# Use of AI within the energy sector call for input

## Overview

We are seeking views on proposals about how Artificial Intelligence (AI) should be used responsibly and safely in the energy sector to encourage more innovation.

### Who should respond

We would like views from people and organisations within the energy sector who are either using or looking to use AI. We would also like to hear from technology companies and AI developers who provide AI services within the sector. We particularly welcome responses from consumer groups, charities and academia as well as other stakeholders and those working on AI policy.

### Background

We think that the use of AI within the energy sector can help improve planning, management and real-time operation of the energy system. AI is already being used by the energy sector across England, Scotland and Wales (Great Britain). It is creating efficiencies; however, it also has challenges and risks.

The Department for Science, Innovation and Technology (DSIT) has set out what regulators should do to make sure that the sectors they regulate follow the UK’s AI regulatory principles in their ‘[A Pro-Innovation Approach to AI Regulation’ AI White Paper](https://www.gov.uk/government/publications/ai-regulation-a-pro-innovation-approach)

As the energy regulator for Great Britain, we are providing an outline of our strategic approach to the use of AI and what we aim to do in line with these principles.

We will be measured by the Office of AI, part of DSIT, on how we guide the energy sector to use AI responsibly, to enable innovation through good practice. The proposed recommendations in this call for input set out to how we intend to deal with both the opportunities and risks.

**Contents**

[Our approach and proposed recommendations 4](#_Toc163227835)

[Why your views matter 4](#_Toc163227836)

[Introductory text 4](#_Toc163227837)

[Background and context 6](#_Toc163227838)

[Our role and the AI principles 10](#_Toc163227839)

[Potential benefits of AI 19](#_Toc163227840)

[Our approach to evaluating potential AI risks 25](#_Toc163227841)

[Potential AI risks and regulatory considerations: consumer 29](#_Toc163227842)

[Potential AI risks and regulatory considerations: market 33](#_Toc163227843)

[Potential AI risks and regulatory considerations: company 36](#_Toc163227844)

[Potential AI risks and regulatory considerations: sustainability 45](#_Toc163227845)

[Proposed recommendations 47](#_Toc163227846)

[Next steps 51](#_Toc163227847)

[Appendix 1: technical standards mapping 52](#_Toc163227848)

[Appendix 2: mapping the AI principles onto energy regulation 60](#_Toc163227849)

[About you 64](#_Toc163227850)

[Feedback 66](#_Toc163227851)

### Our approach and proposed recommendations

The Ofgem AI taskforce has been working with other regulators and other representative bodies as part of this call for input. This call for input sets out the findings and proposed recommendations.

Our initial review of the regulatory framework applying to the energy sector suggests existing regulation is adequate to capture use of AI.

However, we do think there is value producing regulatory guidance and tools to the sector on the risk-based use of AI in the energy sector. This will require collaboration with the sector, academics and other regulators to:

* keep abreast of AI developments ensure consistency
* tailor our regulatory tools for AI

We provide analysis of our role, the opportunities and risks associated with AI, and regulatory considerations from a consumer, market, company and sustainability viewpoint. The recommendations are based on three themes:

* collaboration
* addressing regulatory issues sector support

### Why your views matter

We want to make sure people and companies within the energy sector use AI in a responsible and innovative way, as part of the UK government’s AI principles. Your responses to this call for input will help us to develop our regulatory strategy about how AI is used within the energy sector now and in the future.

## Introduction

We’d like you to answer all the questions in this call for input that are relevant to you, or where you have an interest. If you do not feel comfortable answering any of the questions, you can leave them blank.

Use the table below to read chapters within the call for input and answer the questions.

After you have answered the questions for each chapter, select the ‘Save and come back later’ option found at the bottom of each page.

If you start responding to the call for input and want to return to it later, select 'Save and come back later' to save your answers. You need to answer the questions on the 'About you' page before submitting your response.

Your responses will not be included as part of the call for input if you do not submit them before the closing date.

### Other ways to give us your views

If you would prefer to give us your views using an online form, you can answer on our website [Use of AI within the energy sector call for input​ - Citizens Space](https://consult.ofgem.gov.uk/energy-technologies/use-of-ai-within-the-energy-sector-call-for-input/consultation/)

## Background and context

### Summary

This section explains what AI is, outlines the UK government’s five AI principles and sets out our proposed pro-innovation AI strategy as well as research and work into AI before publishing this call for input.

### What is AI?

AI varies from narrow AI (rule-based), closed datasets to foundation models and generative AI, involving deep-learning applied to exceptionally large datasets. AI can mimic neural networks in a similar way to the human brain. AI tools, including reinforcement learning and generative AI, can infer recommendations and make decisions, whilst narrow AI works within set rules. The output of AI is not always explainable, though technology is being developed aiming to address this issue.

This call for input adopts the National Cyber Security Centre’s definition of AI, as this is widely recognised across UK government:

Artificial intelligence describes computer systems which can perform tasks usually requiring human intelligence. This could include visual perception, speech recognition or translation between languages.

AI creates significant opportunities for Great Britain’s energy sector in the areas of analysis, prediction, operations and maintenance.

### DSIT White Paper five AI principles

The [**DSIT AI White Paper**](https://www.gov.uk/government/publications/ai-regulation-a-pro-innovation-approach)published in March 2023 for consultation, identified five principles to guide and inform the responsible development of AI in all sectors of the economy.

#### Safety, security and robustness

AI systems should function in a robust, secure and safe way throughout the AI life cycle, and risks should be continually identified, assessed and managed.

#### Transparency and explainability

AI systems should be appropriately transparent (communication of appropriate information about AI system to relevant people) and explainable (extent to which it is possible for relevant parties to access, interpret and understand AI system decision making processes).

#### Fairness

AI systems should not undermine legal rights of individuals or organisations, discriminate unfairly against individuals or create unfair market outcomes.

#### Accountability and governance

Governance measures should be in place to ensure effective oversights of supply and use of AI systems, with clear lines of accountability established across the AI life cycle.

#### Contestability and redress

Users, impacted third parties, and actors in the AI life cycle should be able to contest an AI decision or outcome that is harmful or creates material risk of harm.

DSIT indicated these AI principles will be on a non-statutory basis, initially, and implemented by existing regulators, such as Ofgem. This approach allows us to make use of our energy regulatory expertise, allowing us to tailor the implementation of the AI principles to the specific context in which AI is and likely to be used by energy sector participants.

### Ofgem’s AI strategy

The energy sector already utilises AI. AI is likely to play an important role in the development and evolution of the UK’s energy sector and support Net Zero carbon emission ambitions and energy security. Applications of AI in the energy sector are broad; from its use:

* to assist in the management of increasingly diverse, dispersed and intermittent sources of energy
* in energy markets, system operation and networks
* to support effective operational delivery to consumers, including AI-led communication and engagement

We recognise the potential benefits of AI to improve the security of energy supply, enable effective market operation, support the energy sector to transform and innovate, and ensure consumers, including the vulnerable, get fair and secure access to energy.

AI does present novel challenges, which are considered below. However, Ofgem’s pro-innovation approach is aimed at facilitating the use of AI where it benefits society, specifically in our mission to make a positive difference for energy consumers through independent regulation.

We have been working closely with various regulators and representative bodies as part of the programme of work that led to this call for input.

### Consumer insights on AI

Our priority is to protect the interests of existing and future energy consumers. Ofgem has initiated focused research to understand the views of consumers on data and AI use in the public and private sector. In addition, future Ofgem research will enable assessment of how consumers, including the vulnerable, feel towards AI being used in the energy sector, their attitudes towards AI, and how this may impact consumer behaviours.

