

# Digitalising the Energy System

Fields marked with \* are mandatory.

## INTRODUCTION

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This consultation will soon also be available in 23 European Union official languages. These versions will be available progressively on this website. If you wish to respond in one of these languages, please wait until then to provide your replies.

## BACKGROUND FOR THIS CONSULTATION

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To meet the [European Green Deal](#) objectives to decrease GHG emissions by at least net 55% by 2030 and achieve climate neutrality by 2050, the twin green and digital transition calls for a better-functioning, smart, integrated and cleaner energy system, while guaranteeing affordable energy and a fair transition for all. In addition, the Green Deal aims to deliver growth and jobs, improve competitiveness of the EU companies by enabling new opportunities for businesses and drive innovative solutions by encouraging the development of trustworthy technology. At the same time, the digital transformation must benefit everyone, while putting people at the centre of policymaking, as well as making their contributions as citizens, consumers, prosumers, or as part of energy communities prominent and ensuring they play an active role in the energy markets.

Digitalisation of the energy system is key to deliver all these goals. At each step of the supply chain, namely production, distribution, storage, supply, and consumption, digitalisation provides new tools to manage the energy system more efficiently and facilitates the entry of new market participants and the development and deployment of new data driven energy services. Digitalisation is for example necessary to optimise the production and consumption of energy in order to minimise CO<sub>2</sub> emissions, notably by enabling smart homes, buildings and energy devices (from decentralised production, storage and use by machinery or domestic appliances) to provide flexibility and to interact with the energy system, including through smart charging of electric cars. In addition, solutions such as Big Data for predictive maintenance of wind farms or High-Performance Computing for the development of new materials for more efficient batteries or PV panels will help the energy transition.

The **Digitalisation of Energy Action Plan**, which is the object of this public consultation, was announced in the Communication "[An EU strategy for Energy System Integration](#)", which stated the Action Plan's key role to accelerate the implementation of digital solutions and the integration of energy systems, which relate to energy carriers, their respective infrastructure, and their consumption sectors.

The Communication on the **Digitalisation of Energy Action Plan** will build on the Communication on "[A European Strategy for Data](#)", on the [Regulation on the Free Flow of Non personal Data - \(EU\) 2018/1807](#)

and on the [Regulation on the General Data Protection - \(EU\) 2016/679](#) in order to ensure a transparent and well-functioning data framework. The Action plan will also propose concrete steps for the development of a common European Energy data space – as one of the nine data spaces identified in the Communication on “A European Strategy for Data”. Furthermore, the Action Plan aims to support further cooperation between the ICT and the energy system to ensure a more sustainable use of energy in the ICT sector, supporting the **European Green Digital Coalition**.

The Communication on **Digitalisation of Energy Action Plan** will also support the implementation of the Clean Energy Package (2019) and will be in line with the Communication on “[the European way for the Digital Decade](#)” - adopted in March 2021.

## What is the purpose of the Action Plan?

The digital transformation of the energy system brings a lot of benefits, but it also brings risks and challenges related to the specificities of the energy system, notably how to mix of legacy technologies with new and smart technologies, the cybersecurity threats which might affect the energy supply as an essential service to society, as well as the growing energy consumption linked to the use of ICT technologies (e.g.. data centres). An integrated EU policy response is required to ensure that investments in digital technologies in the energy system contribute to the Green Deal and to a Europe that is fit for the digital age. EU action should also ensure that digitalisation of the energy system contributes to a well-functioning single market for goods and services related to energy and to data.

Policy measures are needed to ensure that new markets based on energy data are open and competitive, while respecting ethics, and ensuring data protection, privacy and cybersecurity, with consideration to the specificity of the energy system. The increased energy demand for ICT systems needs to be adequately managed in the context of an integrated energy system. Thus, digital and energy value chains need ever increasing cooperation.

The **Action Plan** will outline how different EU policies and funding instruments will work together to exploit the benefits of the digital transformation of the energy system, while minimising the inherent risks and environmental footprint of the respective digital solutions. The Action Plan will identify possible complementary actions to ensure synergies between those, for example in relation to data sharing for smart grids, smart buildings and smart cities.

## What is the purpose of this consultation?

This questionnaire seeks to collect views from citizens; business communities and industry, including energy and ICT companies; Member States and public authorities; local, economic and social partners, including non-governmental organisations; consumers organisations; academia and research institutes; as well as other digital and energy stakeholders. The questionnaire is divided into the following three sections:

- I. Your involvement in digitalisation of energy and interest in the action plan
- II. Individuals and consumers in the digitalisation of the energy system
  1. An existing example of digitalisation of energy in everyday life: your energy consumption data
  2. Consumer empowerment and citizen engagement in the energy transition

### III. Tackling specific facets of digitalisation of the energy system:

1. Ensuring climate neutrality of ICT
2. Enhancing the cybersecurity of the energy system
3. Enhancing the uptake of digital technologies in the energy system
4. Developing a European data-sharing infrastructure for new energy services
5. International cooperation on digitalisation of energy

The first section aims to collect knowledge on the profile of the respondents.

The second section is aimed primarily at individuals, independently of their level of knowledge about the energy system or not. It addresses general issues relating to the digitalisation of energy, as well as how individuals perceive the twin green and digital transitions in the energy system. The third section is rather targeted to stakeholders involved in such issues. Non-expert individuals are of course more than welcome to answer all questions should they have views on specific questions.

#### How can I participate?

You can complete this questionnaire on the Commission website **until 24 January 2022**. Please use the button at the bottom of the questionnaire to upload feedback in other document formats.

A synopsis report of this public consultation, as well as a summary of all consultation activities' results will be published on this page at the end of the consultation period.

## RESPONDING TO THIS CONSULTATION AND FOLLOW-UP

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In this context and in line with '[better regulation](#)' principles, the Commission is launching this public consultation designed to gather stakeholder views on the digitalisation of the energy system.

