

DIGITALISING LICENSING IN ENERGY

A DIGITALISED, RISK BASED LICENSING REGIME

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EXECUTIVE SUMMARY

As the number of licensees in the energy market looks to increase, primarily driven by the government's recent decision to give Ofgem powers to regulate heat networks¹, a new approach to regulating licensees is required. With the UK government stating there are approximately 14,000 heat networks in operation today, the way in which Ofgem approaches regulating these organisations will require a step-change in approach to ensure Ofgem can conduct its duties effectively.

In addition to the sheer volume of additional licensees, the ways in which licence conditions are designed stifles innovation within the retail sector, with Ofgem's work on future supply market² calling out that they were not confident current arrangements will enable consumers to benefit fully from innovation, digitalisation, and competition.

Given both above, this paper presents an evolution of the current licensing framework. This evolution proposes a way to digitalise the licences as well as calling for a new focus on measuring success of those regulations and compliance with them. This can be achieved through adopting a digitalised, risk-based licensing regime where licensees provide regular updates to Ofgem across numerous categories, such as number of customers or volume of energy managed as well as providing data on their compliance with licences.

By providing a wealth of data to Ofgem, regulation can be targeted by profiling the specific types of risk that organisations pose to the energy system or consumers – enabling a data-driven set of regulations to emerge that targets licensees proportionally.

¹ <https://www.gov.uk/government/news/uk-government-announces-major-expansion-of-heat-networks-in-latest-step-to-power-homes-with-green-energy>

² https://www.ofgem.gov.uk/sites/default/files/docs/2018/07/future_supply_market_arrangements_-_response_to_our_call_for_evidence_0.pdf

1. INTRODUCTION & CASE FOR CHANGE

An overhaul of the way Ofgem implements & measures the licence conditions is required. With the rapid expansion of energy market participants, the challenge of managing licensees is expected to grow incrementally larger as more organisations provide energy services.

Today, Ofgem manages 11 different licence types with hundreds of licensees. The number of both licences and licensees is expected to expand over the coming years with the recent decision for Ofgem to regulate heat networks. Ensuring consistency across the licence conditions is an increasingly complex problem, with information flowing to Ofgem to inform it of the operation of those whom it licences being key to ensuring Ofgem is protecting consumers. A new approach to licensing, if properly designed, can meet the challenges of;

- An increased number of licensees
- Providing opportunities for licensees to meet their obligations innovatively, and
- Current poor visibility of emerging systemic or specific risks to consumers or the energy system

The challenges described above are not unique to energy regulation, and a parallel to the food sector could be drawn. The Food Standards Agency regulates a huge number of actors in the supply chain, from individuals offering catering services to large multinationals, creating an environment where proportionality is a prerequisite of effective regulation. Effective digitalisation of Ofgem's licensing regime can create opportunities in enabling a risk-based approach to be taken, by using targeted data collection and adopting a modular and cross-sector view of licence conditions.

The Redesigning regulation³ report from Challenging Ideas promotes the concept of perimeter regulation, where key principles are described as:

1. Stand apart from the sector
2. Risk assessment
3. Clarity about the unacceptable
4. Employ strong and timely sanctions
5. Drive continual improvement
6. Drive more from less

These key principles, particularly two, four, five and six are prioritised by the approach described in this paper where the overall focus is to transform the way Ofgem interacts with the licensees and enable stronger decisions to be taken, backed up by data collection.

There are two parallel streams of work this report considers: a licence condition solution and a data solution. The licence section describes how to implement licence condition change, describing a new framework of regulatory interventions that focus on measurable outcomes. The data section sets out the needs of a solution, which can ensure the new regime will operate efficiently and effectively.

By taking this approach, a renewed focus on deploying and measuring regulatory interventions at scale and pace can be taken. This will increase certainty for licensees and Ofgem and enable new approaches to regulation with a focus on intervening only where unacceptable risk to consumers or the energy system is identified. High quality and regular reporting data will enable early warning systems to develop, with Ofgem being able to identify trends across licensees and intervene before significant harm to consumers or the energy system occurs.

³ http://www.challenging-ideas.com/wp-content/uploads/2018/12/ReDESIGNING_REGULATION-final-report.pdf

This paper proposes a reform to the licence conditions with a few principal objectives. The new licensing regime should be:

- **Proportional:** Licensees should be regulated based on what they do and how much impact they have.
- **Measurable:** Regulatory intervention should be measurable by design.
- **Digitalised:** The licensing framework should be designed to meet the current and future needs of users.

The following chapters explain how we meet these objectives and design a licensing regime fit for the energy sector of the 2020's and beyond.