### Discovery approach

The discovery programme of work Ofgem’s AI taskforce has undertaken involved:

* mapping the UK’s AI principles onto the legislative and regulatory framework applying to Great Britain’s energy sector, and considering potential issues or challenges
* gathering AI use cases and developing detailed case studies, which has considered relevant innovation-funded projects under the RIIO price controls as well as use cases in the wholesale and retail markets
* developing a risk matrix and considering how risks vary when looked at from consumer, market, company and sustainability perspective
* developing recommendations, with the AI Policy function leading on Ofgem’s response to the DSIT AI White Paper, developing the strategy to manage the opportunities and risks of AI deployment in the energy sector and planning for a new statutory AI duty

The discovery phase of work concludes with this call for input and will be followed by a programme of work to deliver on the proposed recommendations. Throughout this discovery phase, Ofgem has engaged widely with institutions, government departments, other regulators, consumer representatives, trade associations, energy sector companies, technology companies and leading universities and academics on AI. This call for input provides an opportunity for all stakeholders to engage and comment on the initial findings and our proposed recommendations.

## Our role and the AI principles

### Summary

This section outlines our role and the work we have started to identify how the five AI principles are covered by the current regulatory framework.

### What we want to do

We want to identify any regulatory issues or challenges so that we can provide appropriate regulatory guidance and tools for the safe and responsible use of AI within the energy sector.

### Details

We are the regulator of Great Britain’s energy markets and networks. Our powers, duties and objectives come from UK statutes.

Our primary guiding objective is to protect the interests of current and future electricity and gas consumers. These interests are taken as a whole and include their interests by supporting the UK government to meet its legal obligation to get to Net Zero by 2050 and to maintain the security of supply for gas and electricity.

We must carry out our functions in the manner that is best calculated to fulfil that objective, wherever appropriate by promoting effective competition. Before exercising our functions to promote competition, we must consider whether the interests of consumers would be better protected by exercising our functions in other ways.

We conduct our work by following the regulatory principles of transparency, accountability, proportionality, consistency and other principles that we consider represent best regulatory practice.

In our [**draft Forward Work Programme for 2024 to 2025**](https://www.ofgem.gov.uk/sites/default/files/2023-12/2023.12.13_FWP_Consultation_FINAL.pdf)[*<https://www.ofgem.gov.uk/sites/default/files/2023-12/2023.12.13\_FWP\_Consultation\_FINAL.pdf>*](https://www.ofgem.gov.uk/sites/default/files/2023-12/2023.12.13_FWP_Consultation_FINAL.pdf), we identified the need for engagement on AI with the energy sector as an important activity. This call for input considers the significant implications AI may have for the energy sector and proposes recommendations for action to ensure that AI works in the interests of consumers and that any risks are appropriately mitigated.

Our AI taskforce will work with the Department for Energy Security and Net Zero, the Office of AI, regulators and stakeholders to develop the necessary regulatory guidelines and tools to ensure safe and responsible deployment of AI in the energy sector.

### Regulatory framework for Great Britain’s energy sector

Great Britain’s energy sector is governed by a layered policy and regulatory framework with components that reside in binding UK legislation, regulations, licences and codes. Complementing these are codes of practice and guidance documents. Energy utility companies can also seek and obtain certification to various technical standards to demonstrate they have reached an agreed way of managing a process or delivering a service. For example, several gas and electricity distribution network companies are certified to BSI ISO 22458 Consumer Vulnerability.

#### Legislation

Ofgem’s powers and duties are predominantly set out in the following legislation:

* Gas Act 1986
* Electricity Act 1989
* Competition Act 1998
* Utilities Act 2000
* Enterprise Act 2002
* Energy Acts of 2004, 2008, 2010, 2011, 2013, 2016 and 2023
* Electricity and Gas (Market Integrity and Transparency) (Enforcement etc.) Regulations 2013, known as REMIT – the Regulation on Wholesale Energy Market Integrity and Transparency
* Network and Information Systems Regulations 2018The Gas and Electricity (Consumer Complaints Handling Standards) Regulations 2008

Ofgem also administers a range of environmental and social schemes for government.

#### Licences

Licences are granted to suitably qualified operators for the purposes of engaging in specified activities within the energy sector, such as supply, smart meter communication, distribution, transportation, transmission, generation and interconnection. The licences list the conditions that all licensees must abide by to engage in the specified activities.

Under REMIT, which is a regulatory framework specific to wholesale energy markets, market participants are not required to be licensed but are required to register before trading wholesale energy products.

#### Codes

Under their respective licences, licensees are required to maintain, become party to, and, or comply with industry codes. These are detailed multilateral agreements that define the terms under which licensees can access the electricity and gas networks, and the rules for operating in energy markets.

#### Guidance

We also publish other information to help licensees understand and comply with their obligations. This includes guidance documents and decisions from investigations.

#### Technical standards

Technical standards are agreed ways of doing something, covering, for example, how to make a product, manage a process, or deliver a service. Standards are open, consensus-based guidance that represent the distilled wisdom of what ‘good’ looks like. Technical standards are produced by national and international standards bodies (such as the British Standards Institute in the UK and the International Organisation of Standardisation). These product and quality standards are outside of Ofgem’s remit but are used in Great Britain’s energy sector to improve performance and manage risk. The British Standards Institute provided a mapping of selected AI technical standards onto the UK’s five AI principles, which are set out in Appendix 1.

### Mapping approach

Given the non-statutory basis of the framework proposed by DSIT, our initial focus has been to consider the following questions about the existing energy regulatory framework, as well as the broader legislative framework applicable to the energy sector:

Could the existing regulatory framework benefit from further clarification to ensure proportionate application of the AI principles? If so, how? Could the existing regulatory framework be extended to better encompass the AI principles? If so, how?

Could the existing regulatory framework act as the barrier to adoption of AI in the energy sector? If so, how?

During this discovery phase, we have considered to what extent the UK’s AI principles are captured by the existing energy regulatory framework. Our focus has been on energy legislation and regulations that are within Ofgem’s remit. DSIT has formally asked regulators to interpret and apply the five AI principles and we have worked collaboratively with regulators whose remits also apply to the energy sector (covering data protection, equality, human rights, health and safety).

### Issues analysis

We have looked at energy, competition, consumer protection and cyber legislation to see to what extent each AI principle maps onto the existing legislative and regulatory framework. For example, the Electricity Act 1989 prohibits certain activities unless a suitably qualified operator obtains a licence to engage in that activity (or is exempt from the requirement of a licence). For each licensable activity, there are a set of licence conditions which licensees are obliged to comply with. To assess whether the AI principles are captured by licence conditions, we have considered whether there is a direct or indirect mapping onto these binding elements of the regulatory framework:

* a direct mapping is where the AI Principle maps directly onto an aspect of the regulatory framework
* an indirect mapping is where the AI Principle does not map directly onto the regulatory framework but is captured in an indirect way To illustrate the above, an example for each is provided in Appendix 2.

