Energy Data Summit

EUROPE

Study

The State of European Energy Data Maturity

Understanding the journey to data democratisation

opendatasoft E.DSO GEODE

Contents

Forewords

opendatasoft

At a time of disruption and change in the energy sector, data sharing allows companies to meet their pressing challenges. It enables them to digitise, increase efficiency, make better decisions, expand collaboration across their ecosystems, build trust, create new revenue streams and most of all to meet the challenge of decarbonisation. Organisations need to achieve data democratisation, ensuring that everyone inside and outside the company has access to the data required in their working and daily lives.

On the positive side, energy companies are able to access more data than ever before, from an ever-increasing variety of sources, inside and outside their organisation. However, successfully harnessing data brings its own challenges around technology, governance and culture.

Given the growing importance of data, we wanted to understand how mature the sector is, and its progress towards data democratisation. We therefore conducted this in-depth research, partnering with E.DSO and GEODE to survey distribution system operators (DSOs), transmission system operators (TSOs), energy producers and others from across the European energy ecosystem. The aim is to begin a conversation around data maturity and provide energy players with insights and recommendations on how to leverage data to underpin the sector moving forward.

Jean-Marc Lazard, CEO & Co-Founder, Opendatasoft

The rapid acceleration of climate change demands that the world urgently shifts to an energy system free of carbon emissions, supported by an end-to-end flow of data and driven by real-time requirements. Consequently, these interconnected dynamics create a perfect storm where the energy transition converges with digital transformation.

The deployment of photovoltaic smart inverters, EV charging stations, and heat pumps introduces new intelligent devices that are shaping the energy system, emphasising the need for interoperability in energy data exchange. E.DSO, which represents 35 leading distribution system operators (DSOs) in 19 European countries, sees data exchange as central to a digitalised business ecosystem, where information is shared regardless of its original protocol and format. We strongly advocate for an equitable distribution of the benefits of digitalisation between customers, market participants, and DSOs.

European DSOs are remodelling their businesses through data gathered by serving customers, from smart meters, grid capacity analysis & planning, infrastructure operations, system operations, and market facilitation. These efforts show the need for a smart digital infrastructure based on data exchange that ensures observability and control of energy flows in the future energy system.

E.DSO therefore is an enthusiastic partner in this study which is committed to advancing future data exchange, and fully endorses its conclusions. The initiative aims to kickstart discussions on data maturity, offering valuable insights and recommendations for leveraging data to fortify and advance the energy sector via the power of data.

Christian Buchel, Member of the Board of Enedis and Chairman of E.DSO

In order to achieve climate targets being set by the European Union and ensure system reliability and cost effectiveness, the current energy system is evolving into a new structure, and it is important that all actors in the energy value chain - generators, distribution system operators (DSOs), and transmission system operators (TSOs), suppliers, aggregators and end consumers cooperate together.

To achieve this, GEODE members representing 1,400 utilities in 15 European countries (including the UK and Norway) closely cooperate, sharing best practices and knowledge on all crucial topics related to the operation of distribution grids, with a particular focus on digitalisation, data sharing, data interoperability and consumer engagement. All these are relevant aspects of the upcoming future system, in which renewable generation will be the main source of energy, bringing more volatility and thus requiring more flexible operations with enhanced observability and controllability to ensure smoother operations and the facilitation of demand response services.

The need to manage a growing number of distributed energy resources (including EVs, small-scale renewable energy plants and electric heat pumps) as well as new active players (such as aggregators, energy communities and prosumers) is requiring DSOs to implement new digital solutions to enable grid real-time monitoring and control of energy flows. Data exchange is also crucial.

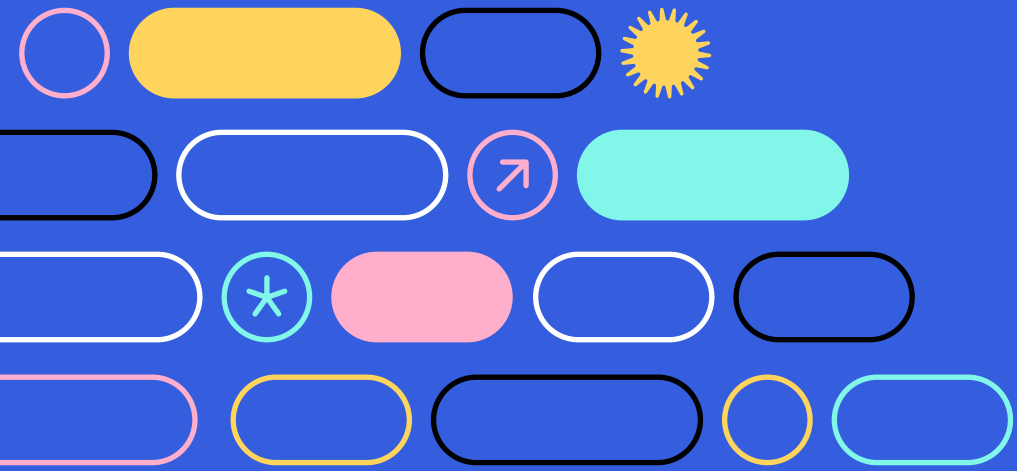
Therefore, GEODE is a proud partner of this study, which will support data exchange in the future with the aim of helping all energy players, including end customers, to use the system more efficiently.

Carmen Gimeno, GEODE Secretary General

Context:

The changing European energy landscape

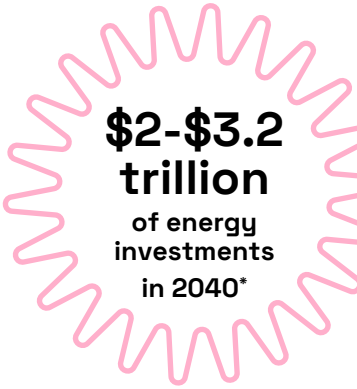
Over the past two years the challenges facing European energy players have both widened and intensified. The rise in prices and supply side changes triggered by the invasion of Ukraine has added achieving energy security to the list of priorities for energy providers, their customers and governments. There it joins existing targets around decarbonising the sector to meet Net Zero commitments, increasing efficiency through more complete digitalisation, and meeting the changing needs of both consumers and industrial/B2B customers, who require competitively priced and available green energy for their homes and businesses. Reinforcing the need to transform, regulations are tightening at both a European and country level, while investors and wider society are increasingly holding energy players to account on their progress towards Net Zero and sustainability goals.