This public consultation is part of a planned larger stakeholder consultation which will feed into the Commission's work on the action plan. It builds upon the results from the feedback received from the Roadmap consultation on this initiative, which took place between 23 July and 10 September 2021. Views are welcome from all stakeholders.

**Please note:** In order to ensure a fair and transparent consultation process **only responses received through our online questionnaire will be taken into account** and included in the report summarising the responses. Should you have a problem completing this questionnaire or if you require particular assistance, please contact *ENER-B5-SECRETARIAT@ec.europa.eu*.

## ABOUT YOU

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#### \* Language of my contribution

- Bulgarian
- Croatian

- Czech
- Danish
- Dutch
- English
- Estonian
- Finnish
- French
- German
- Greek
- Hungarian
- Irish
- Italian
- Latvian
- Lithuanian
- Maltese
- Polish
- Portuguese
- Romanian
- Slovak
- Slovenian
- Spanish
- Swedish

\* I am giving my contribution as

- Academic/research institution
- Business association
- Company/business organisation
- Consumer organisation
- EU citizen
- Environmental organisation
- Non-EU citizen
- Non-governmental organisation (NGO)
- Public authority
- Trade union
- Other

\* First name

Secretary

\* Surname

General

\* Email (this won't be published)

sg@aioti.eu

\* Organisation name

*255 character(s) maximum*

Alliance for Internet of Things Innovation IVZW (AIOTI)

\* Organisation size

- Micro (1 to 9 employees)
- Small (10 to 49 employees)
- Medium (50 to 249 employees)
- Large (250 or more)

Transparency register number

*255 character(s) maximum*

Check if your organisation is on the [transparency register](#). It's a voluntary database for organisations seeking to influence EU decision-making.

380738729287-22

\* Country of origin

Please add your country of origin, or that of your organisation.

- |                                      |  |                                     |  |
|--------------------------------------|--|-------------------------------------|--|
| <input type="radio"/> Afghanistan    | <input type="radio"/> Djibouti           | <input type="radio"/> Libya         | <input type="radio"/> Saint Martin                     |
| <input type="radio"/> Åland Islands  | <input type="radio"/> Dominica           | <input type="radio"/> Liechtenstein | <input type="radio"/> Saint Pierre and Miquelon        |
| <input type="radio"/> Albania        | <input type="radio"/> Dominican Republic | <input type="radio"/> Lithuania     | <input type="radio"/> Saint Vincent and the Grenadines |
| <input type="radio"/> Algeria        | <input type="radio"/> Ecuador            | <input type="radio"/> Luxembourg    | <input type="radio"/> Samoa                            |
| <input type="radio"/> American Samoa | <input type="radio"/> Egypt              | <input type="radio"/> Macau         | <input type="radio"/> San Marino                       |

- Andorra
- Angola
- Anguilla
- Antarctica
- Antigua and Barbuda
- Argentina
- Armenia
- Aruba
- Australia
- Austria
- Azerbaijan
- Bahamas
- Bahrain
- Bangladesh
- Barbados
- Belarus
- Belgium
- Belize
- Benin
- Bermuda
- Bhutan
- Bolivia
- Bonaire Saint Eustatius and Saba
- Bosnia and Herzegovina
- Botswana
- Bouvet Island
- El Salvador
- Equatorial Guinea
- Eritrea
- Estonia
- Eswatini
- Ethiopia
- Falkland Islands
- Faroe Islands
- Fiji
- Finland
- France
- French Guiana
- French Polynesia
- French Southern and Antarctic Lands
- Gabon
- Georgia
- Germany
- Ghana
- Gibraltar
- Greece
- Greenland
- Grenada
- Guadeloupe
- Guam
- Guatemala
- Guernsey
- Madagascar
- Malawi
- Malaysia
- Maldives
- Mali
- Malta
- Marshall Islands
- Martinique
- Mauritania
- Mauritius
- Mayotte
- Mexico
- Micronesia
- Moldova
- Monaco
- Mongolia
- Montenegro
- Montserrat
- Morocco
- Mozambique
- Myanmar/Burma
- Namibia
- Nauru
- Nepal
- Netherlands
- New Caledonia
- São Tomé and Príncipe
- Saudi Arabia
- Senegal
- Serbia
- Seychelles
- Sierra Leone
- Singapore
- Sint Maarten
- Slovakia
- Slovenia
- Solomon Islands
- Somalia
- South Africa
- South Georgia and the South Sandwich Islands
- South Korea
- South Sudan
- Spain
- Sri Lanka
- Sudan
- Suriname
- Svalbard and Jan Mayen
- Sweden
- Switzerland
- Syria
- Taiwan
- Tajikistan

- Brazil
- British Indian Ocean Territory
- British Virgin Islands
- Brunei
- Bulgaria
- Burkina Faso
- Burundi
- Cambodia
- Cameroon
- Canada
- Cape Verde
- Cayman Islands
- Central African Republic
- Chad
- Chile
- China
- Christmas Island
- Clipperton
- Cocos (Keeling) Islands
- Colombia
- Comoros
- Congo
- Cook Islands
- Costa Rica
- Côte d'Ivoire
- Guinea
- Guinea-Bissau
- Guyana
- Haiti
- Heard Island and McDonald Islands
- Honduras
- Hong Kong
- Hungary
- Iceland
- India
- Indonesia
- Iran
- Iraq
- Ireland
- Isle of Man
- Israel
- Italy
- Jamaica
- Japan
- Jersey
- Jordan
- Kazakhstan
- Kenya
- Kiribati
- Kosovo
- New Zealand
- Nicaragua
- Niger
- Nigeria
- Niue
- Norfolk Island
- Northern Mariana Islands
- North Korea
- North Macedonia
- Norway
- Oman
- Pakistan
- Palau
- Palestine
- Panama
- Papua New Guinea
- Paraguay
- Peru
- Philippines
- Pitcairn Islands
- Poland
- Portugal
- Puerto Rico
- Qatar
- Réunion
- Tanzania
- Thailand
- The Gambia
- Timor-Leste
- Togo
- Tokelau
- Tonga
- Trinidad and Tobago
- Tunisia
- Turkey
- Turkmenistan
- Turks and Caicos Islands
- Tuvalu
- Uganda
- Ukraine
- United Arab Emirates
- United Kingdom
- United States
- United States Minor Outlying Islands
- Uruguay
- US Virgin Islands
- Uzbekistan
- Vanuatu
- Vatican City
- Venezuela