2. RECOMMENDATION

2.1. PROPOSED SOLUTION

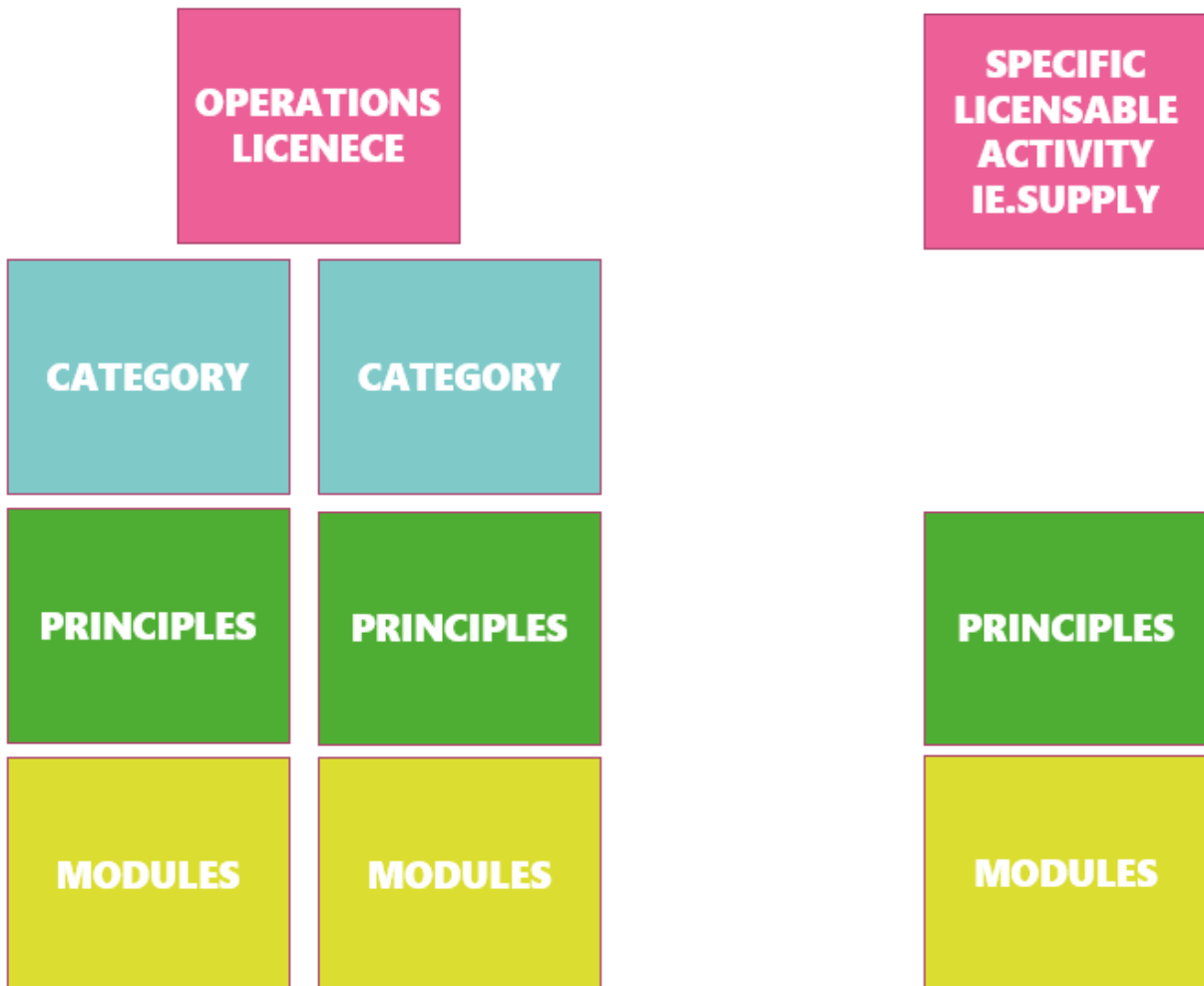
To meet the challenges described in the introduction a new way of implementing licensing is required. This paper proposes a **digitalised, risk-based licensing regime** should be implemented.

This new regime would be built upon several premises:

- 1) A new regime should be underpinned by a principles-based approach to policy categories.
- 2) Interventions should be risk based and categorised into tiers.
- 3) Interventions should be focussed on outcomes.
- 4) Outcomes should be measurable by design.
- 5) Quality data collection and analysis is required to enable the above.
- 6) The licensing regime should be digitalised to enable the above complexity.

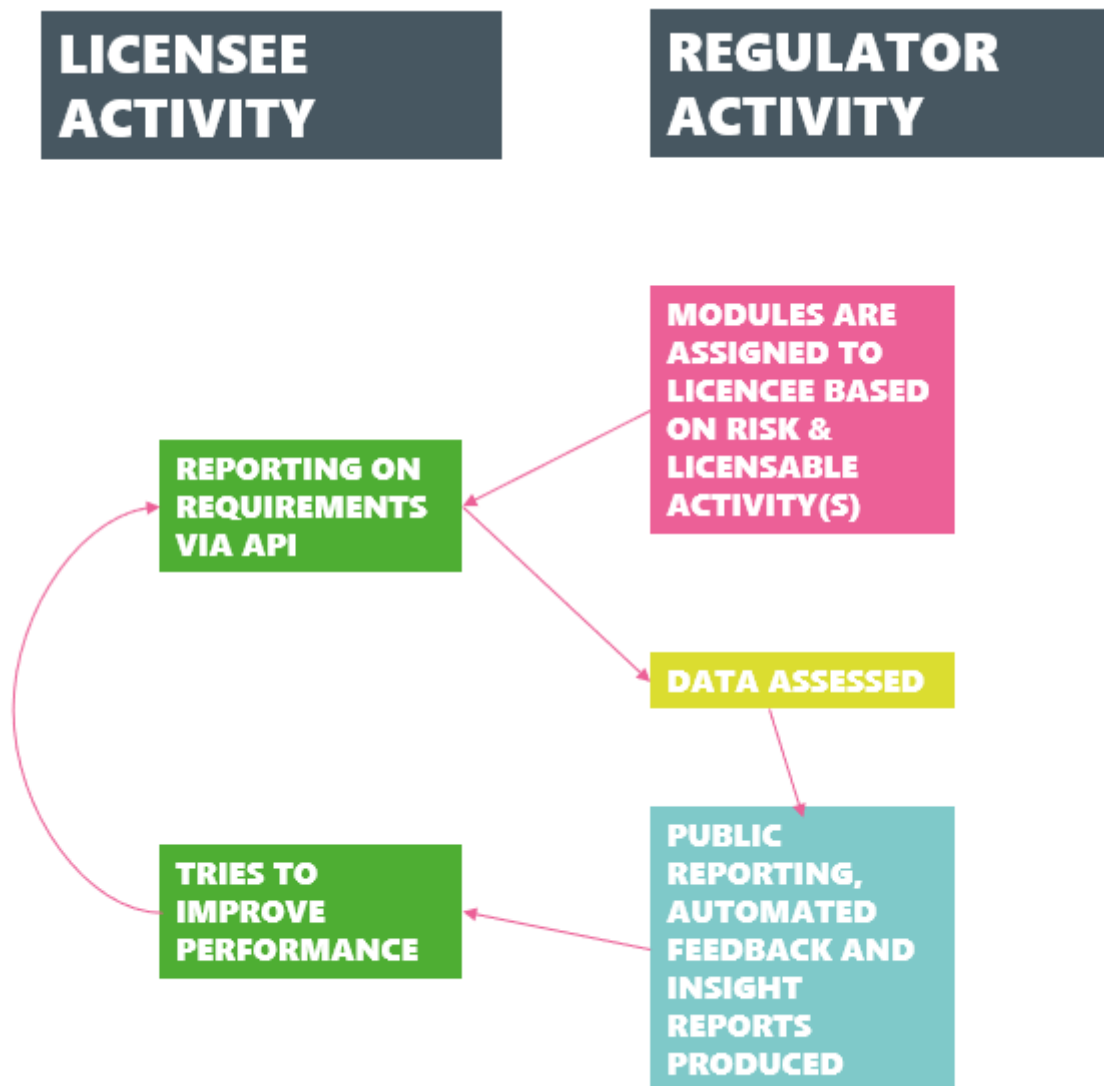
Figure 1 below outlines the high-level structure of the new regime. Tiers and measures of the modules are an emergent feature of the modules themselves, which is explained in Figure 3 later.