1. The need for greater investment and transformation

Meanwhile, the difficulties of achieving the energy transition mean that progress has been sporadic. Supply chain and infrastructure issues, covering everything from the availability of equipment and land for renewable generation to the need to upgrade existing grids demonstrate the complexity of the necessary transformation. Large scale investment is required to drive change - McKinsey estimates that total global energy investments will increase from $1.5 trillion in 2021 to between $2-$3.2 trillion in 2040.*

At a structural level, energy players will need to transform their operations. Less predictable and controllable renewable power sources will require new ways of matching supply to demand, while the rise of distributed, smaller-scale generators and prosumers add further complexity to energy grids. Essentially, energy players will need to move from a unidirectional flow of power from generator to consumer to a bidirectional, ecosystem model.



2. Taking a wider ecosystem approach

New players and stakeholders, such as local authorities and customers themselves, will need to be engaged and catered for, both to achieve decarbonisation and to meet changing requirements, such as around transport electrification (EVs) and the electrification of heat, through hybrid or fully-electric heat pumps. To ensure security of supply, players will need to have greater visibility and operational reach across the end-to-end energy supply chain.

*McKinsey Global Energy Perspective 2023

Meeting this wide range of challenges will not be easy and requires energy players to embrace four key pillars within their strategy - digitalisation, collaboration, innovation and transparency.

Digitalisation

To deliver affordable services to the public and businesses energy players need to operate much more efficiently. A key part of this is digitalising their operations, automating previously manual processes and removing paper-based ways of working. Digitalisation enables companies to understand exactly what is happening across their networks, allowing them to make proactive changes to improve performance. For example, collecting real-time information from smart meters allows them to better analyse demand on a granular level, while digital twins can model assets, such as power plants or substations, enabling predictive maintenance and lower downtime.

Collaboration

The energy transition involves us all, and requires everyone to play their part. Only by working together with customers, system operators (TSOs, DSOs), generators, retailers, suppliers, regulators, start-ups and researchers will change be achieved. Importantly, this means that collaboration has to go beyond traditional partners - for example, consumption data could be shared with local authorities to identify streets and areas with above-average usage, allowing the targeted application of energy efficiency measures. Collaboration has to start within the energy provider itself, breaking down silos between departments in order to encourage a common approach to driving improvements.

Innovation

Decarbonisation and increasing efficiency requires new solutions and more agile ways of working. Often these will come from outside traditional energy players as start-ups, universities and organisations from other sectors bring fresh perspectives and new ideas to solve emerging issues. For example, a bank might launch new types of consumer loans to fund the installation of solar panels, based on accessing usage data. The energy industry needs to be open to these innovations, working together with partners rather than focusing solely on home-grown initiatives and knowledge.

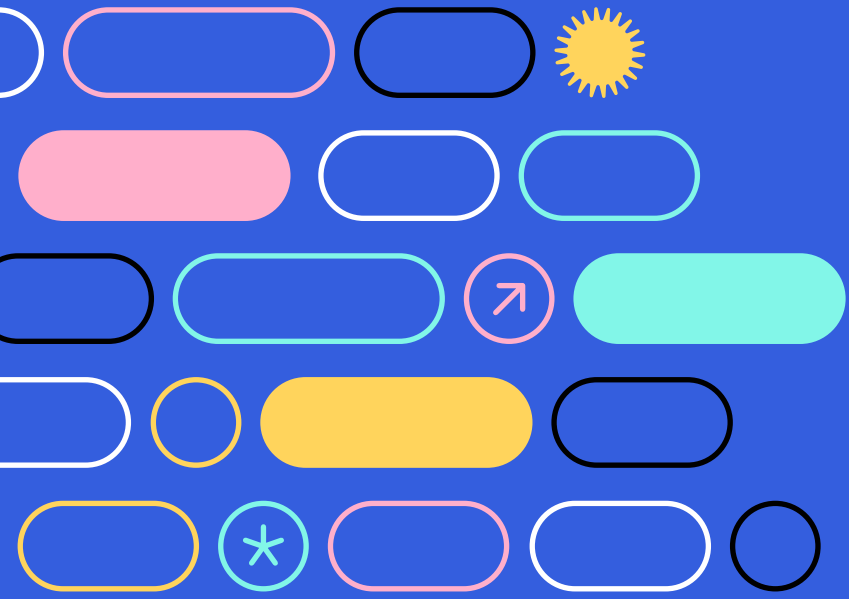
Transparency

Customers have typically had transactional relationships with their energy providers, and little or no contact with other parts of the ecosystem (such as DSOs) unless problems occur. This means that the industry needs to rebuild trust with business and customers, particularly in the context of the energy transition. Energy players have to demonstrate how they are improving operations, embracing decarbonisation and meeting Corporate Social Responsibility (CSR) goals. Regulators, investors and wider society are increasingly holding energy players to account on their progress towards Net Zero and sustainability goals, leading to a need for greater transparency to drive engagement.

Key Findings

from the State of European Energy Data Maturity Study

Overall, the results of the study demonstrate heartening progress across the sector when it comes to effectively harnessing data. The vast majority of companies recognise the benefits and have launched programmes designed to accelerate their data maturity. Some are further down the path to data democratisation than others, but by taking an ecosystem approach, everyone within the energy industry can successfully embrace data to meet their pressing challenges.