- Croatia
- Cuba
- Curaçao
- Cyprus
- Czechia
- Democratic Republic of the Congo
- Denmark
- Kuwait
- Kyrgyzstan
- Laos
- Latvia
- Lebanon
- Lesotho
- Liberia
- Romania
- Russia
- Rwanda
- Saint Barthélemy
- Saint Helena
- Ascension and Tristan da Cunha
- Saint Kitts and Nevis
- Saint Lucia
- Vietnam
- Wallis and Futuna
- Western Sahara
- Yemen
- Zambia
- Zimbabwe

**\* Contribution publication privacy settings**

The Commission will publish the responses to this public consultation. You can choose whether you would like your details to be made public or to remain anonymous.

**Anonymous**

Only organisation details are published: The type of respondent that you responded to this consultation as, the name of the organisation on whose behalf you reply as well as its transparency number, its size, its country of origin and your contribution will be published as received. Your name will not be published. Please do not include any personal data in the contribution itself if you want to remain anonymous.

**Public**

Organisation details and respondent details are published: The type of respondent that you responded to this consultation as, the name of the organisation on whose behalf you reply as well as its transparency number, its size, its country of origin and your contribution will be published. Your name will also be published.

I agree with the [personal data protection provisions](#)

**I. Your involvement in digitalisation of energy and interest in the action plan**

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1) What is your level of knowledge and perception of the sector?

	Excellent	Very good	Good	Basic	I do not know
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My knowledge of the energy value chain and its dynamics is:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My knowledge of how digital and data-driven solutions apply and could apply to the energy system is:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My knowledge of who I am sharing my energy data (third parties) with is:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2) What is your or your organisation's involvement in digitalisation of the energy system?

- Production or storage of renewable electricity
- Production of non-renewable electricity
- Production of another energy source or energy carrier (oil, natural or bio gas, hydrogen, synthetic fuel, etc.)
- Electricity transmission or distribution system operator
- Gas transmission or distribution system operator
- Other energy system operator
- Electricity supplier
- Gas supplier
- Heat supplier
- Other energy supplier
- Energy equipment manufacturer
- Energy consumer association
- Electricity aggregator
- Energy service provider or Energy Service Company (ESCO)
- Energy Regulatory authority
- Telecom Regulatory authority
- Data privacy controller
- Telecom infrastructure operator
- IT technology provider
- IT services provider
- System integrator
- Investor
- Public Institution
- Research/Academia
- Industrial/business consumer
- Household consumer

Other

3) Are you or is your organisation involved in Information Technologies and/or data-driven solutions?

- Yes, including specifically for the energy market
- Yes, but not specifically for the energy market
- No
- I do not know

4) For energy consumers (enterprises or households): To what extent do you agree with the following statements?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	I do not know
I compare offers and prices of different energy suppliers regularly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe digital technologies in the energy system will help me better understand how the energy system works.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am interested to be a more active consumer (e.g. changing my energy consumption habits) if digital solutions can help me do so easily.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I treat third-party access to my energy data (e.g. my electricity consumption habits) with less importance than third-party access to other personal data (e.g. on the internet).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am willing to give third parties more access to my energy data if I will benefit from it (e.g. a lower electricity bill).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I am willing to give third parties more access to my energy data if I understand how it contributes to the transition to a climate neutral society.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Under no circumstances am I willing to give more access to my energy data than I currently am giving.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that the benefits of having more connected devices (e.g. an electric car, a smart heating system) outweigh the possible risks they bring (e.g. privacy).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that the benefits of having more connected devices outweigh the increased energy consumption they may generate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is unclear to me what digitalisation of the energy system would bring to me as an individual consumer.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5) To what extent do the following areas require further EU policy action when it comes to digitalisation of energy? *[Please rank from 1 (highest priority) to 5 (lowest priority)]*

	1	2	3	4	5
Developing a European data-sharing infrastructure for new energy services	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Empowering individuals to fully participate in the energy transition	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enhancing the uptake of digital technologies in the energy system	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enhancing the uptake of digital technologies in the energy system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ensuring climate neutrality of ICT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

6) Which other areas would you consider important to further support the digitalisation of the energy system?

Energy/carbon use monitoring/control in vertical domains for example energy manufacturing buildings /homes agriculture smart city automotive mobility supply chains transportation Strengthen circular economy by recycling and reusing IoT and edge computing equipment Develop platform for benchmarking and methodology to assess ICT energy efficiency and certification for business deployment Facilitating deployment of innovative enabling technologies (IoT, edge computing and AI) in critical sectors

7) What are the three main risks that the integration of digital solutions may bring to the energy system and which should be addressed?

*at most 3 choice(s)*

- Lack of investments
- Complexity of technologies and lack of simple plug-and-play solutions
- Lack of a consistent regulatory framework
- Lack of market flexibility, understood as market structures that are unable to promptly integrate intermittent renewables
- Lack of interoperability because of insufficient use of commonly agreed standards for data exchange for systems and devices
- Risks related to privacy and data protection
- Lack of sufficient data exchange due to commercial confidentiality/ existing business models
- Lack of digital competences and skills
- Lack of trust and/or public acceptance
- Risk of cyber attacks
- Other

8) What other sectors can the energy sector learn the most from when it comes to the integration of digital solutions?