Figure 1



To enable the above to work effectively, it will need to be supported by a data platform. For the remainder of this document, the data platform is referred to as a **Licensing service**. A representation of the kinds of information and logic flows for that licensing service are shown in figure 2. More detail on its component parts and key considerations on how it is implemented are described in chapter 4.

Figure 2



2.2. FIRST STEPS

To stand up the framework described in this paper, several initial steps can be taken. Steps two and three would be expected to be concurrent activities.

- 1) Ofgem begins data collection on licensees with the objective of understanding the organisations it currently licences in a specific area.
- 2) Ofgem picks a licensable activity to update, reflecting the approach in this paper.
- 3) The licensing service is built or procured by Ofgem to enable hosting of the updated licensable activity.

Once a single licensable activity has been deployed in the manner described in this paper, others can follow using the learnings of the first. The first licensable activity to adopt this approach could be a new activity, such as heat networks. This would enable the approach to be tested without the added complexity of managing old licences into new modular approaches in the first instance.

Conversely, this approach may be a timely intervention in re-thinking how supply licences are managed and the expectations upon those organisations. Ultimately, where to adopt first would be at the discretion of Ofgem working with BEIS.

The concept of an Operations licence, as set out in section 3.1 is an idealised approach to undertaking this evolution of the licensing regime. These first steps are described without such an Operations licence as it may be more proportionate to try the first iteration of this approach within a specific licensable activity to take smaller, more manageable steps. For the purposes of the paper, I have embedded the Operations licence into the documentation to show intended direction of travel of the concepts explained.

3. THE LICENCE CONDITION SOLUTION

Not all organisations are of equal importance to the system, with some well understood and others not. By adopting a risk-based approach which prioritises identifying and logging key characteristics of organisations with a view to understanding licensees' likely impact, a more proportionate regulatory regime can be developed.

While the specifics of policies, backstops or expectations on licensees aren't the topic of this paper, the interaction and complexity between them is a barrier for making these interventions measurable. This chapter proposes an approach to licence condition implementation, underpinned by the licensing service explained in chapter 4.

Most sections in this and the following chapter comprise of at least one "component", a description of a task or approach that needs to be undertaken to enable the overall solution.

3.1. THE OPERATIONS LICENCE

To create an outcome driven regulatory regime capable of being consistent across multiple licensable activities, it is vital to create a widely applicable licence that applies to any organisation who operates in the sector. It is proposed that anyone with an existing licence for any specific licensable activity is the basis of who should have this widely applicable licence, referred to here as an Operations licence.

The objective of such a licence would be to hold all the modules across the varying categories in one place. In the current regulatory landscape organisations need to comply with every element of applicable licence conditions unless a derogation is granted for specific aspects of that licence. This approach is clear, but cumbersome and creates barriers to ensuring proportionality of regulation where expansive rules covering every activity of a licensee aren't required to deliver positive outcomes and minimise harm to consumers or the energy system.

The ability and need of any given supplier of say 50 domestic meter points to comply with all existing licence conditions should be less than one where they have 50 high use industrial meters, or 50,000 domestic, as they pose different risks to consumers and the energy system. By utilizing the risk-based approach set out in section 4.1, in conjunction with an Operations licence, Ofgem will be able to set an appropriate level of burden with modular interventions. These interventions can target specific characteristics of organisations associated with the risk they pose to the energy system, customers, or other factors.

An Operations licence should comprise of the following:

- Have several policy categorisations defined
- Have a set of guiding principles for each category
- A suite of modular, outcome driven licence conditions

Revisit figure 1 for a visual representation how the licensing regime would work.

With this Operations licence developed and deployed, Ofgem will be able to make better informed changes to licence conditions, monitor compliance effectively, and predict more accurately how changes to the licences will impact licensees and consumers.

- Component 1: The government should create an Operations licence to enable the recommendations of this report.

3.2. UNDERPINNING POLICY CATEGORIES WITH A PRINCIPLES-BASED APPROACH

The next step down from the deployment of an Operations licence is to define categories of policy interventions where a consistency of approach is useful across licensees. There are several key overarching types of policy activities where a consistency in approach will better help Ofgem ensure the sector can meet the challenges of a net zero enabled energy system.

Proposed policy categories are listed below.

- Digitalisation
- Net Zero
- System Resilience
- Consumer Protection
- Cyber Security
- Environmental
- Financial
- Social Obligations (*WHD, ECO etc*)

Each of these policy categories in a new licensing regime would have a set of principles that underpin them, with collection of modules of licence conditions and their associated measures sat underneath that.

To set expectations at a high level and create consistency across the modules, a principles-based approach which sets the expectations for each policy category is the proposed approach. These principles should be informed by wider governmental objectives and legislation, for example the cyber security category could be written by or in collaboration with NCSC⁴.

By defining the category by a series of high-level principles, both Ofgem and licensees gain an understanding of the general approaches and objectives of the modules that sit underneath it are. These principles in this new ecosystem should be designed either by, or in tandem with other government departments, to embed a consistency of approach across the economy where possible.

- Component 2: Ofgem should work with other government entities to define a series of principles that underpin the modular licensing approach to each of the policy categories listed in section 3.2.