Analysis of the results delivers four clear conclusions:

1 Energy players recognise the benefit of using data.

Education is no longer necessary at a senior level as organisations understand how data can solve their pressing strategic and operational challenges.

2 Organisational maturity is growing, but organisations are not yet truly data-centric.

The majority of companies now have a data sharing strategy in place, backed up by governance mechanisms and budgets. However, data is primarily being used to meet regulatory requirements, improve efficiency and deliver affordable services, rather than to underpin decision-making, collaboration or innovation.

3 Challenges centre on culture, data quality, and technology.

A lack of a data culture and relevant employee skills, combined with poor data quality and overly-complex tools threaten to derail efforts to share data more widely, both internally and externally and to accelerate the range of uses. Energy players need to do more to break down silos between departments and educate employees about how they can use data to drive improved company performance.

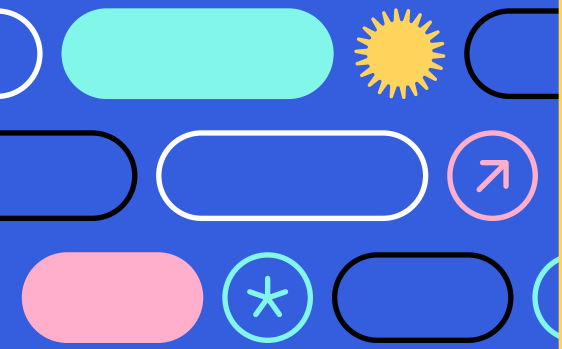
4 Organisations have impressive plans for future data use.

Building on their senior level understanding of the strategic benefits of data, companies recognise what they need to do to accelerate data usage and the shift to data democratisation. They have a comprehensive range of far-reaching plans for internal and external data usage to be implemented over the next 2-3 years.

Lessons learnt

around the current state of European energy data maturity

Data democratisation across the energy ecosystem is essential to meeting the sector's diverse and complex challenges. It enables greater openness, improved efficiency and a more agile, customer- and ecosystem-centric mindset.



Data democratisation

is the process of enabling everybody to access, understand and use data comfortably, without requiring specialist skills or tools.

The Study therefore sought to understand the sector's current data maturity levels, plans for the future and the key obstacles that are holding back progress. Analysis of the results highlight four key findings*.

* Due to rounding, not all percentages add up to 100%

1. Energy players recognise the benefit of using data

The positive news is that at a senior and strategic level, energy companies understand the positive advantages that data bring to their organisations. Education is no longer necessary.

Companies see the benefits of using data in multiple areas

The major benefits data leaders identify are around efficiency and digital transformation, followed by the ability to increase transparency and drive greater innovation. A relatively low number (80%) say it will help meet regulatory requirements, potentially because they feel that this box has been ticked, and that they are now going beyond legislative constraints. This is backed up by the fact that few believe their data programmes will be affected by new regulations - just 4% think that the EU Data Act or EU Data Governance Act will have an impact for example.

Given that respondents recognise the potential of data in many areas, the survey asked them to prioritise which uses were currently most important to them. Drilling down into these results provides a different picture of where companies are focusing their efforts, and their relative level of maturity.

For example, while 84% believe that data can help decarbonisation, just 18% currently rank it as a first or second priority. All of this demonstrates that other, more pressing needs, such as efficiency, cited by an overwhelming 75% of people as a first or second priority, are currently the major focus for energy companies, demonstrating that the vast majority of companies are still early in their data democratisation journey.

100%
To become more efficient and deliver affordable services

98%
To ensure digital transformation and make data-driven decisions

96%
To increase transparency to strengthen relationships with external stakeholders

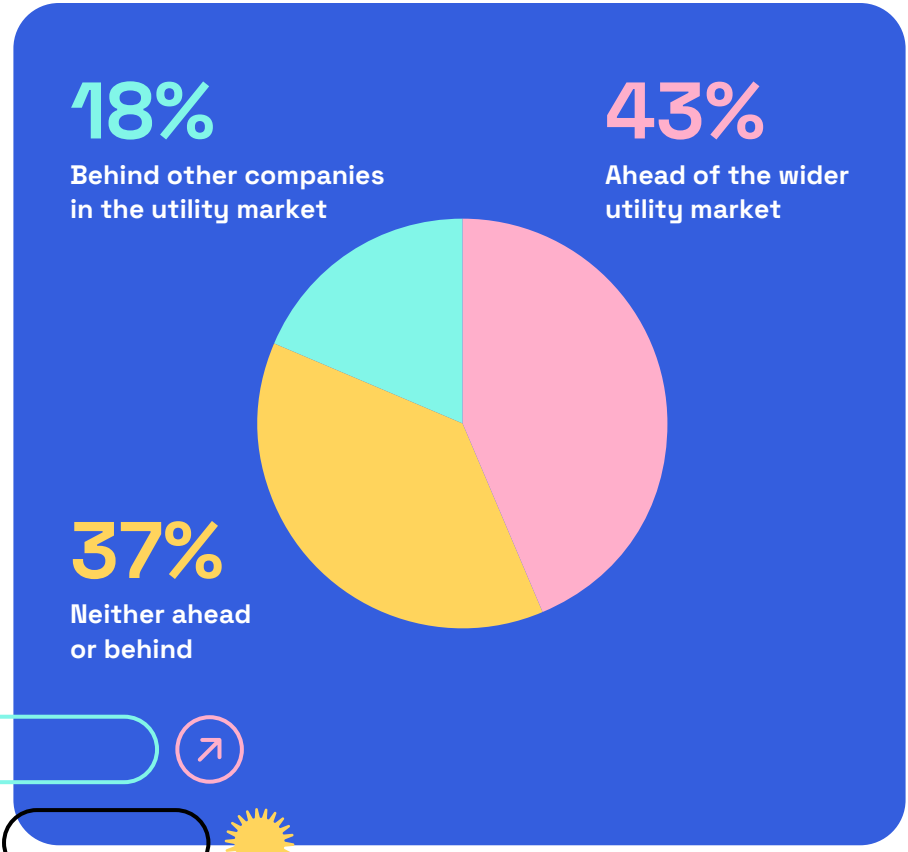
88%
To encourage innovation

84%
To meet the requirement to decarbonise

80%
To meet regulatory requirements

Judging relative progress across the sector

When asked to compare their progress with their peers, 81% think they are either on par or ahead of the wider utility market when it comes to data use. This shows that the vast majority have understood the potential of data for meeting their business needs and are taking steps to harness it.