- Transport and mobility
- Financial services, Banking, Insurance
- Building automation/domotica
- Public Administration
- Agriculture
- Water distribution
- Meteorology
- Education
- Culture
- Advertising & marketing

- Healthcare
- All of the above
- I do not know/No Opinion
- Other

9) Please elaborate on the above choice(s) for question 8.

*1000 character(s) maximum*

IoT/cloud/edge integration is example that could help with uptake of new digital technologies and show new possibilities.

## II. Individuals and consumers in the digitalisation of the energy system

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### 1) An existing example of digitalisation of energy in everyday life: your energy consumption data

#### ISSUES

10) How do you expect having access to regular information on your energy consumption (or generation) could impact your role as final customer in the electricity market?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	I do not know
Paying only for what I use (no more estimated bills or back-billing).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Incentivising to reduce energy consumption and GHG emissions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comparing real consumption figures with those of peers, and better tracking my behaviour.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shopping around for the price that is right for me; checking competitive offers and opportunities to switch.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Adjusting my energy use and making savings; keeping my bills in check.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessing services that could help me improve my carbon footprint.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessing innovative services where I can get tailored energy efficiency advice.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessing innovative services where I can shift my consumption during the day and get rewarded for it (demand response).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessing services that could help me engage with my local energy community.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessing innovative services beyond energy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10 a) If other impact, please specify:

*100 character(s) maximum*

11) What could be the risks when you decide to allow service providers of your choice access your metering and consumption (generation) data?

	No risk	Low risk	Medium risk	High risk
Personal data breaches and potential misuse of my leaked data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Giving away personal information on my personal habits through detailed data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The right permissions for access to my data are not in place, or not properly validated or timely revoked	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Malpractices or unlawful processing or storage of data by service providers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Losing control of my energy consumption	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11a) If other risk, please specify:

*100 character(s) maximum*

## BARRIERS

12) Have you experienced difficulties when requesting access to your own metering and consumption (generation) data?

- Yes
- No
- Not applicable
- I do not know / no opinion

## ACTIONS

13) Should it be made easier for final consumers to have access to their real-time and historic consumption and metering data?

- Yes
- No

*13a) If yes, which mechanism(s) would help achieve this?*

- Having the right tools in place, such as smart meters, for making reliable and granular energy data available.
- A wide choice of consumer-friendly feedback channels, e.g. in-home display, mobile apps, portals, bills.
- Common rules for utilities to communicate final customer energy data and ensure a consistent customer experience.
- A one-stop-shop for online access to energy use data.
- Enhanced comprehensibility of the collected data and consumptions, and user-friendliness of relevant portals and displays.
- Other
- I do not know / no opinion

14) Should it be made easier for third parties (such as suppliers, network operators, energy service providers) to have access to data of final customers?

- Yes
- No
- I do not know / No opinion

14 a) If Yes, which mechanism(s) would help achieve this?

- An attractive offer to use the data that brings benefits to the individuals.
- Practical solutions that allow individuals to exercise control, such as mobile and online dashboards or apps.
- Use of commonly agreed rules and standards to allow for interoperability when it comes to data access and exchange.
- Security measures to protect the data.
- Transparent reporting on how the eligible party uses the data.
- Specific limitations regarding how (long) an eligible party may use specific datasets.
- Other
- I do not know / no opinion

15) What measures could mitigate the risks you have identified?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	I do not know
Security measures to protect my data in line with EU rules.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Transparent reporting on how my data gets used.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Specific limitations regarding how (long) a party, that is allowed by law or chosen by me, may use specific datasets.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

15a) Any other measure, please specify:

*100 character(s) maximum*

Recommend European best practises Use of Relevant existing standards of CEN/CENELEC

## 2) Consumer empowerment and citizen engagement in the energy transition

### ISSUES

16) What are the most important ways for digitalisation of the energy system to significantly improve the engagement of citizens and the empowerment of consumers in the clean energy transition?



*at most 3 choice(s)*

- Facilitating decision-making by making it easier for consumers to access relevant information.
- Raising awareness about energy consumption (e.g. via accessing real-time data, historical comparisons, benchmarking and metering data).
- Providing tailored advice to reduce the carbon footprint (e.g., energy saving tips based on consumers' past behaviour) and their energy bill(s) for gas and electricity.
- Improving the understanding of the functioning of the energy system so to reduce their potential distrust (e.g. communication and awareness raising campaign).
- Empowering consumers to better understand their energy needs and consumption patterns (e.g. keep track of their spending, check their prices, and help save money on their bills).
- Empowering consumers to choose their supplier / service provider.
- Encouraging consumers to change their consumption patterns and reduce their energy use during peak times.
- Enabling more mobilisation at local and regional level by facilitating exchanges and data sharing through energy communities, peer-to-peer trading and group purchasing.
- Other

17) What are the most important services that digital tools can provide to engage citizens or empower consumers in the energy transition?

*at most 3 choice(s)*

- Accessing data in a safe, secure and timely manner.
- Raising awareness through applications that facilitate social interaction and community action.
- Facilitating the access and visualisation of energy data and information to all in a safe, secure, timely and cost-effective manner.
- Easier identification of the origin of energy (e.g. if it is produced from renewables or not).

- Offering services that enable consumers to better understand, control and eventually change without cost their contract (e.g. by tailoring it to their needs in terms of power required on a continuous basis, on a seasonal basis or over a limited period of time), or their behaviour based on their energy production /consumption patterns (with the aim to lower their energy consumption bills also accessible to non-smart phone users (e.g. older persons) or persons with disabilities).
- Offering smart home services that combine energy services with non-energy services and benefits (e.g. health, safety, convenience).
- Offering innovative tailor-made services (e.g. analysis of energy efficiency improvements or investments, peer-to-peer exchange and energy sharing).
- Other

## BARRIERS

18) What are the most important barriers to address so that digital solutions help citizens to engage actively and easily in the energy transition?