3.3. A FOCUS ON OUTCOME DRIVEN MODULES

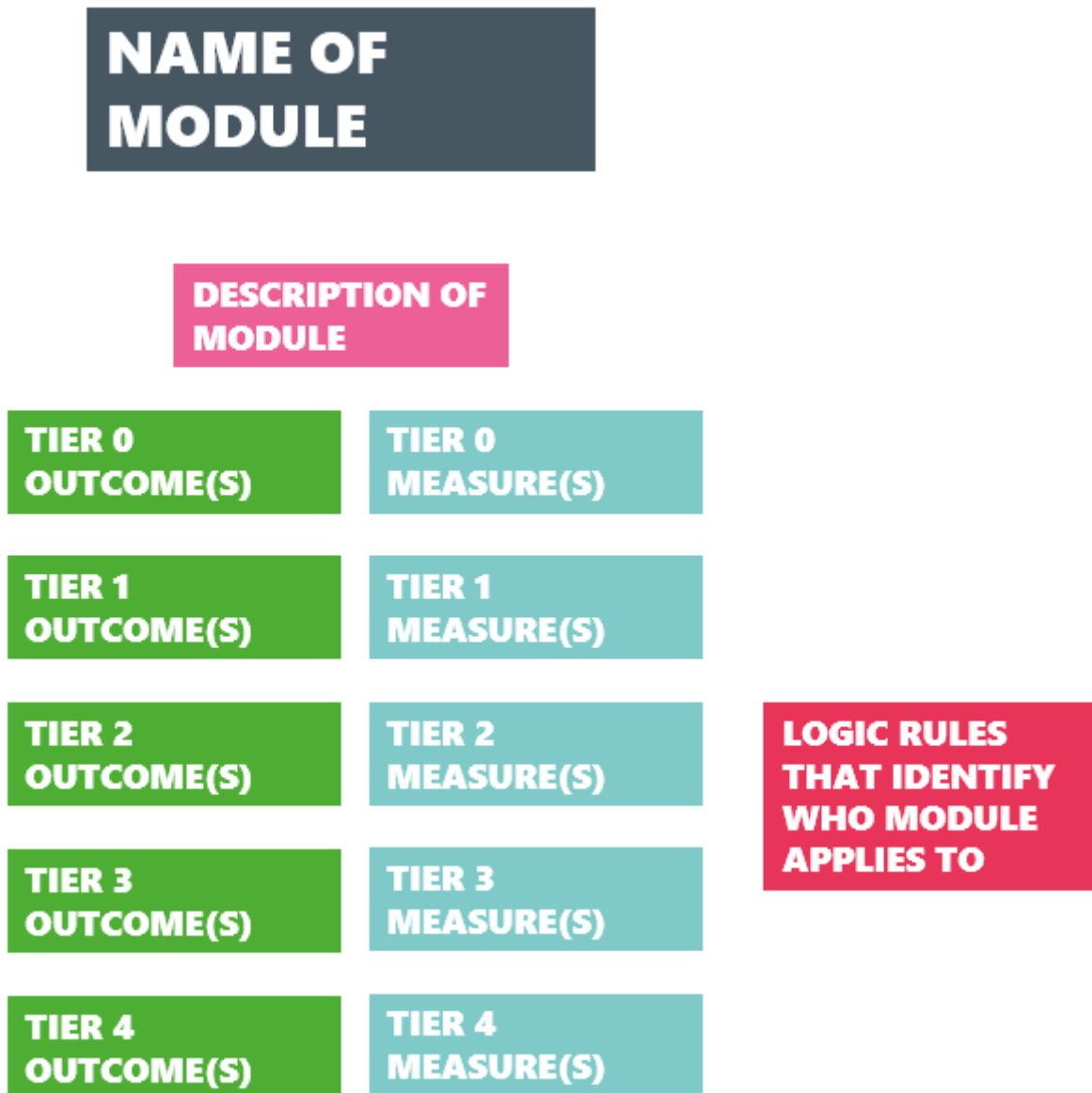
Existing licence conditions are broadly designed to either encourage behaviour such as consumer protection, set standards or expectations, or create certainty on how to act when new burdens are set upon those licensees. They are often framed as requirements and more recently principles to adhere to. They often don't come with specific measures and are usually implemented into specific licenses without equivalent interventions being created across different parts of the market to compliment or support them. While making changes to the licensing regime as proposed here, it serves as an opportunity to re-frame licence conditions into a goal or outcome-oriented state and where relevant, evidenced by data.

⁴ <https://www.ncsc.gov.uk/>

With a focus on an outcome, a module in this new regime should be seeking to be specific and measurable. In combination with the approach set out over this chapter, Ofgem can write modules and provide clear expectations on when and why organisations should have this apply to them with logic rules tied to the data provided by the licensees. This enables cross-sector outcome driven interventions to be implemented, tested, and scaled if appropriate in a more agile way than is currently possible under current arrangements.

Figure 3 below sets out the component parts of a module which enable the outcomes described above.

Figure 3



3.4. THE TIERS WITHIN MODULES

To apply the appropriate level of regulation upon organisations in the energy sector a proportionate risk-based approach should be adopted. The data approach to this has been set out in section 4.1. By creating tiered modules with logic rules dictating how they apply to licensees,

THIS MEANS

A MODULE WITH APPROPRIATE TIERS COULD BE DESIGNED WHERE ONLY ORGANISATIONS OF A CERTAIN SIZE, TURNOVER OR GEOGRAPHICAL PROFILE HAVE SPECIFIC RESTRICTIONS APPLY, SUCH AS THE UNIVERSAL SERVICE OBLIGATION. THEREFORE, **CREATING SPACES FOR MORE BESPOKE OFFERINGS TO EXIST WITHOUT THE USE OF DEROGATIONS.**

each module can ensure that the application of a risk-based approach creates a proportionate level of regulatory oversight and burden on organisations.

Each tier builds upon the last, so where a licensee moves between tier two and three within any given module, possibly due to a growth in the number of customers it services, it would be expected to now report on the measures set out by levels zero,

one, two and three. The growth in a licensee's customers may represent an increase in its tier under one or many modules. This reflects the nuance inherent in organisations and the risks, or opportunities they create.

Within this ecosystem, Ofgem would need to provide clarity on how it understands risk and the thresholds through which an organisation transitions between tiers. Doing so enables effective intervention within the market when appropriate for Ofgem and allows the companies to plan for their growth more effectively in the sector by having clarity on requirement changes as they grow.

Table 1 below sets out the indicative scale of intervention as an organisation's identified risk increases. In essence, the table below demonstrates that as an organisation grows and transitions from tier zero to four, it would have increasing regulations, and increasing monitoring by Ofgem. The specific delineations between the tiers will be set by the logic rules that apply to each module.

Table 1

Tier	Intention of the tier.
Zero	Minimal interventions that apply to all licenced organisations.
One	Applies where organisations have minimal impact and should be selectively monitored
Two	Applies where organisations start having material impacts and should be routinely monitored
Three	Applies where organisations have significant impacts and should be actively monitored
Four	Applies where organisations have profound impacts and should be continually monitored.

Given licensees risk and activities will change over time, it is expected that Ofgem will have to develop new expectations and specify when new tiers apply to that licensee and become locked in for compliance and reporting. For example, if number of customers served became a characteristic

that defined when a module would apply it would be reasonable to set the expectation of the licensee exceeding that threshold for 3 reporting cycles (i.e. 3 months) before the module applies.

3.5. THE ROLE OF LICENSABLE ACTIVITIES IN THIS REGIME.

Existing licences provide organisations with certainty over what their obligations are. The modular approach discussed seeks to extract the common parts of these licence conditions, i.e. the policy categories and their associated modules and bring them into one environment. Section 3.1 discusses the approach in detail, with section 3.2 specifying the categorisations within.

By extracting the common parts of the licence conditions from the specific licenses such as supply or generation, a new role must be created for these specific licences relating to licensable activities. It is proposed that the existing licenses are used as a repository of backstop conditions, such as conditions which set clear boundaries of behaviour for specific activities like billing in supply. These requirements could include modules on how certain organisations are expected to act in their role or call out to specific activities that need to be undertaken, such as following codes.