2. Organisational maturity is growing

Energy players are moving forward rapidly when it comes to data sharing and usage. **92% of respondents either have a data use strategy in place now or will introduce one in the next 24-36 months.**

Putting in place the right investments to build a data strategy

	Agree	Neither agree or disagree	Disagree
My organisation has the financial resources	76%	20%	4%
My organisation has the necessary tech and tools	65%	31%	4%
My organisation has the resources (skills, culture, governance)	59%	33%	8%

The vast majority of organisations have put in place **the financial resources** to underpin data usage. However, fewer feel these resources are being deployed effectively. Under two-thirds (65%) say they have **the necessary technology and tools** to drive greater data use. Even fewer agree that they have dedicated **sufficient resources to culture, governance and developing employee skills**. This could explain why organisations currently have lower overall maturity around data democratisation.

Data leadership drives progress

At a strategic level companies are putting in place the roles to support data sharing,

88%
Data governance strategy

78%
Managing data access and distribution/sharing

55%
The process of creating a data culture and training employees

Organisations have appointed data leaders, starting with people **in charge of data governance** (88% of companies) and **managing data access and distribution/sharing** (78%). However, again only just over half (55%) have someone **responsible for creating a data culture and training**, reinforcing the need to accelerate maturity.

Data maturity is most focused on internal use cases

Thanks to their investments, organisations are growing in maturity, especially **around internal data sharing**, shown by the availability of data to specific groups.

Data analysts	90%
Employees who may need to access data within their working lives	86%
Developers, IT managers	86%
Customers (B2B or B2C/citizens)	71%
External partners (economic players, media, technology partners, public authorities, regulators) through open data portals	71%

Hearteningly, whether they are data specialists or not, the vast majority of internal staff can access data, **primarily using it to improve efficiency and deliver affordable services**. A lower number are using it to collaborate externally, either with other utilities, customers or the wider ecosystem.

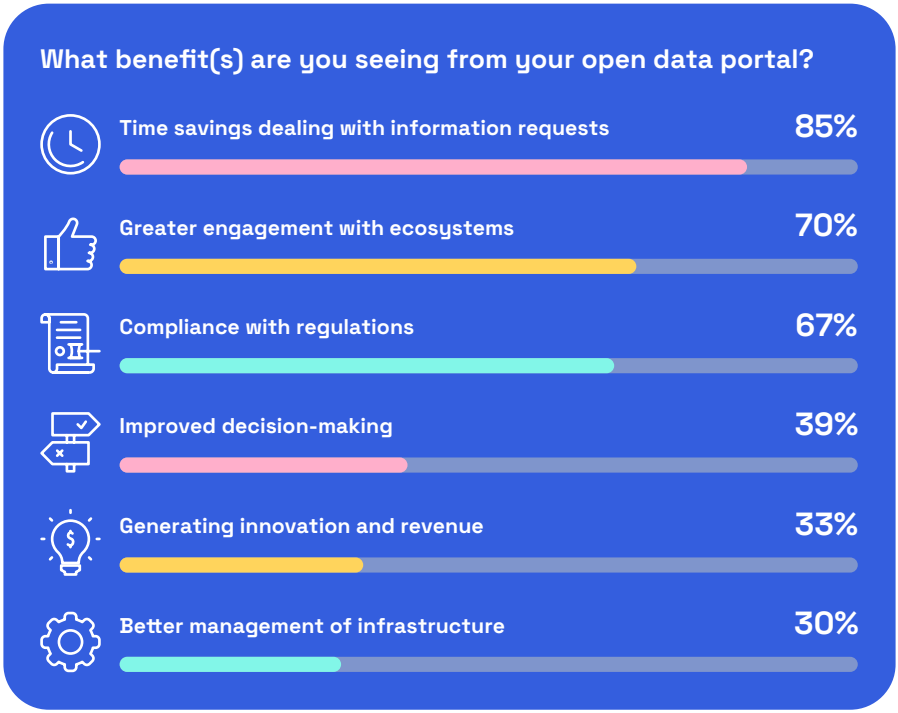
A lack of open data holds back sharing across the energy ecosystem

However, while they are using data, **the majority of organisations are not yet truly data-centric**. Many are still only scratching the surface of what can be done with data. **The focus is on internal efficiency ahead of sharing data more widely across the ecosystem**, showing a lack of true maturity.

Demonstrating this, **nearly a third (31%) of respondents don't have an open data portal**, impacting external sharing. This backs up the relatively low percentages of customers and partners who can access data shown in the graphic above.