Issues analysis initial findings

|  | **Safety, security and robustness** | **Transparency and explainability** | **Fairness** | **Accountability and governance** | **Contestability and redress** |
| --- | --- | --- | --- | --- | --- |
| **Direct mapping** | No | Yes (for transparency)  No (for explainability) | Yes | No | Yes |
| **Indirect mapping** | Yes | No | No | Yes | No |
| **Potential issues or challenges** | Raise novel issues: supply chain duties\*  Multi-regulatory framework (energy regulation, health and safety)  Regulatory monitoring and evaluation | Raises novel issues: technical, process, outcome\*\*  Regulatory monitoring and evaluation | Tacit collusion (existing issue)  Multi-regulatory framework (energy regulation, data protection, equality, human rights)  Regulatory monitoring and evaluation | Raises novel issues: responsibility, auditability and liability\*\*\*  Regulatory monitoring and evaluation | Consumer awareness of redress routes  Multi-regulatory framework (across all aspects) |

Note:

\* Supply chain duties are interpreted as follows:

* effective use of AI can be influenced through the supply chain (original development, deployment and subsequent adaptation) with different organisations having various responsibilities

\*\* Technical, process and outcome-based transparency is interpreted as follows:

* technical transparency relates to information about the technical operation of the AI system (for example, AI explainability)
* process transparency relates to information about the design, development and deployment practices used for the AI system
* outcome-based transparency relates to transparency and explainability around how the solution works and which factors influence its decision making

\*\*\* Responsibility, auditability and liability is interpreted as follows:

* responsibility means that individuals and organisations can be held accountable for AI systems they develop, deploy, or use
* auditability refers to the process of documenting all stages the AI life cycle (including data collection, model training, fine-tuning, system development, updating and retirement)
* liability relates to the need for all parties involved in an AI life cycle to act lawfully and understand their legal obligations

#### Summary of our mapping findings

Although AI is relatively new, many of the regulatory issues that surround it are not. Many aspects of Great Britain’s energy regulation framework are outcomes based. The current framework is agnostic as to what technology and IT systems licensees utilise to deliver obligations and desired outcomes. Moreover, licensees are expected to have in place and maintain robust processes, systems and governance. Where the use of technology adversely impacts outcomes around fairness and transparency, for example, Ofgem appears to have sufficient powers to address important risks arising from the use of AI when detected.

However, licensees’ deployment of AI is likely to pose novel questions from an energy regulation perspective, particularly around supply chain duties, explainability, and governance and accountability. Moreover, monitoring and evaluating AI-related infringements of energy regulation may be difficult, particularly the detection of compliance issues and breaches under current approaches. In addition, not all risks arising from the use of AI in the energy sector are fully captured by energy regulation, with a multi- regulatory framework for example, equality, human rights, and health and safety.

### Do you agree with the overall approach to identify how the five AI principles are captured by the current legislative and regulatory framework that applies to the energy sector?

We are particularly interested in your views around the extent current licence obligations capture either directly or indirectly the five AI principles.

Yes/ No

Please delete only one item

If you do not agree, please use this text box to tell us why.

### Do you agree with the initial findings around the potential issues or challenges of applying the AI principles in the energy sector?

We are particularly interested in your views around the novel issues we have identified, the multi-regulatory framework and monitoring and enforcement implications.

Yes/ No

Please delete only one item

If you do not agree, please use this text box to tell us why.

## Potential benefits of AI

### Summary

This section sets out the benefits of using AI and how it has already started to be used within the energy sector.

### What we want to do

We want to find out about other uses of AI within the energy sector, so that we can review the potential issues and challenges of expanding their use.

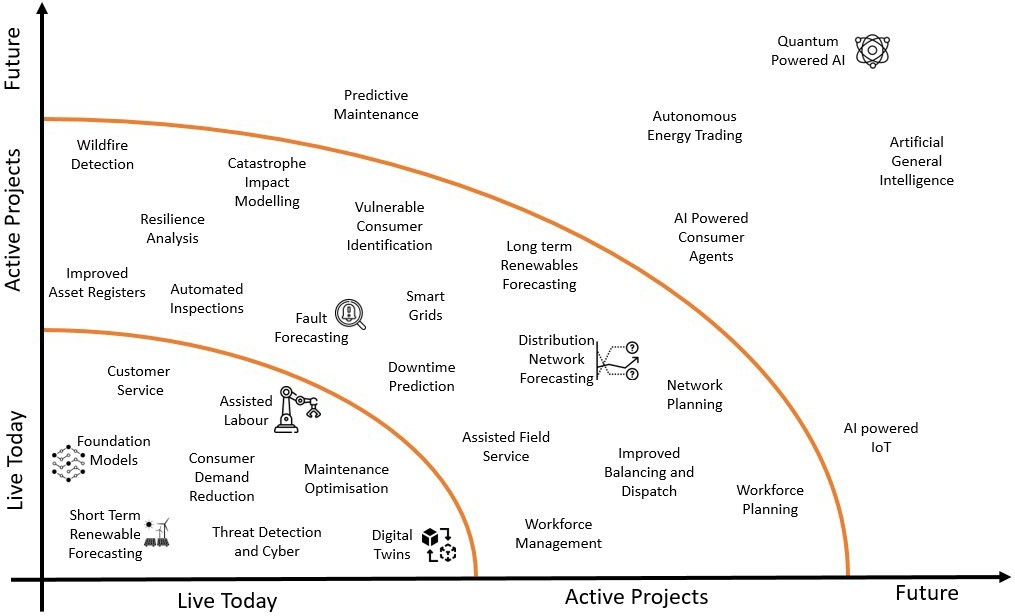
### Details

We have carried out a discovery exercise that looks at the current use of AI in the energy sector. We have also looked at projects underway to understand the benefits, and a limited consideration of the most major expected future innovations.

AI technology has been a field of study since the 1940s, with the first recognisable modern neural networks introduced in the 1970s. As recently as five years ago, the adoption of the technology has required drawing on a scarce resource pool, hard to get data, and significant compute (processing power, memory, networking, storage, and other resources) required for the computational success of any program. Through the work of the large technology companies, and the changes in business practices, these barriers to entry have been lowered, with a focus on foundation models giving ready access to AI capabilities.

One of the significant developments leading to the current AI interest is the introduction of foundation models. These pre-trained AI can be integrated into any system, where a relevant AI can be found and there is a process to use it, for example chatbots, knowledge management, document analysis, document retrieval. With this route, there is still a need for there to be an intelligent user corroborating the output of foundation models if the output can have an impact on, for example consumers.

This represents both an opportunity and a challenge. It is possible to use large language models to automate workflows to improve the efficiency of customer service operations. Examples include automate customer support interactions, interpret customer queries, provide relevant information and execute certain support tasks.



However, while removing intensive process-driven work and repetitious tasks is arguably desirable, there are significant downsides, like the tendency of these types of AI to ‘hallucinate’ and generate false information.

### Current state

#### Live today

AI is currently in use, performing a broad range of tasks in the energy sector. Some tasks are sector specific while others are general enterprise tasks. We understand the following are being used by the sector either in the UK, or overseas today:

* customer service
* assisted labour
* renewable forecasting
* threat detection and cyber
* maintenance optimisation
* enhancing digital twins

#### Active projects

We are aware of many projects aiming to exploit AI in the energy sector. An example includes improving maintenance and asset management processes such as:

* network planning
* resilience analysis
* workforce planning
* fault forecasting
* downtime prediction
* automated inspection
* improving asset registers
* catastrophe modelling

Various other projects are underway to use AI in tasks including:

* improved long term forecasting
* improving balancing
* distribution network forecasting
* smart grids
* vulnerable customer identification
* wildfire detection

#### Future

Significant innovations are continuing to emerge, from new software methodologies and computational models through to developing new technologies. We have undertaken horizon scanning to identify longer term targets and aspirations shared by the industry:

* predictive maintenance
* autonomous energy trading
* AI powered consumer agents
* AI powered internet of things capabilities
* artificial general intelligence (not a use case but expected to enable many)
* quantum AI (not a use case but expected to enable many)

AI is widely used across Great Britain’s energy sector, with the focus on getting value from simple or localised use cases, from forecasting certain types of renewables to supporting customer service agents.

Simple use cases, with low impact of failure, building either on AI foundation models, or with readily available data to build the AI, are live today, with active projects being brought into the live environment quickly.