The backstops and expectations of the activity would also be expected to work in a tiered manner. While the Operations licence described in section 3.1 is underpinned by data measures, it is expected that some requirements on licensable activities won't always lend themselves to measurable data points. Expectations or backstops within the specific licence activities may for example create the need for written submissions. In the spirit of reducing regulatory burden and a risk-based approach – these types of requirements should only be expected for the organisations with sufficient mass to pose a more systemic risk.

- Component 3: Ofgem should use the specific licensable activities licences as a repository of backstops or expectations related to the specifics of that activity, with the number of them minimised.

3.6. MEASURING COMPLIANCE.

The next consideration is how a regulator will measure compliance with those modules. Using the data points gathered from the measures, Ofgem can quickly assess impact across the licensees.

THIS MEANS

WITH EFFECTIVELY DESIGNED MODULES AND TIERS WITH CLEAR DATA SUBMISSION EXPECTATIONS, OFGEM CAN SET THE **PACE AND GRANULARITY** OF THE DATA IT RECEIVES. ENABLING OFGEM TO ACT ON INSIGHT EARLY.

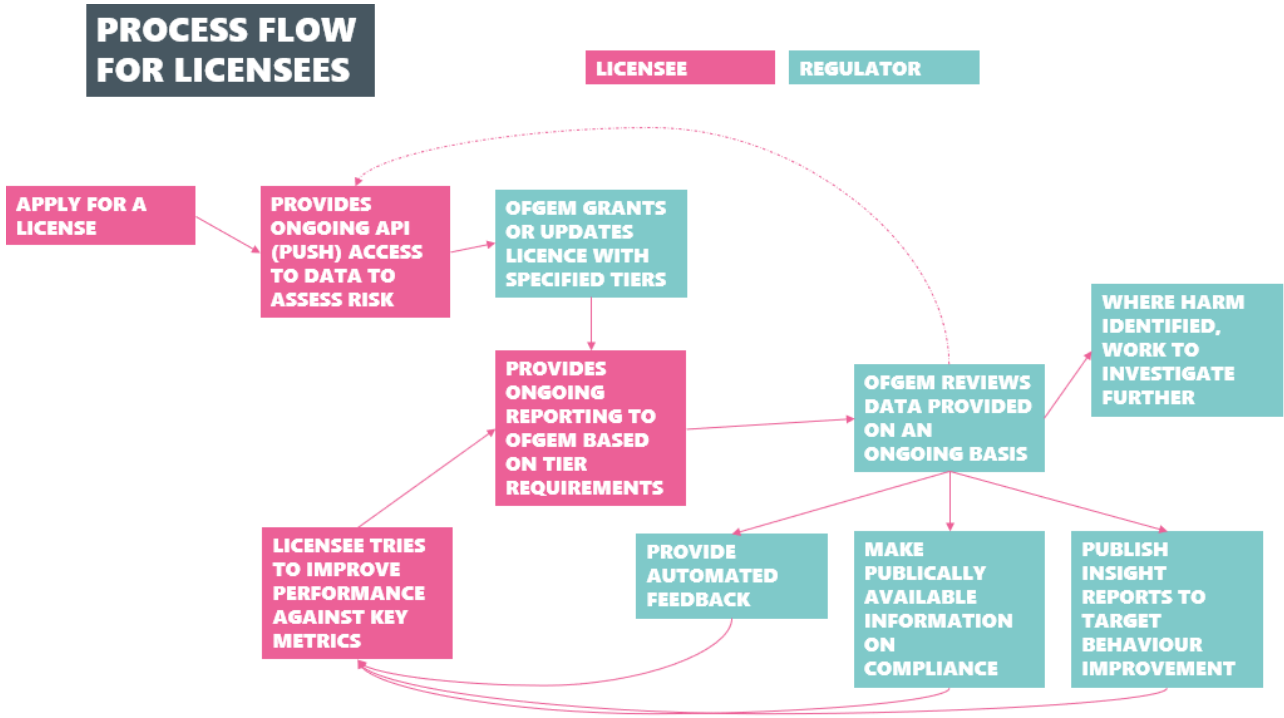
To do this, several requirements underpin the data-driven approach. Sections 4.1 to 4.5 describe the technical needs of a licensing service. Additionally, modular policies must be designed with **outcomes** in mind, which are **measurable with data**.

By providing these building blocks, any module created will be specific and measurable. By utilising the modular framework with specific data measures, Ofgem will be able to readily access data on any company, module, or tier where data measures exist. A robust data model underpinning this service is vital, and where implemented will enable an analysis of compliance and the impact of interventions currently not possible within the existing licensing regime.

There are a great number of statistical models, tools, machine learning algorithms and other techniques that will be leverageable by Ofgem in the future when it has reliable, good quality data submitted to it. Complex analysis leveraging these tools or techniques can be built up over time.

The first need is to regulate the hundreds of licensees in the energy ecosystem effectively and this will only be possible with a systematic approach to data collection. Embedding the improved data capture now will enable compliance activities to be able to make the transition from reactive to proactive. Figure 4 below sets out a conceptual process flow of how the data can drive and inform compliance and enforcement activities, as well as influence licensee behaviour.

Figure 4.



4. THE DATA SOLUTION

To enable a new digitalised licensing regime to emerge, several key data challenges must be addressed. The capture of consistent information about the licensees, with a view of understanding the impact they have on the energy ecosystem is vital to enabling a new approach for regulation.

Companies are varied in complexity and their needs; additionally, the number of resources to monitor the energy market is finite. There are already a significant number of organisations now embedded in some way to the operation of the UK’s energy system. A significant increase in the number of licensees is expected as Ofgem takes on the role of heat networks, therefore a new approach, closely matching the EDiT recommendation⁵ of Ofgem developing a “Dynamic risk dashboard” to manage risks within the energy sector should be deployed.