31%
of respondents don't have an open data portal

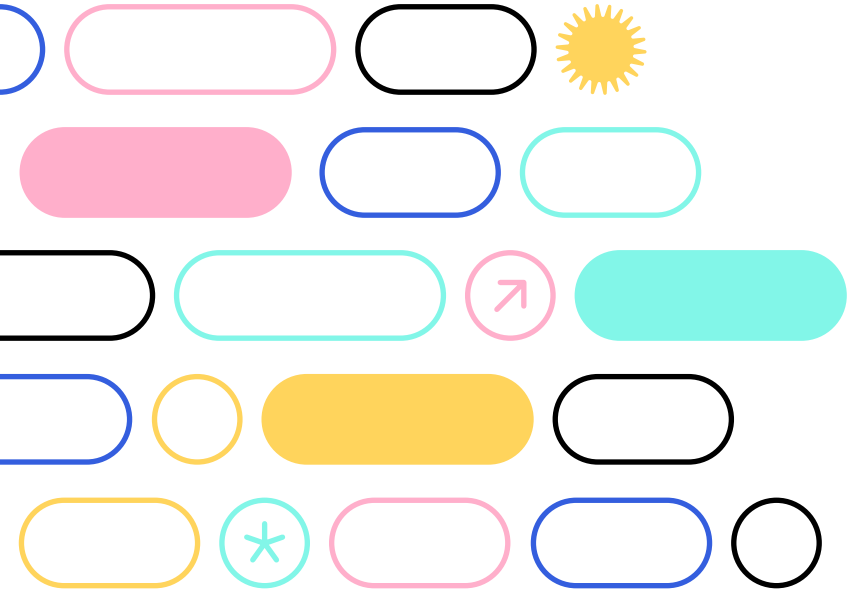
Yet, **94% of respondents with an open data portal feel it is delivering benefits**, showing its importance to data democratisation.



The pan-European perspective

The European Union has issued directives promoting open data and data sharing in the energy sector. However not all national energy regulators have formulated specific measures or regulations to drive its adoption. Additionally, some non-EU countries (the UK and Norway) have introduced their own regulations around data sharing, designed to increase transparency, aid collaboration, and accelerate decarbonisation.

While meeting regulations is just one of the benefits of sharing data, it can be the catalyst to kick-start programmes and unlock initial investment. Therefore, the degree of regulatory maturity can impact the pace and depth of data sharing by energy companies within specific countries.



3. The main challenges to achieving data democratisation

Unsurprisingly, given the scale and complexity of energy companies and the wider ecosystem, nearly three-quarters (73%) of respondents have **either encountered obstacles to better using data**, or expect to do so in the future. Just 8% believe the process of better using data will be without challenges.

Three main areas hold back wider data use and maturity:

Poor/unreliable data quality **84%**

84% of respondents cite unreliable, low-quality data as a key obstacle, with **19% seeing it as the primary challenge** to better using data. Fixing this basic issue is vital to driving trust in the organisation's data and therefore increasing usage.

Lack of data culture within the organisation **73%**

Nearly three-quarters (73%) believe their lack of an internal data culture holds back the sharing of information across the organisation. **19% rank this as their number one challenge to success** – the same percentage as data quality. Backing this up, just 59% believe they have the right skills, culture and governance resources in place, as shown in the figure in page 15. Cultural change is not easy, and progress can be slow, particularly in large organisations that are used to working in departmental silos.

Complexity of current data management tools **64%**

While around two-thirds (65%) say they have the necessary technology and data management tools in place (see page 15), 64% complain that they are difficult to use. This silos data, rather than democratising access. Often while companies have invested heavily in systems to collect and store data (such as data warehouses or data lakes), they are missing user-friendly ways to manage and share it, holding back data democratisation.

59% Lack/absence of internal resources dedicated to data management

57% Lack of data governance strategy and processes

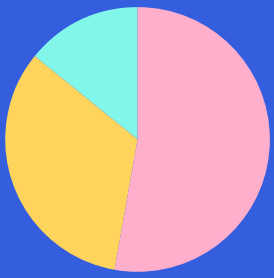
40% Regulatory constraints related to data

32% The level of investment required

The impact on decision making and collaboration

A lack of data sharing due to poor data quality, lack of a data culture and over-complex tools **has a direct impact on company operations.** For example, only a third (33%) say that their decision-making is based on thorough analysis of all available data.

When a decision is made in your organisation, what is it usually based on?



53%
Your people's experience of how your sector operates

33%
Thorough analysis of the data available to employees

14%
The perceptions of senior managers rather than hard facts

Reinforcing this immaturity in external sharing, companies are **not collaborating across their ecosystems and taking advantage of the experiences of their peers.** Instead, they turn to **independent/ management consultants** or research organisations rather than learning from other energy players.

Where do you turn for advice and guidance when it comes to data projects?

Independent consultants/management consultants	80%
Research organisations/think tanks focused on data	65%
Other utility companies within my country	57%
Utility industry organisations	37%
Other utility companies internationally	37%

4. Organisations have impressive plans for future data use

Energy companies understand that progress on data use needs to accelerate if they are to achieve data democratisation. They therefore have **ambitious plans to extend data sharing internally and externally over the next 24-36 months.**

What elements to increase data use do you have in place now, and what are your plans for the next 24-36 months?

	Already in place	Planned for next 2-3 years
Define and implement an overall data use strategy	45%	47%
Create new roles related to data sharing/use	33%	53%
Increase financial investments in data sharing tools	27%	51%
Specifically train employees on better use of data	20%	61%
Create an internal data sharing space	49%	41%
Create an external data sharing space for partners	43%	39%
Create an external open data project	33%	27%

Showing the growth, while **33% have roles dedicated to data sharing** in place now, a further 53% expect to create them within three years. **51% will increase their investment in data sharing tools** and **61% will train staff on better using data** in their jobs in the same timeframe.

Increasing maturity through more formal sharing

While energy players already share data internally and externally, they are focusing on formalising and better structuring how data is shared, such as through intuitive data portals aimed at specific groups. **90% will have created an internal data sharing space** (up from 49% today), while **82% will provide partners with a dedicated external data sharing space**, growing from 43% now.