Complex use cases, with a high impact of failure, without readily available AI foundation models, or with limited data, are currently facing significant hurdles to reaching the live environment.

Various innovation-funded research projects are underway to use AI in Great Britain’s energy networks, covering system operation, transmission and distribution, for planning, management and balancing purposes.

Data represents a challenge. Ofgem is working to improve the quality and availability of data through regulatory initiatives such as the Data Best Practice Guidance. Within the energy sector, significant challenges remain caused by lack of useable, accurate and accessible data, preventing valuable AI use cases from being built.

### Challenges to energy sector adoption

The most impactful AI use cases for Great Britain’s energy sector appear to sit at the system level, running across main aspects of the energy value chain. For example, improved [**solar photovoltaic generation forecasting**](https://smarter.energynetworks.org/projects/nia2_ngeso002/)[*<https://smarter.energynetworks.org/projects/nia2\_ngeso002/>*](https://smarter.energynetworks.org/projects/nia2_ngeso002/)may have already reduced carbon dioxide emissions, by reducing the need for carbon producing spinning reserve provided by generators. However, these system level use cases require data spanning the whole system. In many cases, this data is not available. Where it is available, it is frequently not interoperable, with the quality and accuracy not sufficient for it to be of use. If not addressed, this is likely to prevent valuable use cases from being realised.

#### Do you have examples of AI use cases within the energy sector in Great Britain or elsewhere that we have not included?

Yes/ No

Please delete only one item

If you do have examples of AI uses, please use this text box to tell us what they are.

#### Do you agree with the factors we have identified that could inhibit the adoption of AI in the energy sector?

Yes/ No

Please delete only one item

If you do not agree, please use this text box to tell us why.

## Our approach to evaluating potential AI risks

### Summary

This section outlines an approach to help organisations evaluate the risks associated with the use of AI in Great Britain’s energy sector. It illustrates how Ofgem will address specific risks relating to AI and its impact on the consumer, market, company and sustainability.

### What we want to do

We want to assist in the development of a risk framework for the energy sector to use to help identify potential risks associated with the use of AI.

### Details

We believe it is important to have an approach to the regulation of AI that is proportionate and based on the application of principles considered important in managing risk rather than setting prescriptive rules on the application of AI. The aim being that the regulatory approach allows organisations to have flexibility in how they deliver desired outcomes and manage the risk while empowering them to innovate. The following risk framework is intended to assist organisations in understanding the energy regulator’s view on risk and proportionality. The alternative to outcome-based regulation is a prescriptive approach, regulating through the application of rules. These rules would need to account for all eventualities which would be very difficult to implement effectively for developing technologies such as AI.

Any organisations considering using AI should, as a matter of good practice, clearly articulate the benefits of AI, its use and any associated risk compared with alternative or traditional technologies. Effective use of AI should be accompanied by proportionate management of risk established through an effective evidence-led risk assessment and the implementation of effective controls.

Risk is commonly expressed as the combination of the probability of something adverse happening and the consequence of the adverse event. The risk matrix below is intended to provide a framework to guide dutyholders (such as energy sector licensees and other organisations) considering using AI towards the proportionate actions and ensure the risks of failure are avoided or mitigated.

Evaluating potential AI risks

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Consequence**  Minor inconvenience to small numbers of people | **Consequence**  Significant inconvenience to large number of people | **Consequence**  Major inconvenience to most people | **Consequence**  Impact on personal safety or fundamental rights  Significant risk to national security or infrastructure |
| **Likelihood** Failure expected under normal conditions | High | Very high | Very high | Very high |
| **Likelihood**  Failure expected some of the time | Medium | High | Very high | Very high |
| **Likelihood**  Failure not likely under normal conditions | Low | Medium | High | Very high |
| **Likelihood**  Failure could happen, but it is very unlikely | Low | Low | Medium | High |

Systems containing AI that are autonomous, complex and adaptive are more likely to fail and therefore will be positioned higher on the vertical axis. In addition, if AI is applied in a dynamic operating environment the likelihood of failure will increase. However, rule-based AI, transparent models, and explainable AI are likely to be positioned lower on the vertical axis especially when operating in a stable environment.

For example, failure of a system containing AI used to assist operations to help balance supply and demand on the national electricity grid could result in instability and a power outage. This would be considered a high or very high risk depending on the consequence. Whilst engineering means will have been used to reduce the likelihood of the AI failure, there will be a need to introduce additional measures to reduce the impact this failure will have on the grid stability. It will also be necessary to reduce the consequences by, for example, designing the system to limit the impact to a smaller group of customers.

As part of our outcome-based regulation, dutyholders are expected to understand the risks including where AI could adversely affect consumers and society and implement good practice that is proportionate to the risk. Our approach to regulation of AI will be risk informed.

Ofgem’s AI taskforce has considered guidance and other literature that has been developed by UK regulators on AI. This good practice has been used to develop four examples to illustrate potential AI risks. These examples relate to consumer, market, company and sustainability perspectives.

### Do you agree with our proposed approach to evaluating the risks associated with the use of AI in the energy sector?

Yes/ No

**Please delete only one item**

If you do not agree, please use this text box to tell us why.

## Potential AI risks and regulatory considerations: consumer

### Summary

This section outlines our approach to make sure that when AI is used within the energy sector the outcome does not adversely impact consumers.

### What we want to do

We want to understand the potential risks that consumers may face so that we can develop regulatory guidance and tools that ensures that the use of AI within the sector is fair, ethical, transparent and explainable.

### Details

The potential risks consumers face from the use of AI within the energy sector has been considered by Ofgem’s AI taskforce. They have worked with a number of Ofgem teams, organisations that are already using AI within the energy sector and other regulators and consumer groups and academics.

### Fairness

DSIT’s definition: AI systems should not undermine the legal rights of individuals or organisations, discriminate unfairly against individuals or create unfair market outcomes.

Considerations suggested by DSIT: Develop and publish guidance (where necessary with other regulators) which illustrates fairness that applies to AI systems and supports compliance. Ensure that systems are designed to be fair.

Summary of regulators’ approach that could inform the use of AI in the energy sector: Done well, AI has the potential to improve service to consumers and identify when unfair outcomes could occur. Done poorly, AI has the potential to exclude certain customers causing discrimination and inequality, create bias resulting in disturbances in the marketplace to the detriment of customers or result in collusive processes or reducing the stability of the marketplace.

Good practice at the outset may include:

* protection of personal data
* clearly articulating the benefits of the use of AI over other technology
* developing clear specification of the use of AI including justification of the use and storage of data
* appropriate, representative and accurate use of training data
* assessing and testing unintended consequences with control and mitigation measures implemented
* humans and AI interaction understood
* review of the effectiveness of arrangements

### Transparency and explainability

DSIT’s definition: Transparency - the communication of appropriate information about an AI system to relevant people. Explainability - the extent to which it is possible for relevant parties to access, interpret and understand the decision-making processes of an AI system.

Considerations suggested by DSIT: Support and encourage the sector to implement measures. Ensure parties affected by the use AI can access sufficient information to enforce their rights and provide useful guidance.

Summary of regulators’ approach that could inform the use of AI in the energy sector: Given the spectrum of potential applications of AI in the energy sector it is important that the transparent and explainable use of AI is put into context for those affected.

Board level executives and senior decision makers within dutyholders need to understand the opportunities and risks from AI.

Users of AI need to be clear, open and honest with individuals from the start about the application of AI, use of data and outcomes (including opting out) in line with existing regulatory duties. It may be helpful to see this as a social contract that may go beyond legal duties to engender trust.