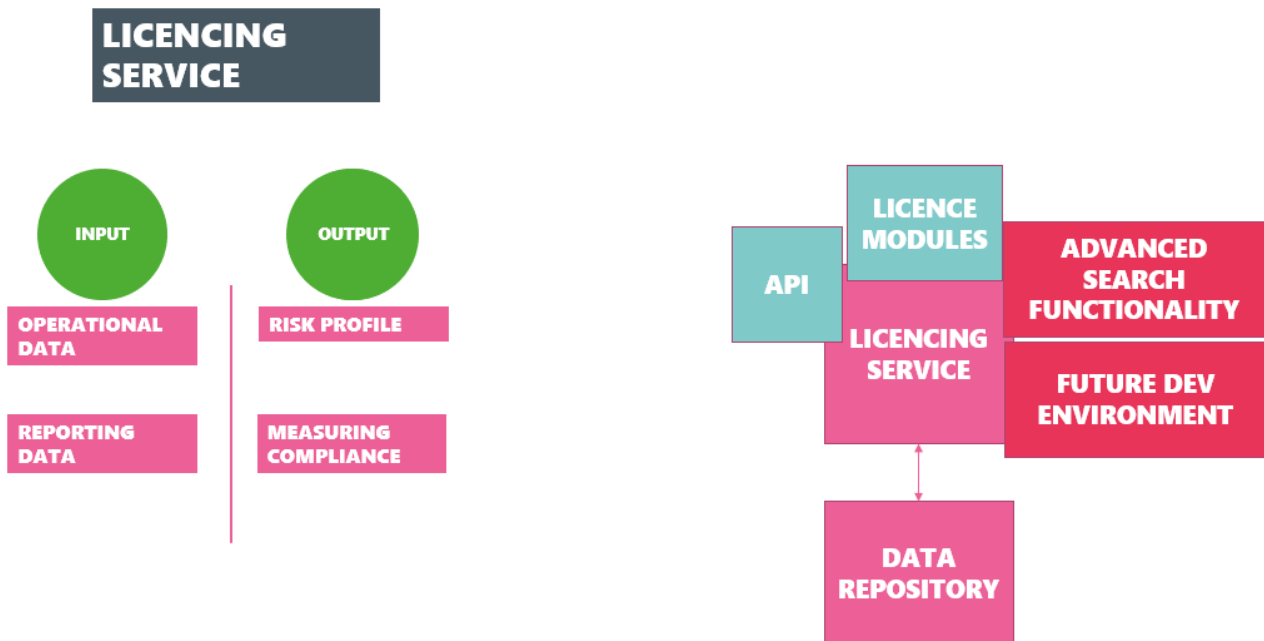
Figure 5 outlines a high-level summary of the licensing service. The licensing service can be best described as a data platform with the following key service functions.

- Act as a data exchange for:
 - Pulling data in organisational data (informing risk)
 - Pulling data in on evidence of compliance
 - Making downloadable automated public reports on licensees’ compliance
- Providing advanced search functionality, enabling licensees and others to understand how licences apply.
- Securely hosting organisational and compliance data.

There are several additional functions that the service can build over time, including the ability to:

- Host an **open development environment** where changes to modules can be suggested/tested
- **Intelligently identify emergent risks** to consumers and the energy system
- Predict licensee behaviour trends and **intervene before noncompliance**.

Figure 5



⁵ <https://esc-production-2021.s3.eu-west-2.amazonaws.com/2022/01/ESC-Energy-Digitalisation-Taskforce-Report-2021-web.pdf>

4.1. A PROPORTIONATE, DATA-DRIVEN, RISK-BASED APPROACH

Ofgem needs to have reliable data to understand the risk and opportunity presented by licensees. By embedding digitalisation into the very centre of the regulatory framework, underpinned with associated data flows – Ofgem can manage the increased complexity of the marketplace.

Data can initially be used to assess risk of the licensees and be used to ascribe relevant modules with interventions proportional to the licensees' predicted impact. This approach is not novel and could be compared to the work done by the Food Standards Agency to digitalise its registration⁶.

THIS MEANS

CONSISTENT DATA SOURCED FROM LICENSEES ABOUT ORGANISATION STRUCTURE AND SCOPE CAN DIRECTLY INFORM HOW THAT LICENSEE IS REGULATED.

One of the more difficult tasks to undertake is to identify a clear set of data-driven measures that can inform risk across different licensable activities, organisations, and policy categories. Where possible, Ofgem should seek to utilise existing 'off the

shelf' data sets that it would be reasonably expected organisations already hold or data sets that they can easily create. This will reduce burden and drive improvements in interoperability between various data assets in these organisations.

To categorise the risk of any licensees some measures will need to be captured. Some simple measures may include:

- Companies house number for the licensee
- Turnover or cash reserves
- Number of meter points they manage
- Which network regions they operate in
- Number of customers served
- Total volume of gas and electric they manage per unit of time

By defining and capturing data points relevant to determining an organisation's risk, Ofgem will be able to quantitatively compare these organisations against each other and build a framework for categorising risk thresholds. This framework for categorising risk can then be leveraged by anyone designing new modules. The data collected here will also be the basis of the logic rules on how modules are assigned to licensees.

- Component 4: Ofgem needs to design an extendable data collection methodology that can categorise the "risk" licensees pose based on their type of activity and organisational impact

⁶ <https://www.gov.uk/food-business-registration>

4.2. DIGITALLY ENABLED MODULES

To enable this solution, the ways in which policies are written will need to be adapted to fit into the outcome focussed, tiered design principles as described in sections 3.3 and 3.4 respectively. With these considerations in mind, an approach to writing modules should reflect a way that code can be written. A worked example of a modular outcome-based licence condition is provided in Appendix 1.

To enable the digitalisation of modules, they will need to be tagged with metadata to enable advanced search queries. Where a comprehensive and robust tagging is undertaken, the service will be able to search against licensees, licence types, categories, modules, or tiers.

In addition to metadata considerations, there are some key points to consider for writing a module within this framework.

- Has it been written in the form of an outcome?
- What is the outcome you are trying to achieve?
- Is it measurable?
- How does each licensable activity interact with the tiers?

This framework will mean that as a licensee's level of risk changes, perhaps over an increase in the number of customers serviced, new modules may now apply with associated reporting requirements. As such, the logic rules need to be made available openly and incorporated into any data platform so that licensees understand what requirements are likely to fall on them as they grow their business.

The central use of logic rules can be demonstrated with the Balancing and Settlement Code⁷ (BSC) work on digitalisation, the Retail Energy Code⁸ and Genserv's approach taken in the development of Codeworks⁹. Genserv's work has resulted in the creation of a platform which enables users to identify which parts of the smart energy code are relevant to them, interact with it and use it as a source of understanding of obligations. This is explained by the quote below and describes some of the benefits that the modular approach this paper describes can achieve.

*For the launch, Genserv have successfully digitised the Smart Energy Code (SEC) (2000+ pages), a pivotal contract that sits at the heart of the smart meter roll-out. Parties can interact with code documentation, **filter for information that is relevant** to them and **access previous versions of the code** complete with all the changes made. This will **save businesses and regulatory teams time, as well as make the code easier to understand.***

- Component 5: Interventions need to be written in the form of modules, following a similar logic to writing code.
- Component 6: The technical solution will require a standard metadata approach to be developed to enable its effective use.