Which of these datasets do you expect to deliver value for your organisation in the near future when shared externally?	Yes	No
Real-time operational data around the functioning of distribution networks	82%	18%
Asset data showing how specific assets are performing or where they are located, as well as providing information required for maintenance	72%	27%
IoT-based sensor information monitoring key parts of network infrastructure and collecting environmental data	72%	27%
Customer data, including usage via smart meters/meter readings, along with personal identifiable information used for billing and marketing	77%	23%
Partner data, such as local authority data about new housing or producer data about new generating capacity, which all feeds into forward planning	69%	31%

Respondents tick all that apply

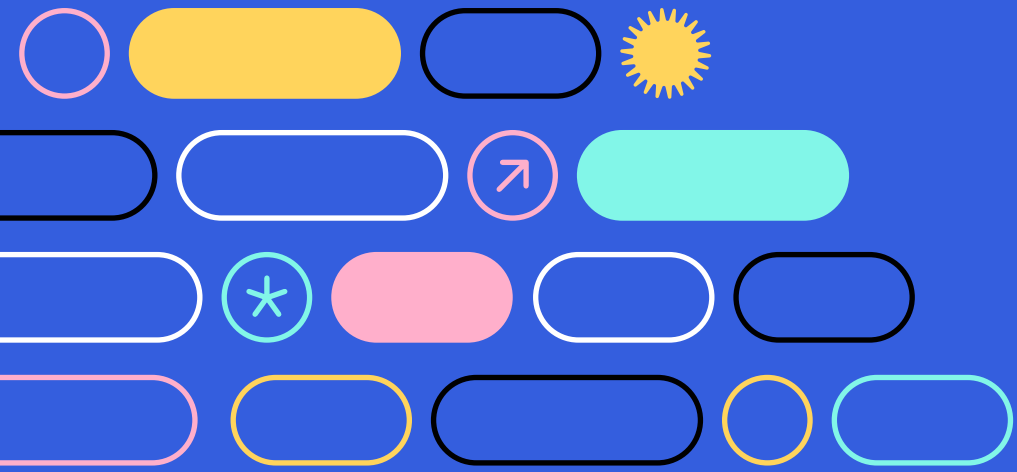
Looking forward, respondents plan to share a growing range of data types externally in order to generate value. 82% expect to achieve value by sharing real-time operational data around the functioning of distribution networks, 77% from customer data (including smart meter figures and personally identifiable information), and 73% from sharing asset and sensor data. However, on the flipside this means that between 18-27% expect to realise no value from sharing specific types of data externally. This points to a lack of integrated strategies built on the wider ecosystem benefits of external data sharing.

Recommendations

to achieving effective data democratisation

The *State of European Energy Data Sharing Study* paints a picture of a sector that has begun its data sharing journey, but understands that it still has a way to go to achieve data democratisation.

Achieving success means following proven best practices and continually monitoring, learning and improving. Based on our experience, energy players should focus on nine areas to drive results.



Understand maturity levels and strive to improve

Analysts, consultants and governments have created a range of data maturity models, which we've synthesised into a four stage process. Understand your current level and use it to benchmark your maturity progress moving forward.

0 Data Laggards

- Organisation does not see data as important
- Little knowledge of organisational data
- No regulatory compliance, culture or skills.

1 Data Aware

- Greater senior level understanding of importance of data, but no formal strategy
- Use of or access to data is limited to specialist staff
- Some governance but little understanding of all data generated by the business
- No data skills or culture

2 Data Developing

- Overall strategy and funding in place, including a clear data leader (such as a CDO)
- Governance policies and frameworks in place, but may be applied inconsistently
- Tech stack in place, but with gaps in capabilities
- Non-expert staff require support from specialist users to work with data

3 Data-centric

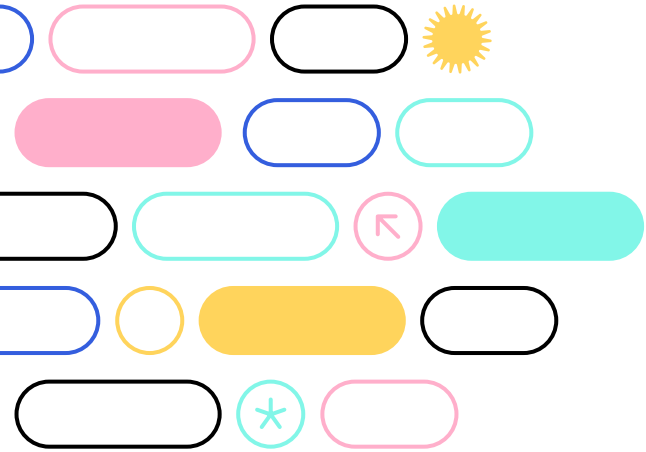
- Data is available at scale inside and outside the organisation
- Non-expert data users have little or no reliance on specialist support
- Developed data culture drives the creation of new, innovative use cases
- Data is embedded into every business process and decision
- Complete tech stack and tools, including an intuitive data portal
- Ongoing roadmap to further develop variety of datasets and introduce new data assets

Learn from others

While there is some competition between players at the retail end of the market, in the majority of cases DSOs and TSOs do not directly compete. That makes it easier for them to share their experiences, learn from others across the ecosystem and pool ideas through collaboration. When looking for best practices it is vital that companies go beyond their own countries and ecosystems - what can the experiences of players in other countries, who may have more advanced regulatory regimes, teach them? What advice can organisations in other sectors provide?

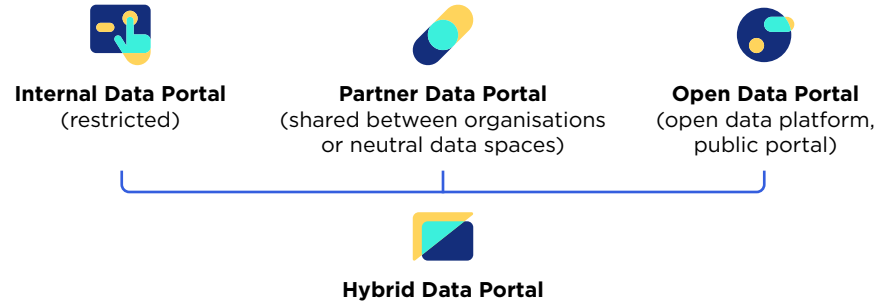
Be user-centric

Simply sharing data is not enough to drive usage. Companies need to have a laser focus on their users, whether internal or external, providing them with the right data, in the right formats, through intuitive data experiences that meet their needs. This process has to begin by listening to their requirements and engaging with communities and ecosystems. Otherwise data will remain unused, failing to unlock its true value.