Explainability is an important concept in application of AI that may have significant consequences should it fail. This often requires support from a complex and dynamic supply chain.

To explore these issues further, Ofgem’s AI taskforce worked with a broad range of stakeholders (Citizens Advice, Energy Ombudsman, Equality and Human Rights Commission, Financial Conduct Authority), at a workshop on 13 December 2023, to develop a ‘rich picture’ of potential use of AI in the energy sector to illustrate the range of applications, opportunities and challenges.

Unlike engineering applications of AI where systems can be put in place to identify and address failure of AI based systems, it is difficult to recognise when AI is resulting in unfairness. In addition, defining unfairness is difficult beyond phrases such as ‘cause no deliberate harm’. Therefore, in addition to an overarching definition of fairness it is also important to undertake a detailed analysis that assists in identifying potential unfairness associated with the AI application.

### 6 Do you agree with how we have approached evaluating risks from a consumer perspective?

We would particularly be interested in your views about the issues of fairness, ethics, transparency and explainability.

Yes/ No

Please delete only one item

If you have answered 'no' above, please use this text box to explain why.

## Potential AI risks and regulatory considerations: market

### Summary

This section outlines our approach to make sure that when AI is used within energy markets the outcome does not adversely impact competition.

### What we want to do

We want to understand the potential risks that may arise at the market level so that we can develop regulatory guidance and tools that makes sure that the use of AI results in fair market outcomes.

### Details

The potential risks at the market level from the use of AI within the energy sector has been considered by Ofgem’s AI taskforce. They have worked with a number of Ofgem teams, organisations that are already using AI within the energy sector, and other regulators.

### Algorithms and collusion

Concerns have been raised that the use of algorithms, including AI, make it easier for companies to achieve and sustain collusion without any formal agreement or human interaction, known as ‘tacit collusion’. Automated mechanisms with deep learning techniques allow companies to monitor prices, implement common policies, send market signals and optimise joint profits.

This issue has been explored in an OECD (Office for Economic Co-Operation and Development) paper published in 2017 ‘[**Algorithms and Collusion, Competition**](https://www.oecd.org/competition/algorithms-collusion-competition-policy-in-the-digital-age.htm)[**Policy in a Digital Age**](https://www.oecd.org/competition/algorithms-collusion-competition-policy-in-the-digital-age.htm).The Ofgem AI taskforce has had discussions with the Competition and Markets Authority and Financial Conduct Authority to explore this issue.

The OECD concludes that ‘despite the apparently ambiguous effects [for certain characteristics/factors], algorithms appear to have changed more substantially the structural characteristics that raise competition concerns, namely market transparency and frequency of interaction, as compared to other structural characteristics or demand and supply factors’. An example of how traditional algorithms manipulate the market through high frequency trading was the 'Flash Crash’ in financial markets in 2010. The level of uncertainty associated with AI has the potential to exacerbate these risks.

There are potential solutions to address this risk. First, there are traditional existing ex-post measures, such as market studies (which can lead to non-binding recommendations) and market investigations (which can lead to the imposition of structural and/or behavioural remedies). There are also alternative, more interventionist approaches, such as:

* adaptation of ex-ante merger control
* audits of models, algorithms, data and decisions
* reconsideration of the legal approach to agreement and tacit collusion

Any interventionist regulatory solution would need to carefully weigh negative impacts on competition that could outweigh the potential benefits. Ofgem’s AI taskforce is exploring this issue further with the Competition and Markets Authority.

### Interoperability with international markets

Great Britain’s energy sector interfaces with international markets. For example, energy wholesale markets interface with Europe through interconnectors. Supply chains can also be international, such as the technology companies that provide AI services to the sector. As a result of these international interfaces, there are potential issues and challenges arising from different regulatory approaches (prescriptive versus principle-based outcomes) to AI regulation. Ofgem is considering this complex issue with the aim of ensuring a joined-up and effective approach by UK and international regulators.

### Do you agree with how we have approached evaluating risks from a market perspective?

We would particularly welcome your views about the issue of algorithms and collusion, and interoperability with international markets.

Yes/ No

Please delete only one item

If you do not agree, please use this text box to provide more information.

## Potential AI risks and regulatory considerations: company

### Summary

This section outlines our approach to make sure that AI is used responsibly and safely by energy companies (or licensees) and that their customers have appropriate routes to seek redress.

### What we want to do

We want to understand the potential risks that may arise at the company level. This means that we can develop regulatory guidance and tools that makes sure energy companies have effective oversight of AI systems. We also want to ensure their customers have appropriate routes to contest a negative AI outcome and seek redress.

### Details

### Governance and accountability

DSIT’s definition: Governance measures should be in place to ensure effective oversight of the supply and use of AI systems, with clear lines of accountability established across the AI life cycle. Dutyholders should implement governance across all stages of the AI life cycle.

Considerations suggested by DSIT: Ensure that clear expectations for regulatory compliance and good practice are placed on dutyholders. This should reflect the need to ensure proper functioning, throughout the systems life cycle.

Summary of regulators’ approach that could inform the use of AI in the energy sector: A multi-regulatory approach to regulation to ensure joined up regulation and effective and proportionate enforcement should it be necessary for example, Ofgem, the Competition and Markets Authority, the Information Commissioners Office, the Equality and Human Rights Commission, and the Health and Safety Executive.

Risk-based corporate governance principles should be implemented for AI. These may include:

* senior management function, including board level oversight of risk, assumptions and any model shortcomings
* ensuring organisational AI competency
* change control
* data governance and risk management
* testing models and procedures
* regular review and internal audit
* record-keeping
* ways to educate users about the use of AI and identifying errors

### Contestability and redress

DSIT’s definition: Where appropriate, users, impacted third parties and actors in the AI life cycle should be able to contest an AI decision or outcome that is harmful or creates material risk of harm.

Considerations suggested by DSIT: Clarify existing routes and, if necessary, implement new routes to contestability and redress. Encourage and guide dutyholders to make routes available to ensure affected parties can contest harmful AI outcomes.

Summary of regulators’ approach that could inform the use of AI in the energy sector: It is considered existing routes provide adequate coverage to allow Ofgem to ensure appropriate contestability and redress for the application of AI in the energy market.

Contestability arrangements should enable decisions made by companies to be reversable and where necessary for them to provide compensation to facilitate recovery and redress. Organisations within the supply chain have a role to play to ensure the value of AI is realised and risks are reduced. Contractual arrangements are needed to ensure appropriate mechanisms for contestability and redress are in place.

Unlike engineering applications of AI where existing good practice such as functional safety can be used to identify and protect from AI maloperation, robust guardrails to protect people against inappropriate or ill-informed use of AI for market analysis or consumer engagement are considered difficult to implement. Users for such applications should have arrangements in place to manage any risks for example, prototyping, post-market surveillance, adverse incident signals.

Clarity on liability and effective measures to regulate the energy sector and AI supply chain are required.

Governance measures should be in place to ensure effective oversight of the supply and use of AI systems, with clear lines of accountability established across the AI life cycle.

A workshop on 21 February 2024 considered accountability and governance for effective use of AI and explored various responsible roles and groups, including board member, management, project teams, life cycle stakeholders, supply chain participants, sector representative and regulatory bodies. The outcome is illustrated in the table below.