*at most 3 choice(s)*

- Lack of social acceptance and mistrust in data sharing.
- Lack of appropriate digital tools for individuals to understand and use easily.
- Lack of knowledge and awareness from consumers of digital solutions in energy, their use and their benefits.
- Lack of skills in using digital solutions in the energy system.
- Lack of a framework that fully unleashes the potential benefits of digital solutions for end-consumers (e.g. public incentives, clarity on contractual conditions or switching procedures).
- Perceived or real cost of deployment of digital solutions compared to unclear or insufficient benefits.
- I do not know/No opinion.
- Other

## ACTIONS

19) In what order of priority should the European Commission consider the following measures to encourage a more consumer-centric approach to the uptake of digital technologies in the energy system? *[Please rank from 1 (highest priority) to 5 (lowest priority)]*

	1	2	3	4	5
EC action should stimulate the development and implementation of digital tools to support citizens (including at community level) becoming active consumers and invest in the energy transition.	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
EC action should encourage an innovative data-driven energy services market to boost consumers' benefits and rights.	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
EC action should develop reskilling and upskilling pathways as well as "digital energy literacy".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
EC action should consider additional measures to guarantee that EU citizens' rights that apply offline (in the energy market or when buying a product) can also be fully exercised when procuring digital energy services.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
EC action should use digital tools to support tailor-made solutions to engage individuals in the energy transition that take into account socio-economic and national/regional cultural differences, paying particular attention to the digital divide and energy poverty issues.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

20) Are there other actions that the EU should consider to encourage a more consumer-centric approach to the uptake of digital technologies in the energy system?

*1000 character(s) maximum*

Favour the deployment of critical cross-sectorial technology components in particular V2H/V2G; house retrofit incentives embedding digital technologies across sectors (heat, transport, renewables, etc)

This is the end of the first part of the questionnaire. The following sections are rather targeted to individuals or organisations with knowledge of the existing EU framework in the relevant fields of intervention. You may submit the questionnaire (at the bottom of the page) at any moment; all questions do not need to be answered.

**Would you like to answer the second part of the questionnaire, dealing with specific facets of the digitalisation of the energy system (climate neutrality of ICT, cybersecurity, uptake of digital solutions, data-sharing infrastructure, international aspects) ?**

- Yes
- No

### **III. Tackling specific facets of the digitalisation of the energy system**

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#### **1) Supporting the development and uptake of climate neutral solutions for Information and Communication Technologies**

## ISSUES

21) Which areas of the ICT sector should further contribute to the EU's climate objectives? *[Please rank from 1 (highest priority) to 4 (lowest priority)]*

	1	2	3	4
Data centres, servers, and other data processing	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communication infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Distributed devices (e.g. appliances)	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Software (e.g., communication protocols, blockchain, artificial intelligence or supercomputing applications)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

22) Please explain your above choices if you deem necessary

*1000 character(s) maximum*

Efforts should be made on distributed devices having most impacts to the energy system such as Heat Pumps, PV & EV chargers as well as datacenter & AI

## BARRIERS

23) What are the most important barriers for the ICT sector in the EU to invest in sustainable energy and energy efficiency?

*at most 3 choice(s)*

- Lack of available climate neutral solutions for the ICT sector
- Lack of regulatory measures, common standards or rules for greening the ICT sector
- Lack of private investment in climate neutral solutions for the ICT sector
- Lack of public investment in research and innovation
- Lack of awareness or interest of the ICT sector to invest in sustainable energy solutions
- Lack of interest from consumers to use/procure IT solutions based on sustainable energy
- Lack of coordination between ICT companies and energy companies (e.g. to use excess heat from data centres for heat supply to buildings, industries or storage)
- Lack of capital to invest in sustainable energy solutions
- Lack of sectoral goals for renewable energy sources (RES)
- Greening requirements would harm the competitiveness of the solutions and industry

Other

## ACTIONS

24) In what order of priority should the European Commission consider the following measures related to the greening of the ICT sector? *[Please rank from 1 (highest priority) to 5 (lowest priority)]*

	1	2	3	4	5
EC action should support the IT industry to propose self-regulatory measures and pledges to achieve climate neutrality.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
EC action should consider sustainable energy requirements for the ICT sector, such as energy efficiency targets, and renewable energy use targets.	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
EC action should consider establishing a principle of full-lifecycle end-to-end transparency for ICT products and services.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
EC action should consider planning requirements for ICT infrastructure, such as on freshwater use and heat reuse.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
EC action should support research and innovation of climate neutral digital solutions via additional targeted funding.	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

25) Are there other actions the EU should consider to green the ICT sector?

*1000 character(s) maximum*

Define proper standards and KPIs to benchmark efficiency of the ICT sector, similar to the EPBD

## 2) Enhancing the cybersecurity of the energy system

### ISSUES

26) Do you believe the energy transition will introduce new cybersecurity risks? Please provide your view on the risk-level per part of the energy system:

26a) Production assets:

	No risks	Yes, low risks	Yes, medium risks	Yes, high risks
Electricity: Centralised production	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Electricity: Decentralised production (PV, wind farms)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Gas, including renewable gases	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Oil and other liquid fuels	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

### 26b) Transmission and/or distribution infrastructure

	No risks	Yes, low risks	Yes, medium risks	Yes, high risks
Electricity transmission networks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Electricity distribution networks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Public charging points for electric vehicles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Heat (district heating networks)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Gas (including future renewable gases) pipelines, compressor stations, storage facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Oil pipelines, other fuel pipelines, storage facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### 26c) Consumption by household consumers (per type of consuming devices)

	No risks	Yes, low risks	Yes, medium risks	Yes, high risks
Electricity for heating and cooling (e.g., electric radiators, heat pumps, air conditioning)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Electricity for appliances and electronics (e.g., lighting, white goods, consumer electronics)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Electricity for transport (home charging points, electric cars)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Home electricity storage in batteries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Gas (e.g. boilers)	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

### 26d) Consumption by non-household consumers (Industrial and Business)

	No risks	Yes, low risks	Yes, medium risks	Yes, high risks
Electricity	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Gas	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Oil, other liquid fuels	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Home electricity storage in batteries	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Industrial size storage (industrial batteries, electrolysers)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

### 26e) IT infrastructure used by the energy system

	No risks	Yes, low risks	Yes, medium risks	Yes, high risks
Smart Meters for Electricity	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Smart Meters for Gas	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Tele-communication infrastructure	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Data storage (data centres, cloud infrastructure)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Data exchange interfaces of electricity-consuming devices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

27) Specifically related to electricity risks, will the large-scale deployment of connected devices and infrastructures (such as electric vehicles & charging points, heat pumps, photovoltaic panels & inverters, home or industrial batteries) increase the cybersecurity vulnerabilities of the electricity grid by having an impact in the following areas?

