme 1	Theme 2	Theme 3
1. Support market participants to make informed decisions by providing user-friendly, comprehensive and accurate information	Develop Balancing Markets	Facilitate Flexibility	Facilitate a Level Playing Field for all Technologies
2: Drive overall efficiency and transparency in balancing, taking into account impacts of ESO actions across time horizons	Develop Balancing Markets	Facilitate Flexibility	Facilitate a Level Playing Field for all Technologies
3: Ensure the rules and processes for procuring balancing services maximise competition where possible and are simple, fair and transparent	Develop Balancing Markets	Facilitate Flexibility	Facilitate a Level Playing Field for all Technologies
4: Promote competition in the wholesale and capacity markets	Support Low-carbon Grid	Develop Balancing Markets	
5: Coordinate across system boundaries to deliver efficient network planning and development	Support Low-carbon Grid	Facilitate Flexibility	Facilitate a Level Playing Field for all Technologies
6: Coordinate effectively to ensure efficient whole system operation and optimal use of resources	Support Low-carbon Grid	Facilitate Flexibility	Facilitate a Level Playing Field for all Technologies
7: Facilitate timely, efficient and competitive network investments	Support Low-carbon Grid	Facilitate a Level Playing Field for all Technologies	

Figure 6 - Table mapping ESO principles to themes

⁹ <https://www.gov.uk/government/publications/smart-power-a-national-infrastructure-commission-report>
<https://www.nic.org.uk/wp-content/uploads/Delivering-future-proof-energy-infrastructure-Goran-Strbac-et-al.pdf>
https://www.theccc.org.uk/wp-content/uploads/2015/10/CCC_Externalities_report_Imperial_Final_21Oct20151.pdf

Glossary

Please also see the full glossary¹⁰ published alongside the forward plan for more detail.

Acronym	Word	Explanation
BM	Balancing Mechanism	The Balancing Mechanism is a single purchaser trading platform to enable final opportunity balancing of the electricity system by the system operator.
ESO	Electricity System Operator	An organisation entrusted with ensuring supply and demand are balanced second to second and in the longer term, and managing power flows across the network safely and reliably. National Grid is the ESO for Great Britain.
ESORI	ESO Reporting and Incentives Arrangements Guidance Document	Document published by Ofgem to provide guidance on the operation of the 2018-21 ESO Incentives Scheme
ETYS	Electricity Ten Year Statement	An annual publication detailing likely future transmission requirements of bulk power transfer capability of the National Electricity Transmission System (NETS), based on the Future Energy Scenarios (FES).
NGET	National Grid Electricity Transmission	The company comprising the England and Wales ETO and Great Britain
NOA	Network Options Assessment	A methodology which assesses the major projects considered to meet the future needs in GB's electricity transmission system as outlined in the Electricity Ten Year Statement (ETYS) 2017, and recommends which investments in the year ahead would best manage the capability of the GB transmission networks against the uncertainty of the future.

¹⁰<https://www.nationalgrid.com/sites/default/files/documents/Glossary%20of%20key%20terms.pdf>