### Accountability and governance for effective AI use

|  |  |
| --- | --- |
| **Responsible person or group** | Aspects of AI accountability and governance |
| **Board** | Board members should be accountable and should have the ultimate oversight and own the role of delegating responsibilities  Be able to set top-down strategy, principles, and policies Consider strategic context and reputational issues |
| **Management** | Management should be able to understand the important risks and bias associated with its deployment  Monitor progress against strategic goals and allow for course correction as needed  Ensure relevant good practice is used to comply with existing regulation and organisation arrangements |
| **Project** | Define clear goals and outcomes  Adhere to relevant good practice through planning, documenting, monitoring and escalating Ensure ethical and governance goals are embedded |
|  |  |
| **Life cycle** | Have a good understanding of objectives and intended outcome from the beginning  Consistently monitoring, reviewing, and obtaining feedback for learning throughout the data life cycle  To ensure data protection and assurance adhere to data life cycle good practices such as quality, cleaning, poisoning, bias, and deletion |
| **Supply chain** | Understand and clarify what the customer’s needs are  Put in place robust arrangements for anonymisation of data, governance, triangulation of data risk management and incident reports  Provide data provenance records and adhere to commercial data assurance |
| **Sector** | Help develop, maintain, communication and encourage the following of relevant good practice  Provide opportunity to learn lessons, and self- assessments Publish necessary data and intelligence |
| **Regulator** | Establish clear expectations and articulate it in guidance  Have a clear understanding of what risk and relevant good practice looks like, including governance  Interaction with other governments priorities and potential conflicts |

At a principles level, arrangements in organisations can be used to provide effective governance of AI. However, these arrangements should take account of AI specific factors including the uncertainty of risk, challenges of transparency, and complexity of the supply chain.

It is important to proactively cultivate board-level expertise to enable robust governance frameworks for AI. Notable areas identified during the workshop include:

* appoint board member with expertise in AI, ethics and consumer interest
* have a clear understanding of board roles and responsibilities
* senior training and coaching sessions
* provide the opportunities for meaningful discussion on AI
* have a clear and simple way of communicating the benefits and worse case scenarios of the use of AI

### Safety, security and robustness

DSIT’s definition: AI systems should function in a robust, secure and safe way throughout the AI life cycle, and risks should be continually identified, assessed and managed.

Considerations suggested by DSIT: Introducing measures for regulated entities to ensure that AI systems are technically secure and function reliably throughout their life cycle.

Summary of regulators’ approach that could inform the use of AI in the energy sector: Safe, secure and robust AI in the energy sector needs proportionate measures to effectively manage its application. Prospective users of AI should have clear objectives and anticipated benefits that justify its use over more conventional technologies.

Effective data management should be in place including data quality, accuracy, and relevance across the life cycle. AI models and algorithms should take account of adaptability, and drift, to ensure they remain relevant. They should be explainable.

Strong data architecture and risk management infrastructure should be used to ensure security of data, models and associated systems, including risks associated with data aggregation.

Development of skills and guidance to ensure safe and secure application of AI, including the interaction of AI and humans.

The expectation of safety, security and robustness is already embodied within the established regulatory approach. This applies to all participants, regardless of the role within the energy sector. This applies to all systems, regardless of the technology, methodology and its use.

AI as an emerging technology, builds on existing technology and data. These existing technologies are subject to an established regulatory framework, covering safety, security and robustness, including guidance and good practice (for example approaches to functional safety through established international standards such as IEC 61508).

The adoption and effective use of these existing practices remains essential to design the development of any services involving AI, throughout the life cycle of the service. This must include ensuring that the appropriate good practice is adopted throughout the supply chain, which should be recognised as highly complex and not always transparent, with innovative technology of this type.

We plan to develop the regulatory framework covering the safe, secure and robust use of AI within the energy sector in collaboration with a number of regulatory bodies and authorities, including but not limited to the Information Commissioners Office, the National Cyber Security Centre, the National Protective Security Authority, and the AI Safety Institute.

AI introduces capabilities and behaviours that must be taken into account throughout the life cycle of any service developed using this technology. As an emerging technology, it is expected that these capabilities will continue to evolve at pace. Both factors must be considered in the context of the service being delivered, including their impacts on the landscape of people, processes, and technologies.

As this is an emerging and rapidly developing technological landscape, Ofgem propose that the regulatory framework is responsive to the maturity and understanding of innovations emerging from this field. This flexible and iterative approach to the development of the regulatory framework will be undertaken with collaboration with the relevant regulatory authorities, and through extensive engagement with relevant AI expertise and representatives across the energy sector.

An important part of Ofgem’s approach may involve the gathering and dissemination of information. To explore these issues further, Ofgem will conduct a workshop on safety, security and robustness with stakeholders to start to develop a view on the nature of relevant good practice and understand where joint guidance may be beneficial.

### Cyber

From the initial discovery phase of work, Ofgem recommends AI considerations should be incorporated into existing cyber resilience activity, with a strong focus on:

mitigating cyber risks from AI systems, particularly relating to the security of supply for consumers supporting opportunities for AI systems to strengthen industry cyber resilience

We aim to work with the energy industry and partners to take steps towards reducing the downside and increasing the upside for energy consumers in a proportionate way.

The initial discovery work has identified the following themes.

AI opportunities for increasing cyber security within the energy sector: Used appropriately, AI systems present a potentially significant opportunity to boost the energy sector’s cyber security – automating and augmenting capabilities for relatively low cost. Ofgem is already seeing organisations using AI tools to support their activities, as well as taking forward AI-related innovation projects. Ofgem is proposing to work with partners to support and guide industry’s safe and secure use of AI.

Security of supply risk: Threat actors could seek to deliberately target AI systems to cause an incident that affects the security of supply. Appropriate processes and controls could mitigate this risk.

Use of AI tools by cyber threat actors: This represents a general increase in the cyber threat globally which needs to be managed by the energy sector. Ofgem is working closely with the National Cyber Security Centre, the UK government’s lead on cyber threat intelligence and assessments, so that the sector is aware of AI-related threats.

Energy sector cyber-AI risks are not unique: Academic, regulator and industry engagement has shown that the energy sector faces similar challenges to many other industry sectors. This is especially true for those sectors that also use operational technology to deliver their essential services. Ofgem is therefore partnering with others to enable a joined-up cross-sector approach.

### Do you agree with how we have approached evaluating risks from a company perspective?

We would particularly welcome your views about the issues of governance, accountability and redress, safety, security and robustness, and cyber.

Yes/ No

Please delete only one item

## Potential AI risks and regulatory considerations: sustainability

### Summary

This section sets out the issues associated with the sustainability of AI from an environmental perspective.

### What we want to do

We want to understand the potential environmental impact of AI use in the energy sector so that we can develop regulatory guidance to ensure sustainability.

### Details

AI energy and water consumption

AI models consume substantial amounts of energy and water because of the vast amount of data that the model is trained on, the complexity of the model, and the volume of requests made to the AI by users.

Worldwide electricity generation is one of the top sectors for water withdrawal. Global AI demand may require 4.2 to 6.6 billion cubic meters of water withdrawal in 2027, which is around half of the UK’s total annual withdrawal. Read about [**how much water does AI consume from the OECD AI Policy Observatory**](https://oecd.ai/en/wonk/how-much-water-does-ai-consume). Gartner has also predicted that by 2025, if sustainable AI practices are not implemented, AI is likely to consume more energy than the human workforce. It is also considered that the processing power needed for many applications of AI is large, increasing its environmental impact. Read [**Gartner's article about its top predications for IT organisations and users in 2023 and beyond**](https://www.gartner.com/en/newsroom/press-releases/2022-10-18-gartner-unveils-top-predictions-for-it-organizations-and-users-in-2023-and-beyond).

Choice of data centre and training of the models can contribute to sustainability of AI. Moreover, AI can be used to support sustainability efforts through, for example, controlling and reducing energy usage through load shifting during peak hours. AI is already being utilised to support sustainability through identifying and signalling problems, and detecting equipment failures before they occur.