	No risks	Yes, low risks	Yes, medium risks	Yes, high risks
The uninterrupted service/ security of electricity supply	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Reliability of data for other commercial operations (B2B or B2C), like billing for charging, trading, aggregation	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personal data collected and processed by those connected devices	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Security and reliability of connected devices to the grid	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

28) Out of the suggested actors, which ones would be best placed to manage and mitigate the cyber risks for the sectors listed in the table?

28a) Production assets:

	The asset owners or Operators on behalf of owners	The manufacturer of the equipment	The network operator	The internet service provider	Data exchange or storage service providers	Member State or national authority to oversee the management and mitigation of cyber risks by the private sector	EU level authority to oversee the management and mitigation of cyber risks by the private sector
Electricity: Centralised production	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Electricity: Decentralised production (PV, wind farms)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Gas, including renewable gases	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oil and other liquid fuels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## 28b) Transmission and/or distribution infrastructure

	The asset owners or operators on behalf of owners	The manufacturer of the equipment	The network operator	The internet service provider	Data exchange or storage service providers	Member State or national authority to oversee the management and mitigation of cyber risks by the private sector	Member State or national authority to oversee the management and mitigation of cyber risks by the private sector
Electricity transmission networks	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Electricity distribution networks	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Public charging points for electric vehicles	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heat (district heating networks)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gas (including future renewable gases) pipelines, compressor stations, storage facilities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Oil pipelines, other fuel pipelines, storage facilities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

28c) Consumption by household consumers (per type of consuming devices)

	The asset owners or operators on behalf of owners	The manufacturer of the equipment	The network operator	The internet service provider	Data exchange or storage service providers	Member State or national authority to oversee the management and mitigation of cyber risks by the private sector	EU level authority to oversee the management and mitigation of cyber risks by the private sector
Electricity for heating and cooling (e.g., electric radiators, heat pumps, air conditioning)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electricity for appliances and electronics (e.g., lighting, white goods, consumer electronics)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electricity for transport (home charging points, electric cars)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Home electricity storage in batteries	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Gas (e.g. boilers)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

28d) Consumption by non-household consumers (Industrial and Business)

	The asset owners or operators on behalf of owners	The manufacturer of the equipment	The network operator	The internet service provider	Data exchange or storage service providers	Member State or national authority to oversee the management and mitigation of cyber risks by the private sector	EU level authority to oversee the management and mitigation of cyber risks by the private sector
Electricity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Gas	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Oil, other liquid fuels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Home electricity storage in batteries	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Industrial size storage (industrial batteries, electrolysers)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

28e) IT infrastructure used by the energy system

	The asset owners or operators on behalf of owners	The manufacturer of the equipment	The network operator	The internet service provider	Data exchange or storage service providers	Member State or national authority to oversee the management and mitigation of cyber risks by the private sector	EU level authority to oversee the management and mitigation of cyber risks by the private sector
Smart Meters for Electricity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Smart Meters for Gas	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Tele-communication infrastructure	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Data storage (data centres, cloud infrastructure)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Data exchange interfaces of electricity-consuming devices	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

## BARRIERS

29) What are the most important barriers to strengthening cybersecurity in the various segments of the energy value chains?

*at most 3 choice(s)*

- Organisational barriers (e.g. the insufficient cooperation at sectoral level or the lack of appropriate skills in companies)
- Financial barriers (e.g. relevant organisations not investing enough in cybersecurity compared to other areas of investment)
- Market barriers (e.g. market mechanisms do not incentivise cybersecurity enough)
- Technical barriers (e.g. lack of credible cyber-certification schemes)
- Information barriers, diversity of standards, lack of clarity on what should be used/adopted (e.g. Regulations in force or internal company rules prevent the exchange of relevant information with other market participants)
- Regulatory barriers (e.g. lack of regulatory requirements)
- Other barriers

## ACTIONS

30) In addition to the existing framework, in what order of priority should the European Commission consider the following measures to enhance cybersecurity of the energy system? *[Please rank from 1 (highest priority) to 5 (lowest priority)]*

	1	2	3	4	5
EC action should elaborate non-binding guidance on cybersecurity in energy, complementing the existing Commission recommendation C (2019)2400 on the cybersecurity in the energy sector.	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
EC action should enhance European energy cybersecurity cooperation, for example by promoting the exchange of information and best practices, in line with Directive on measures for high common level of cybersecurity across the Union known as the NIS directive and future NIS2, but also including specific requirements if deemed necessary.	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
EC action should consider establishing a network code for the cybersecurity of gas operations.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
EC action should consider additional cybersecurity certification schemes (and/or promote the use of internationally recognized cybersecurity standards), in line with the Cybersecurity Act (Regulation 2019/881) of 17 April 2019. They would be linked to specific levels of assurance for energy related products and services (complementing others like “basic”, “substantial”, “high”).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

EC action should foster international cooperation with like-minded partners (states) and require equivalent level of privacy and data protection.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
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31) Are there other actions the EU should consider to further ensure the cybersecurity of the energy system?