⁷ <https://www.elexon.co.uk/bsc-and-codes/digital-code/>

⁸ and the Retail Energy Code

⁹ <https://genserv.com/our-thoughts/genserv-launches-new-platform-codeworks-to-provide-a-digital-solution-to-code-management/>

4.3. THE TECHNICAL NEEDS OF A LICENSING SERVICE

To meet the requirements of the variety of organisations involved in the energy system, it is recommended that a technical solution be deployed by Ofgem to manage the complexity of the proposed licensing regime. The needs as described here outline an initial scope of things that can be built into the design. It would be expected that any implementation undertake research, work iteratively, and follow Government Digital Service¹⁰ design principles.

Table 2 below are some high-level features of this solution to ensure the new regime proposed can be stood up over time.

Table 2

Features	Who Primarily Benefits		
	Licensees	Regulator	External Stakeholders
Pull and push API for data flows			
Logical model of companies and their licences			
Publishing reporting metrics			
View changes to companies, modules, and reporting requirements over time			
A data repository storing the information about licensees and their reporting data			
A web service which highlights the modules which apply to a searched licensee, policy category, risk etc.			
Governance	Who Primarily Benefits		
	Licensees	Regulator	External Stakeholders
Data is presumed open			
The platform's data and processes follow Data Best Practice			

- Component 7: Ofgem will need to build or procure a data platform that enables at minimum the needs set out in section 4.3

4.4. ESTABLISHING DATA STANDARDS

¹⁰ <https://www.gov.uk/guidance/government-design-principles>

It is important that any implementation drives data and metadata standards from licensees as the overall approach can be further extended in the future. While explicit standards may not be required for day one, ensuring data quality is high in this ecosystem will be a key factor in embedding this solution and managing the various licensees.

Ofgem has publicly stated that they intend to adopt the Data Best Practice guidance¹¹ principles that is currently embedded into RIIO2 licences. It seems logical then that the basis of implementing a new licensing regime should build on the principles of that document. Two key elements of the guidance are:

- Data as presumed open
- Open Data Triage

While the guidance does not specify metadata standards or implementations, the document sets out expectations on making sure that data assets are interoperable with the wider ecosystem. For the purposes of this report and any implementation of its proposals, it would be expected that any data solutions will be designed with a view to leveraging and providing open data, and that the ecosystem that is built for licensing is designed in such a way to ensure high levels of transparency and trust for users of the service.

- Component 8: Ofgem should ensure a strong focus is placed on maintaining high data quality from the licensees by providing clear metadata and guidance.

4.5. ONGOING DATA GATHERING

To facilitate the operation of this new regime Ofgem will require continuous data collection from anyone with a licence. There are two strands of data collection, the first relates to the data that informs Ofgem of the risk of that licensee. The other relates to the specific modules and their measures that applies to that licensee.

On the former, there are some initial suggestions on the types of data points that might be useful to collect in section 4.1. This informative organisation and operational data will require less frequent updates and might be expected to be provided via a push to Ofgem's platform every month on a defined date.

Data relating to the compliance and measurement of modules may require a different frequency. It is likely that, while designing measures there will be different requirements for the frequency of Ofgem accessing information on a particular licensee. It is recommended that this reporting data should be accessible on demand by Ofgem, with well-defined and enforced time thresholds for how frequently it should be updated as a minimum. Where not complied with it may be necessary to enforce against organisations to improve compliance with the new regime. The frequency at which updates are required as a minimum should be set once for all organisations to avoid confusion and therefore embedded into a module that all applies to all organisations within the Operations licence described in section 3.1.

- Component 9: Ofgem will need to embed data collection and validation into its business model.
- Component 10: Ofgem may require setting up automated penalties for failure to provide data.

¹¹ <https://www.ofgem.gov.uk/publications/decision-data-best-practice-guidance-and-digitalisation-strategy-and-action-plan-guidance>

5. CONCLUDING POINTS

5.1. BENEFITS OF THIS FRAMEWORK

There are a variety of benefits for the deployment of this framework in Ofgem’s licensing regime. Below is a short list and explanation of some of these aligned with the three objectives set out in the introduction.

Table 3

Objective	How its achieved in this approach	Explanation
Proportional Regulation	Ofgem & licensees can plan with the knowledge of what criteria needs to be met for a condition to apply to a specific organisation.	In designing modules and their tiers, clear expectations & logic-based rules will be set on what conditions need to be established before a condition applies to an organisation. If a licensee plans to grow, they can predict what will apply to them and when.
	Ofgem can apply more nuanced logic to whom modules apply and target intervention appropriately.	By recording and assessing data on licensees, Ofgem will be able to target interventions to licensees to facilitate the right outcomes, rather than apply to all in a blanket manner.
Measurable Regulation	Ofgem measuring the performance of licensees against their licence conditions.	Data collection on the outcomes driven modular approach will enable Ofgem to measure and compare how licensees are operating.
	Ofgem will be able to demonstrate the effectiveness of policy intervention.	By using a variety of data analysis tools or techniques Ofgem will be able to demonstrate how effective its interventions are by utilising the data generated by licensees in conjunction with third party sources.
Digitalised Regulation	Ofgem creates a digital platform that hosts the licence conditions and the wealth of data created by it.	With the large increase in licensees expected, having a managed platform with consistent approaches will enable data to become central to a new digital first regime.
	Ofgem’s compliance, enforcement and policy activities can be driven by data collection and analysis.	By embedding presumed open data collection throughout licensees’ interactions with Ofgem, meaningful insight can be garnered at pace by regulators and the public – enabling evidence driven understanding of licensees to emerge.

In addition to the above, the approach set out in the paper also enables Ofgem to develop early warning systems as data sharing and insights become more embedded in regulation. Intervention can be targeted before the problems identified become too severe or large amounts of time elapse between non-compliance and remedial action taken. The data provided by licensees directly to Ofgem can additionally be supported by third party datasets from other government departments, public bodies, or private enterprises to provide additional insight into the activities of licensees.

It is not unreasonable to assume that the success or failure of this approach will be contingent on how well the licensing service is designed. In addition, the change in approach to policy will require

a change in culture from Ofgem in how it views its licensees and how it undertakes enforcement and compliance activities. The needs of the sector, and that of the Net Zero goals, require a targeted and proportionate approach towards those who operate within it that is inherently measurable.

5.2. ACKNOWLEDGEMENTS

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6. APPENDIX

6.1. APPENDIX 1. WORKED LICENCE CONDITION EXAMPLES

For the purposes of this example, Dr Zoya Pourmirza of the University of Newcastle has written up her interpretation of this approach with two worked examples of cyber security modules. These are outlined below.