These factors emphasise the need to clearly articulate the benefits of the use of AI over other technologies. Thus, avoiding undermining the UK’s Net Zero carbon emission objectives and Ofgem’s work to ensure consumers benefit from a cleaner, greener environment. Ofgem’s AI taskforce is exploring this issue further.

### Do you agree with how we have outlined the risks from a sustainability perspective and the need for guidance for the energy sector on its sustainable use of AI?

Yes/ No

Please **delete** only one item

If you do not agree, please use this text box to tell us why.

## Proposed recommendations

### Summary

This section sets out our proposed recommendations for the safe and responsible use of AI by participants within the energy sector.

### What we want to do

We want to use these recommendations within our AI strategy. This will outline our high-level strategic approach to regulating AI within the energy sector and will be published by the end of April 2024.

### Collaboration

We will collaborate with the Office of AI (part of DSIT) and other relevant regulators such as the Competition and Markets Authority, the Information Commissioners Office, the Equality and Human Rights Commission and the Health and Safety Executive whose remits are economy-wide and include Great Britain’s energy sector.

We will continue our close collaboration with other relevant stakeholders to ensure our approach reflects current thinking on critical issues as well as supporting the identification of opportunities.

We will establish an AI Best Practice Cross Industry Forum to ensure we are informed of AI developments and risk mitigation approaches. The participants will include institutions, standards bodies, technology companies and energy sector stakeholders.

### Addressing regulatory issues

We will consider the potential for AI collusion in energy markets, by continuing discussions with the Competition and Markets Authority and energy sector regulators in other jurisdictions.

We will ensure interoperability with international markets is considered, with any issues and challenges effectively addressed in a joined-up manner by UK and international regulators.

We will consider the need for additional regulatory tools, such as an AI sandbox, to provide collaborative opportunities with industry. We will consider the issue of liability and the AI supply chain to ensure effective measures are in place to regulate the sector.

### Sector support

Ofgem’s approach to collaboration will be used to develop specific guidance for the sector. This approach is anticipated to minimise the need for formal intervention, whilst ensuring Ofgem has the regulatory tools to take action in proportionate way should it be necessary. Our proposed toolkit consists of stand-alone AI guidance, enhancement of existing Ofgem guidance, or a combination of both.

### Do you agree with our proposed recommendations?

Yes/ No

Please delete only one item

If you do not agree, please use this text box to tell us why.

### Are there any issues that are not covered by our recommendations?

Yes/ No

Please delete only one item

If you answered 'yes', please use this text box to tell us why.

### Should certain recommendations and issues be prioritised over others?

Yes/ No

Please delete only one item

If you have answered 'yes' or 'no', please use this text box to explain why.

## Next steps

We aim to:

* assess the outcome of this call for input and adapt our approach to the regulation of AI in the energy sector as necessary
* publish a high-level strategy to demonstrate how we propose to have a robust method of AI regulation in the energy sector, based on the five AI principles
* undertake a series of collaborative workshops which build on the stakeholder engagement undertaken as part of this discovery phase, to develop and deliver AI energy sector guidance to main audiences (where possible the aim will be to ensure our guidance complements guidance produced by other regulators with similar remits)
* undertake more in-depth horizon scanning to identify the opportunities and threats associated with AI in the energy sector

## Appendix 1: technical standards mapping

### Selected AI technical standards mapped to the five AI principles

Selected AI technical standards mapped to the five AI principles

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Standards with principle as core focus (core and related)** | **Safety, security and robustness** | **Appropriate transparency and explainability** | **Fairness** | **Accountability and governance** | **Contestability and redress** |
| **Published** | 5 (9) | 2 (6) | 1 (3) | 2 (6) | 2 (2) |
| **Draft** | 2 (5) | 2 (5) | 2 (5) | 3 (5) | 0 (5) |
| **Total** | 7 (14) | 4 (11) | 3 (8) | 5 (11) | 2 (7) |

Source: British Standards Institute, March 2024

### Technical standards: published

Technical standards: published

|  | **Safety, security and robustness** | **Appropriate transparency and explainability** | **Fairness** | **Accountability and governance** | **Contestability and redress** |
| --- | --- | --- | --- | --- | --- |
| [**ISO/IEC 42001:2023**](http://www.iso.org/standard/81230.html)  Artificial intelligence Management system | Yes | Yes | Yes | Yes (core focus) | No |
| [**ISO/TR 22100-5:2021**](https://www.iso.org/standard/80778.html)  Safety of machinery  Relationship with ISO 12100  Part 5: Implications of artificial intelligence machine learning | Yes (core focus) | No | No | No | No |
| [**ISO/IEC TR 24027:2021**](https://www.iso.org/standard/77607.html)  Bias in AI systems and AI aided decision making | Yes | Yes | Yes (core focus) | Yes | No |
| [**ISO/IEC TR 24029-1:2021**](https://www.iso.org/standard/77609.html)  Assessment of the robustness of neural networks  [**Formal methods**](https://www.iso.org/standard/79804.html)  [**Statistical methods**](https://www.iso.org/standard/86901.html) | Yes (core focus) | No | No | No | No |
| [**ISO/IEC TR 24028:2020**](https://www.iso.org/standard/77608.html?browse=tc)  Overview of trustworthiness in artificial intelligence | Yes | Yes (core focus) | Yes | No | No |
| [**ISO/IEC 38507:2022**](https://www.iso.org/standard/56641.html)  Governance implications of the use of artificial intelligence by organizations | No | No | No | Yes (core focus) | No |
| [**ISO 10002:2018**](https://www.iso.org/standard/71580.html)Quality management  Customer satisfaction  Guidelines for complaints handling in organizations | No | No | No | No | Yes (core focus) |
| [**ISO 22458:2022**](https://www.iso.org/standard/73261.html)  Consumer vulnerability  Requirements and guidelines for the design and delivery of inclusive service | No | No | No | No | Yes (core focus) |
| [ISO/IEC TS 8200​](https://www.iso.org/standard/83012.html)  Controllability of automated artificial intelligence systems | Yes | No | No | No | No |
| [ISO/IEC TR 5469](https://www.iso.org/standard/81283.html)  Functional safety and AI systems | Yes (core focus) | No | No | No | No |
| [ISO/IEC AWI TS 29119-11:2020 [2024 due]](https://www.iso.org/standard/84127.html)  Software testing  Part 11: Testing of AI systems | Yes (core focus) | Yes | No | Yes | No |
| [ISO/IEC 38507:2002](https://www.iso.org/standard/56641.html)  Governance of AI | No | Yes (core focus) | No | Yes | No |
| [ISO/IEC 25059:2023](https://www.iso.org/standard/80655.html)  Systems and software Quality Requirements and Evaluation (SQuaRE)  Quality model for AI systems | Yes (core focus) | Yes | No | Yes | No |