*1000 character(s) maximum*

EU should tighten the cybersecurity requirements and associated audits of critical energy infrastructures in coordination with Member states

### 3) Enhancing the uptake of digital solutions in the energy system

#### ISSUES

32) Do you agree that the below list of digital solutions as key enablers of the energy transition is exhaustive?

- 5G (5th Generation Network Technology)
- Advanced Distribution Management Systems (ADMS)
- Artificial Intelligence (AI)
- Big Data
- Blockchain/ Distributed Ledger Technology (DLT)
- Aggregation Platforms in the field of Demand Response and Electromobility and Virtual Power Plant (VPP) Platforms
- Homes and Building Energy Management Systems (HEMS and BEMS) automating data processing
- Cybersecurity technologies
- Distributed Energy Resource Management Systems (DERMS)
- Hardware/infrastructure and Software for EV charging (Public Key Infrastructure PKI) only for automated charging
- High Performance Computing (HPC)
- Internet of Things (IoT)
- Machine Learning
- Smart Meters / Advanced metering infrastructure (AMI)
- Smart Thermostats and heat pumps with flexible energy management
- Software platforms for Operations & Maintenance (O&M)

Yes

No

33) Among the following potential benefits of integrating digital solutions in the energy system, what would you say are the most important ones?

*at most 3 choice(s)*

- Increasing flexibility and resilience of the energy system (e.g. increasing average time between failures, and limiting the consequences of power failures to a smaller number of users and for a smaller period of time).
- Increasing the efficiency of the management of the energy system
- Increasing the energy efficiency and sustainability of the energy system
- Decreasing the GHG emissions of the energy system and its impact on climate
- Improving the safety and productivity of the energy system
- Increasing the share of renewable energy in the energy system
- Optimising the use of energy in different sectors, better balancing energy supply and demand
- Reducing the use of energy use in different sectors (buildings and homes, transport, industry)
- Improving the engagement of market actors, including empowering consumers and engaging citizens.
- Integrating sectors, notably electricity, heating and cooling and transport
- Integrating energy services with non-energy services and benefits
- Other

## BARRIERS

34) What are the most important barriers preventing the development of new innovative digital solutions in the energy system?

*at most 3 choice(s)*

- Lack of Public R&I investments
- Lack of private R&I investments
- Lack of finance to move from research to demonstration
- Lack of harmonisation and standards
- Lack of skills and digital innovators in the field of energy
- Lack of pilot projects
- Lack of acceptance in the energy system
- IT companies focus on other more profitable sectors
- Energy companies are not sufficiently aware
- Inadequate Energy market regulation

- Lack of availability of open-source solutions
- Other

35) What are the most important barriers to the wide deployment of more mature digital solutions in the energy market?

*at most 3 choice(s)*

- Lack of public investments
- Lack of private investments
- Lack of finance to move from demonstration to commercialisation
- Lack of harmonisation and standards
- Lack of skills to use existing solutions and integrate them to the energy system
- Lack of pilot projects
- Existing solutions lack quality
- Access to capital to buy existing solutions
- Lack of a developed energy market
- Lack of acceptance of the actors in the energy system
- Energy companies are not sufficiently aware of existing digital solutions
- Social awareness and acceptance, lack of trust of potential users
- Inadequate Energy market regulation
- Lack of information, good examples and best practices are not sufficiently promoted
- Lack of availability of open-source solutions
- Other

## ACTIONS

36) In what order of priority should the European Commission consider the following measures related to the uptake of digital technologies in the energy system? *[Please rank from 1 (highest priority) to 5 (lowest priority)]*

	1	2	3	4	5
EC action should foster research and innovation to develop new digital solutions in the energy system and explore synergies between digitalisation and energy objectives.	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
EC action should further help innovators move from innovation to commercialization.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
EC action should stimulate investments on market uptake of already developed digital solutions to be further integrated in the energy system.	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



EC action should promote the development of open-source software for the energy system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
EC action should set minimum requirements or targets for the use of IT in the energy system and monitor its progress.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

37) Are there other actions the EU should consider to further exploit the uptake of digital solutions in the energy system?

*1000 character(s) maximum*

Accelerate the deployment of new key regulations: interoperability & flexibility network code, develop new subsidies/grant incentives to facilitate commercialisation of TRL7 technology, integrate digital investment on State Aid finance

#### 4) Data exchange, data spaces and data sharing infrastructure for new energy services

##### ISSUES

38) What type of data are most important to develop data-driven or data-based activities/services in a way that contributes to the energy transition?

- Data generated by my own activities
- Data generated by my clients/users of my products
- Data generated by other actors in the energy system
- Data generated by other actors in other sectors

39) What type of data is most important to develop data-driven or data-based activities/services in a way that contributes to the energy transition? Data from:

*at most 5 choice(s)*

- Smart metering
- Energy-consuming appliances
- Heating and cooling
- Energy network operations (e.g. electricity grid)
- Building automation/domotica
- Electric vehicles
- Other transport and mobility services
- Financial services, Banking, Insurance
- Social media
- Public Administration
- Meteorology

- Advertising & marketing
- Healthcare
- All of the above
- I do not know
- Other

40) Among the potential benefits of data exchange for the clean energy transition listed below, what would you say are the three most important ones?

*at most 3 choice(s)*

- Enabling better strategic planning and decision-making for the development of the energy system, in particular for infrastructure.
- Optimising the efficiency of energy production by using data for better asset management.
- Balancing energy supply and demand through demand response and flexibility markets.
- Better linking infrastructure investment and use of the various energy carriers - electricity, heat, cold, gas, solid and liquid fuels - with each other and with the end-use sectors, such as buildings, transport or industry.
- Developing new and providing better data-driven energy services to consumers.
- Empowering consumers to engage in the clean energy transition, for example through increased awareness, energy communities or behavioural changes.
- Facilitating investments in building renovations.
- I do not know
- Other

## BARRIERS

41) What are the most important barriers to unlock the potential of data for the EU's energy transition...?