Centralise sharing to break down portals

Relevant data must be easy to find and reuse by everyone. Energy players should therefore put in place one-stop shop data portals that provide stakeholders with a convenient and secure place to quickly discover and use trusted data assets. Data portals can be internal (used solely by employees), shared with specific audiences (such as partners or customers), open to use by all, as with open data portals or a hybrid of one or more of these types. Essentially they act as a gateway to your organisation's data, democratising access and its use and reuse.



Always consider privacy and security

Trust is vital to successful data sharing, particularly when it comes to customer data. Data needs to be protected at all times, and any personal information anonymised before sharing. Energy players need to demonstrate that they are meeting the highest standards around security and regulations to get customer buy-in for sharing their data.

Show the benefits

Data can be a nebulous concept to many people, whether employees, partners or customers. It can be difficult for them to see how it can be used in new ways. Energy companies therefore need to create use cases that show the benefits to individual audiences, both to demonstrate value and to encourage users to come up with new ways of harnessing data themselves.

Make data appealing

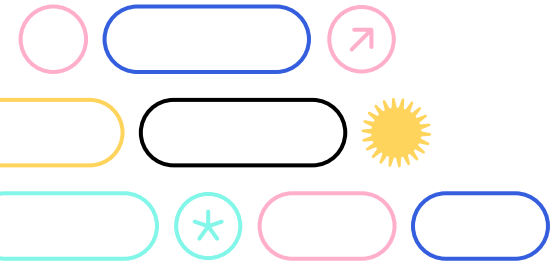
The majority of non-specialists find it hard to understand and use raw, tabular data effectively. Therefore energy companies must ensure that they are providing it in formats that they will engage with and reuse, such as drill-down dashboards, interactive maps, data stories and other visualisations. This will encourage greater engagement and drive data democratisation.

Widen ecosystems

Energy companies are used to working with specific, long-standing partners. To encourage innovation, create new services and meet challenges such as decarbonisation, they should widen their ecosystems and use data to build relationships with non-traditional partners.

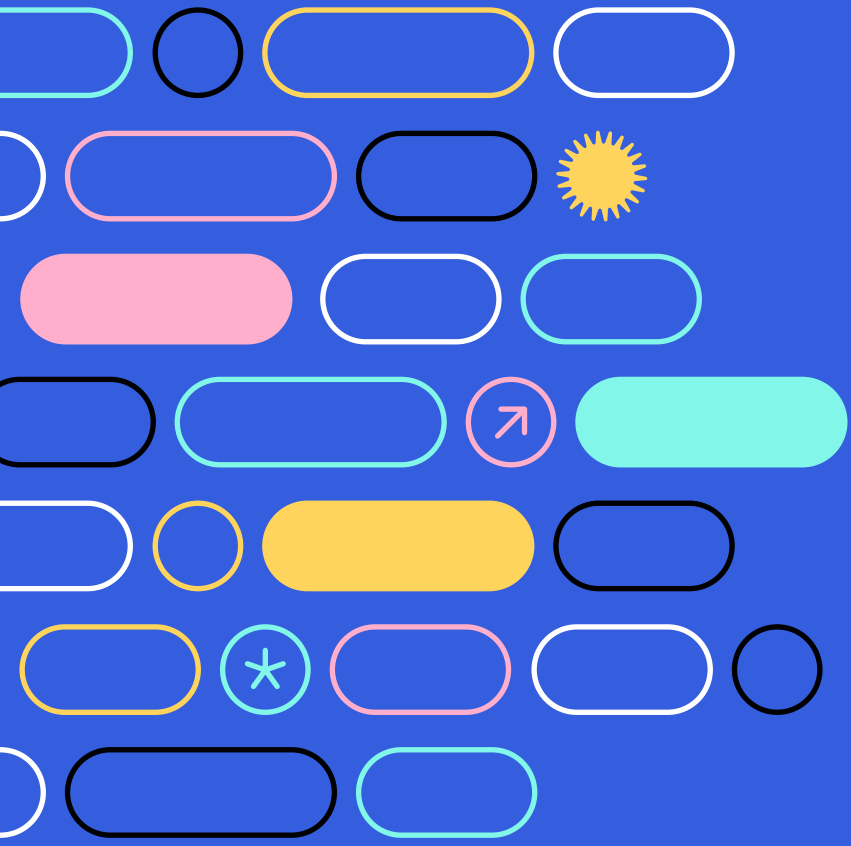
Data is a journey, not a destination

Finally, and most importantly, energy companies should understand that data sharing is a continual, ongoing process. Once the foundations are put in place, the programme needs to evolve, adding new datasets, new audiences and new use cases over time. Monitor performance against objectives and continually listen to users so that sharing continues to add value by industrialising data use.