Source: British Standards Institute, March 2024

### Technical standards: draft

Technical standards: draft

|  | **Safety, security and robustness** | **Appropriate transparency and explainability** | **Fairness** | **Accountability and governance** | **Contestability and redress** |
| --- | --- | --- | --- | --- | --- |
| [[DRAFT] ISO/IEC CD 12792​](https://www.iso.org/standard/84111.html)  Transparency taxonomy of AI systems | No | Yes (core focus) | No | No | No |
| [[DRAFT] ISO/IEC CD TS 6254​](https://www.iso.org/standard/82148.html)  Objectives and approaches for explainability and interpretability of ML models and AI systems | No | Yes (core focus) | No | Yes | No |
| [[DRAFT] ISO/IEC DTS 12791](https://www.iso.org/standard/84110.html)  Treatment of unwanted bias in classification and regression machine [learning tasks](https://www.iso.org/standard/85072.html?browse=tc) | No | No | Yes (core focus) | No | No |
| [[DRAFT] ISO/IEC AWI TS 17847](https://www.iso.org/standard/85072.html?browse=tc)  Verification and validation analysis of AI systems | Yes (core focus) | No | No | No | No |
| [[DRAFT] ISO/IEC CD TR 20226​](https://www.iso.org/standard/86177.html)  Environmental sustainability aspects of AI systems | Yes | No | No | No | No |
| [[DRAFT] ISO/IEC AWI TR 21221](https://www.iso.org/standard/86690.html)  Information technology – Artificial intelligence – Beneficial AI systems | No | No | No | No | Yes |
| [[DRAFT] ISO/IEC AWI TS 22443](https://www.iso.org/standard/87119.html)  Guidance on addressing societal concerns and ethical considerations | No | Yes | Yes | Yes | Yes |
| [[DRAFT] ISO/IEC AWI TS 22440](https://www.iso.org/standard/87118.html)  Functional safety and AI systems Requirements | Yes (core focus) | No | No | No | No |
| [[DRAFT] ISO/IEC AWI 23282](https://www.iso.org/standard/87387.html)  Evaluation methods for accurate natural language processing systems | Yes | No | No | No | No |
| [[DRAFT] ISO/IEC DIS 42005](https://www.iso.org/standard/44545.html)  Information technology Artificial intelligence AI system impact assessment | No | No | Yes | Yes (core focus) | Yes |
| [[DRAFT] ISO/IEC DIS 42006](https://www.iso.org/standard/44546.html)  Requirements for bodies providing audit and certification of artificial intelligence management systems | No | No | No | Yes (core focus) | Yes |
| [[DRAFT] ISO/IEC AWI 42105](https://www.iso.org/standard/86902.html)  Guidance for human oversight of AI systems | Yes | Yes | No | No | Yes |
| [[DRAFT] ISO/IEC DIS 5259-5](https://www.iso.org/standard/84150.html)  Data quality for analytics and machine learning (ML) Part 5: Data quality governance framework | No | No | No | Yes (core focus) | No |

Source: British Standards Institute, March 2024

## Appendix 2: mapping the AI principles onto energy regulation

### Direct mapping

The AI fairness principle appears to map directly onto the standard licence conditions (SLCs) 0 (treating domestic customers fairly) and 0A (treating microbusiness consumers fairly) of the electricity supply licence for domestic and microbusiness consumers respectively:

* The definition of fairness in DSIT’s AI White Paper is that AI systems should not undermine the legal rights of individuals or organisations, discriminate unfairly against individuals, or create unfair market outcomes.
* SLCs 0 and 0A objectives are to ensure licensees, and their representatives in the case of domestic electricity suppliers, treat domestic and non-domestic customers fairly.There are standards of conduct aimed at delivering the objective of a fair outcome for customers. These are principle-based rules about the relationship between the suppliers and their customers, applying across a range of the licensee’s activities, covering how they behave, provide information, carry out customer service processes, and (for domestic customers) how licensees seek to identify consumers in vulnerable situations and respond to their needs.

As would be expected from principle-based rules, AI systems are not specifically mentioned in these two SLCs. Moreover, the UK’s AI principle for fairness is also outcomes-based, aimed at delivering fair outcomes for individuals and organisations. As a result, there appears to be a direct mapping from this AI principle to the principles-based rules of SLCs 0 and 0A of the electricity supply licence.

Electricity supply licensees are also required to comply with other aspects of the energy legislative and regulatory framework which include elements relating to fairness:

* Chapters I and II of the Competition Act 1998 prohibit anti-competitive agreements and abuses of dominant position
* Ofgem has powers under the Enterprise Act 2002 to conduct market studies or to make a market investigation reference to the Competition and Markets Authority where it has reasonable grounds for suspecting that any feature or combination of features prevents, restricts of distorts competition in gas and electricity markets
* REMIT imposes obligations and prohibitions on wholesale energy market participants regarding their conduct to support open and fair competition in wholesale energy markets

Taken collectively, there appears to be a direct mapping from the AI fairness principle onto these pieces of competition legislation meaning that undue discrimination and unfair market outcomes aspects of the AI principle are also captured by the existing framework.

Looking at the other licensable activities within the gas and electricity sectors (for example distribution, transmission, generation etc.) there are SLCs prohibiting discrimination, which appears aligned with the discrimination aspect of the AI fairness principle.

Overall, for Great Britain’s energy sector, covering energy wholesale, networks and retail supply, many of the aspects of the AI fairness principle appear to directly map onto various elements of the energy regulatory framework:

* Gas Act
* Electricity Act
* Competition Act
* Enterprise Act
* REMIT
* Various consumer protection legislation

Other aspects of fairness, such as equality and human rights, are captured by non-energy regulation over which other regulators have competence (for example, the Equality and Human Rights Commission).

### Indirect mapping

The AI accountability and governance principle appears to indirectly map onto SLC 4A (operational capability) of the electricity supply licence:

* the definition of the Accountability and Governance in DSIT’s AI White Paper is: ‘Governance measures should be in place to ensure effective oversight of the supply and use of AI systems, with clear lines of accountability established across the AI life cycle’
* SLC 4A obligates the licensee to ensure it has and maintains robust internal capability, systems and processes to enable it to effectively and efficiently serve its customers, identify likely risks of consumer harm and to mitigate any such risk, and comply with relevant legislative and regulatory obligations. This means that the licensee must have sufficient control over all of its material economic and operational assets necessary to maintain robust internal capability, systems and processes (for example, premises, facilities, staff, IT systems and brand name, used or needed to run its supply business)

As would be expected from an outcomes-based principles regime, licensees have discretion to determine what type of IT systems they utilise so long as there is sufficient

control over these assets. So, whilst AI systems are not specifically mentioned in the operational capability SLC, if sufficient control is deemed to be equivalent to effective governance and accountability then there is an indirect mapping.

SLC 4C (ongoing fit and proper requirement) of the electricity supply licence also appears to have relevance alongside SL 4A as this requirement ensures licensees appoint and have in place fit and proper persons who hold positions of significant managerial responsibility or influence. This ensures licensees have and maintain robust processes, systems and governance. Again, whilst AI systems are not specifically mentioned in the ongoing fit and proper SLC, if fit and proper management is deemed to be equivalent to effective senior management oversight then there is an indirect mapping.

## About you

1. **What is your name?**

Name

### What is your email address?

Email

### Are you responding as an individual or an organisation?

Individual/ Organisation

Please delete only one item

### If responding on behalf of an organisation, please tell us what type of organisation you represent. If you are responding as an individual you can leave this blank.

Please delete all that **do not** apply

* Charity
* Consumer representative Energy sector licensee Institute
* Technology company Trade association University
* Other (please specify)

If you answered 'other', please use this text box to tell us which organisation you represent.

### Tell us which sector you work in

Please delete only one item

* Electricity and gas
* Electricity only
* Gas only
* Other (please specify)

If you answered 'other', please use this text box to tell us which sector you work in.

## Feedback

We want to make our consultations and calls for input better.

Please help us improve our consultations and calls for input by answering the questions below. Your answers will not be published.

### How easy was the information to understand?

Please delete all that **do not** apply

* Very easy
* Easy
* Hard
* Very hard

Please use this text box to tell us about any other comments you may have.

### How easy was it using this platform (Citizen Space)?

Please delete all that **do not** apply

* Very easy
* Easy
* Hard
* Very hard

Please use this text box to tell us about any other comments you may have.