41a) ...at an operational level \* :

- Lack of experience in data sharing and valorisation.
- Lack of possibilities to access or share data in a safe and reliable manner.
- Fear of loss of autonomy and control on the use of data once shared.
- Uncertain or unbalanced data monetisation models (e.g. due to single or collective market power or dominance of one or more enterprises)
- Little incentives for the data provider/generator to share data

- The lack of interoperability for data exchange between devices and/or actors (e.g., energy suppliers, citizens, network operators, building managers, public authorities).
- The lack of common EU-wide standards for data exchange between devices and actors (e.g., energy suppliers, citizens, network operators, building managers, public authorities).
- The lack of open Application – Programming Interfaces (API's) for data exchange between devices and/or actors.
- The lack of easy and digital identification to validate access to consumer /customer data (e.g. the use of a digital identity)
- The lack of a European cloud infrastructure that can safely manage data exchange between EU companies.

41b) ...at a management level:

- The lack of EU-wide platforms or marketplaces to manage data sharing in the energy system.
- The lack of cooperation of national organisations to harmonise evolving data sharing infrastructure in the energy system.
- The lack of a mandate of the existing organisations to harmonise a data sharing infrastructure in the energy system.
- The lack of support for the existing organisations to establish a data sharing economy in the energy system.

41c) ... from a legal perspective:

- The lack of legal certainty on the responsibilities of involved actors in relation to data sharing.
- The lack of an EU-wide public authority to ensure that operators in the energy system comply with their obligation to share data.
- The lack of cooperation of national public authorities to ensure data sharing in the energy system.
- The lack of enforcement to ensure data sharing in the energy system.

41d) Any other barrier, please specify

*500 character(s) maximum*

\* More information is available [here](#).

42) What key elements to enable EU-wide data sharing in the energy system are missing\* ?

- Data and messaging standards
- Model operational agreements for data sharing
- Legal agreements for data sharing
- Pricing/earning models to gain revenues from data or data sharing
- Connectivity
- Governance of data access and exchange
- Metadata (information about data that helps describe, structure or administer that data)
- A clear framework for authorisations (consents) for data sharing
- Identification and authentication
- All of the above
- I do not know
- Other

\* More information is available [here](#): presentation by InnoPay at the Alliance for the Internet of Things (AIOTI) Webinar of 8 March 2019.

43) Have you ever experienced difficulties/issues to get access to final customer's metering and consumption data?

- Yes
- No

43a) If yes, what was the nature of such difficulties / issues?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	I do not know
Legal uncertainty due to different rules across Member States	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Commercial disincentives or lack of willingness by company	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Lack of interest or awareness by consumer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

Lack of appropriate infrastructures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
High cost of providing or processing such data (e. g. interoperability issues)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

## ACTIONS

44) In what order of priority should the European Commission consider the following measures related to facilitating data exchanges and creating a data sharing infrastructure for new energy services? *[Please rank from 1 (highest priority) to 5 (lowest priority)]*

	1	2	3	4	5
EC action should create a legal framework that defines rules, roles and responsibilities for access to data and data exchange for the energy system.	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
EC action should set EU wide standards and protocols for access to data and data exchange.	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
EC action should create a governance structure that involves stakeholders to organise access to data and data exchange in the energy system.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
EC action should aim to provide an EU-wide secure cloud infrastructure for data storage and data exchange for the energy system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
EC action should leave the market to organise access to data and data exchange in the energy system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

45) Are there other actions the EU should consider to enable data exchange in the energy system?

*1000 character(s) maximum*

Enforce usage of current standards as agreed through the ETSI CEN CENELEC taskforce (derived from the SGAM)

## 5) International cooperation

46) For what issues do you consider international cooperation the highest priority when it comes to digitalisation of energy? *Please rank from 1 (highest priority) to 5 (lowest priority).*

	1	2	3	4	5
Developing a European data-sharing infrastructure for new energy services.	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Empowering individuals to fully participate in the energy transition	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enhancing the uptake of digital technologies in the energy system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Ensuring cybersecurity, data protection and privacy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Ensuring climate neutrality of ICT	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

47) Who is it most important for the European Union to cooperate with at an international level when it comes to digitalising the energy system?

*at most 3 choice(s)*

- Canada
- China
- India
- Japan
- United States of America
- United Kingdom
- Russia
- All Asian countries
- All African countries
- All North-American countries
- All Latin-American countries and Regional Organisations (CELAC)
- European Economic Area (EEA) and European Free Trade Association (EFTA) member countries (that are not EU members)
- EU candidate countries
- Energy Community Contracting parties
- OECD-member countries (that are not EU members)
- Union for the Mediterranean
- Other

48) What should international cooperation focus on? *Please rank from 1 (highest priority) to 5 (lowest priority).*

	1	2	3	4	5
Development of standards and technical rules (for example for information security, interoperability of appliances/devices).	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Development of governance to oversee data exchange between companies and public authorities in the energy system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Exchange of best-practices (for example through joint data-bases) on all 5 issues listed in question 47.	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Address digitalisation of energy in bilateral cooperation discussions and high-level dialogues.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Address digitalisation of energy in multi-lateral forums (e.g. IEA, OECD, IRENA, G7, G20, Mission Innovation, Clean Energy Ministerial).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

49) Are there other actions the EU should consider to promote international cooperation on digitalisation of energy?

*1000 character(s) maximum*

#### IV. Further comments or suggestions

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50) Do you / your company / your organisation have any further comments?

*1000 character(s) maximum*

We would also like to point out to 2 of our relevant publications:

Open Energy Marketplaces Evolution - <https://aioti.eu/wp-content/uploads/2021/03/Open-Energy-Marketplaces-Evolution-Published.pdf>

and Electric vehicles (EV) and electric vehicle charging User Cases driven approach - <https://aioti.eu/wp-content/uploads/2021/12/AIOTI-EV-Charging-User-Cases-Published-2.pdf>

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