“Protecting Communication Security Module”

Description: This module is intended to protect the security of the communication between devices (e.g., energy appliances, customer energy manger, communications hub) and actors (e.g., supplier, DSR service provider) by preventing unauthorised interception of the communication and ensuring the authenticity of such communication.

- **Module Tier Zero:**
 - Organisations’ services enable an appropriate trust environment via basic authentication methods
- **Measure Tier Zero:**
 - Data Field: Select type of authentication service/approach used (e.g, HTTP basic authentication)
 - Data Field: Number of possible illegitimate authentication attempts blocked on devices
- **Module Tier One:**
 - (i) The licensee ensures there is low probability of eavesdropping and tampering.
 - (ii) The licensee ensures there is low probability of Denial of Service (DoS) attacks.
 - (iii) The licensee ensures that appropriate authentication is offered for services and users.
- **Measure Tier One:**
 - (i) Data Field: Number of positive actions taken to protect data in transit
 - (ii) Data Field: Average availability of service
 - (iii) Data Field: Number of possible illegitimate authentication attempts blocked on actors such as service providers and managers
- **Additional Guidance:**
 - In this Tier energy devices connected to the internet such as smart domestic appliance should conform to the ETSI EN 303 645. Services and applications hosted in cloud (e.g., DSR service provider or customer energy manager) should conform to cloud security best practice such as NCSC’s Cloud Security Principles. Smart Energy Appliances that are connected to the internet and can modulate or shift its electricity consumption in response to signals should follow standards such as PAS 1878 and 1879
 - Services for authentication could be such as using Public Key Infrastructure (PKI), secure application layer protocols such as Transport Layer Security (TLS) version 1.3, and X.509 certificates.
- **Module Tier Two:**
 - Licensees should build service resiliency (e.g., build redundancy to avoid single point of failure) so that downtime does not have energy system impacts.
- **Measure Tier Two:**
 - Report: One page report to describe service resilience plans & update at 6-month frequency, or when new services/approaches are taken to build service resilience.
- **Logic rules**
 - IF organisations provide smart energy services, THEN Module Tier Zero applies

- IF organisations provide energy services that utilise smart energy devices THEN Module Tier One applies
- IF organisations provide services to >50,000 devices THEN Module Level Two applies

“Protecting information and data Security Module”

Description: This module is intended to protect the security of information and the data that are gathered, stored, transmit, and processed. This module will protect these data and information from unauthorised access, use, disruption, modification, or destruction.

- **Module Tier Zero:**
 - All devices with non-sensitive Personally Identifiable Information (PII), should be protected by following GDPR and preserve confidentiality.
- **Measure Tier Zero:**
 - Data Field: Total number of devices requiring anonymisation to encrypt for non-sensitive PII
- **Module Tier One:**
 - All devices with sensitive and non-sensitive Personally Identifiable Information (PII), should be protected against CIA (Confidentiality, Integrity, and Availability) triad.
- **Measure Tier One:**
 - Data Field: Total number of devices requiring protection against CIA triad
 - Data Field: Approaches taken to protect that data (select from list)
- **Additional Guidance**
 - Confidentiality: data is only accessible by authorised user (e.g., Eavesdropping attack). Services to provide confidentiality includes multi-factor authentication, strong passwords, encryption, segregation of data, and assigning users with appropriate user privilege levels
 - Integrity: trusting the information that is flowing. (e.g Data injection attack). Services to provide Integrity includes regular backups, access privileges, version controls and input validation.
 - Availability: making sure the information is available in a timely manner (e.g., DoS attack) Services to provide Availability includes updating systems, redundancy, firewall and proxy servers, ensuring adequate bandwidths and the use of access controls.
 - In this Tier data and information collected, stored, transmit, and processed should conform to information security policies and standards such Cyber Essentials and ISO 27001. ISO 27001 is part of ISO/IEC 27000 family, which is an international standard for information security which specified the guideline for establishing, implementing, maintaining, and improving information security system.
- **Module Tier Two:**
 - In addition to the CIA triad, information should be protected against Authentication and Non-repudiation.
- **Measure Tier Two:**
 - Data Field: Total number of devices requiring protection against authentication and non-repudiation
 - Data Field: Approaches taken to protect that data (select from list)
- **Additional guidance**

- Authentication: verifying whether someone (or something) is, who (or what) it is declared to be. Services to provide Authentication includes having strong credentials, X509 certificate and 2FA, using TLS
 - Non-repudiation: Assuring that someone cannot deny the validity of something. Services to provide non-repudiation includes having Digital Signature, and using PKI
 - The ISO 27001 that was suggested for Tier Zero is a security management standard, not a security standard and does not provide a 'Gold Standard' for security. Tier Two requires a security standard to be implemented and ensure the security of an organisation.
- **Module Tier Three:**
- Customers should be protected against disinformation and be able to distinguish between valid/secured information and disinformation.
- **Measure Tier Three:**
- Report: Short report submitted at end of each quarter detailing steps taken to mitigate disinformation and any identified events where this occurred.
- **Logic Rules:**
- IF organisations hold or process non-sensitive consumer Personally Identifiable Information (PII), THEN Module Tier Zero applies
 - IF organisations hold or process sensitive and non-sensitive consumer Personally Identifiable Information (PII), THEN Module Tier One applies
 - IF organisations provide automated demand side response or energy management THEN Module Level Two applies
 - IF organisation have active energy consumer and consumers can manually shift their consumption THEN Module Tier Three applies

6.2. APPENDIX 2. COMPONENTS REQUIRED TO BUILD UP THIS REGIME.

- Component 1: The government should create an Operations licence to enable the recommendations of this report.
- Component 2: Ofgem should work with other government departments to define a series of principles that underpin the modular licensing approach to each of the policy categories listed in section 3.2.
- Component 3: Ofgem should use the specific licensable activities licences as a repository of backstops or expectations related to the specifics of that activity, with the number of them minimised.
- Component 4: Ofgem needs to design an extendable data collection methodology that can categorise the “risk” licensees pose based on their type of activity and organisational impact
- Component 5: Interventions need to be written in the form of modules, following a similar logic to writing code.
- Component 6: The technical solution will require a standard metadata approach to be developed to enable its effective use.
- Component 7: Ofgem will need to build or procure a data platform that enables at minimum the needs set out in section 4.3
- Component 8: Ofgem should ensure a strong focus is placed on maintaining high data quality from the licensees by providing clear metadata and guidance.
- Component 9: Ofgem will need to embed data collection and validation into its business model.
- Component 10: Ofgem will require to set up automated and appropriate penalties for failure to provide data.

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