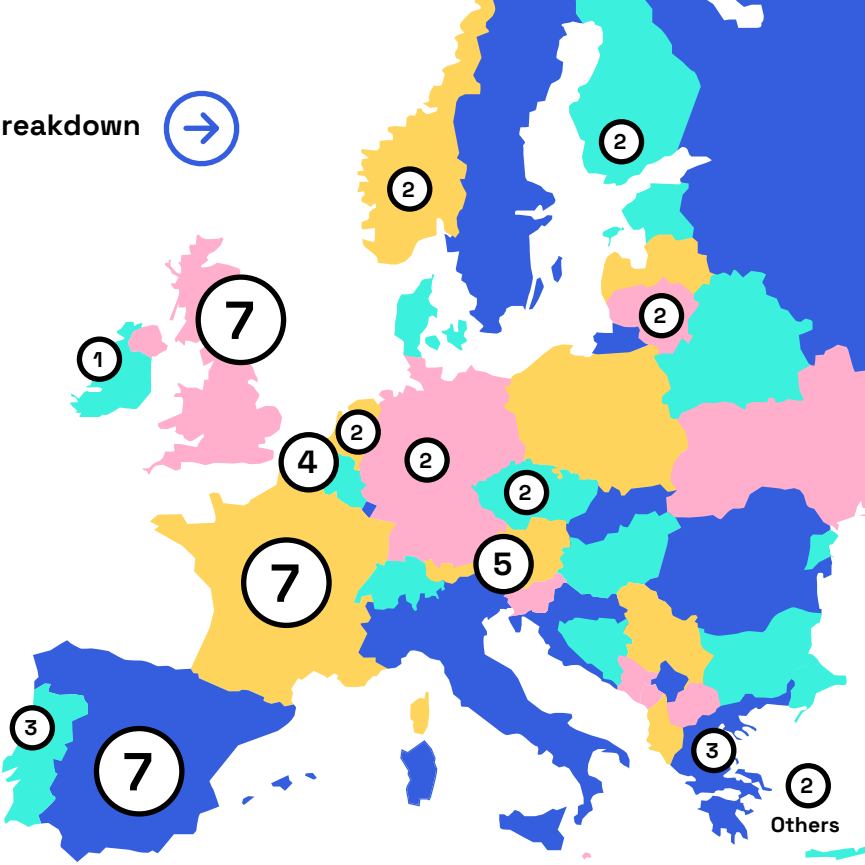


About the report

To gather data for this report, 51 executives from across the European energy sector were surveyed in Q3 2023. They included representatives from Distribution System Operators (DSO), energy producers, Transmission System Operators (TSO) and other players (including tech providers, public energy authorities, and other utilities). 51% had decision-making authority on issues related to data use and sharing.



Country breakdown

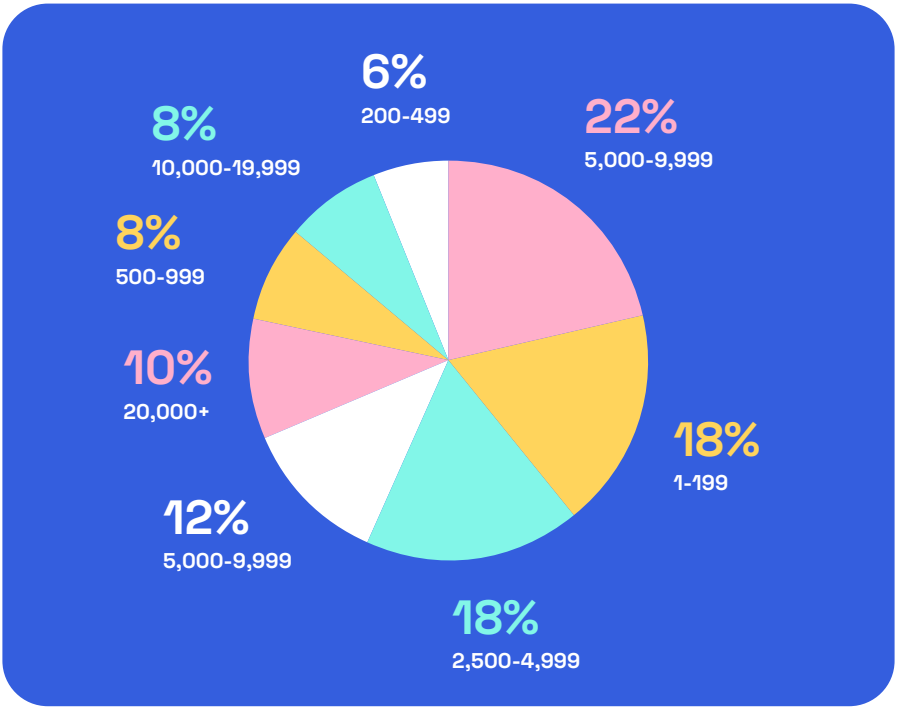


Company type

Responses came from players across the energy ecosystem, including DSOs, TSOs and energy producers.

71%	10%	4%	16%
Distribution System Operator (DSO)	**Energy producer**	**Transmission System Operator** (TSO)	**Other** (including tech provider, public energy authority, utility)

Company size (employees)



Job roles

Respondents had a broad mix of roles, covering both data and business functions, and spanned both senior (CDO/CIO/Head of) and manager level. Job titles included:

- Head of data management
- Head of Data & AI
- Head of Enterprise Data Management
- Chief Data Officer
- Head of Partnerships and Innovations
- Director of Innovation
- Data Manager
- Chief Innovation Officer
- Data Quality Manager

We would like to thank all those that completed the survey, and acknowledge the support provided by our partners E.DSO and GEODE in validating the questionnaire and helping collect the data.

opendatasoft Opendatasoft is the leader of data democratisation and provides a Data Portal solution that empowers organisations to scale personalised and seamless data experiences in record time. Opendatasoft is the essential data solution to decrease costs and digitise services, increase and build new revenue streams, mitigate risks and manage crises.

Opendatasoft serves 350 customers in 25 countries, powering more than 3,000 data portals. Based on this experience, we've developed a unique expertise in data management, which we use to provide our customers with premium services to help them deliver use cases that meet their specific needs.

Opendatasoft works with energy companies across Europe, enabling them to quickly open and democratise their data, meet changing regulatory requirements and create and share compelling digital experiences across their internal and external ecosystems.

European Distribution System Operators (E.DSO) promotes and enables customers empowerment and the increase in the use of clean energy sources through electrification, the development of smart and digital grid technologies in real-life situations, new market designs and regulation. E.DSO brings together 35 leading electricity distribution system operators (DSOs), including two national associations, cooperating to ensure the reliability of Europe's electricity supply for consumers and enabling their active participation in our energy system.

Founded in 1991 GEODE is made up of European independent gas and electricity distribution companies. The association represents more than 1,200 privately and publicly-owned companies in 15 countries, serving a population of 100 million people. GEODE defends the interests of local distributors with energy authorities at a national and international level and allows the exchange of expertise, and the sharing of data and knowledge.