WindEurope's recommendation for a wind energy data classification scheme

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EXECUTIVE SUMMARY

This position paper emphasizes the critical need for a robust data classification scheme within the wind energy sector. By aligning the implementation of EU legislative frameworks such as the EU Data Act[1] and the European Wind Power Action Plan [2], the industry can effectively address challenges related to data management, exchange, security and collaboration.

The paper proposes a **data classification scheme** addressing the major types of data used in the wind energy sector. This scheme aims to guide and facilitate the sector-specific implementation of relevant data regulation. It proposes 4 data classes: **Critical Data, Confidential Data, Personal Data, and Public Data**.

Beyond the implementation of relevant regulation, the proposed data classification scheme also aims to facilitate data handling. This includes data sharing, standardisation, cybersecurity and intellectual property protection. A well-defined data classification scheme can foster innovation, an accelerated achievement of renewable energy targets, industry competitiveness, performance and enhanced data-driven services. Its implementation will require strong collaboration among relevant stakeholders as well as regular updates to ensure its relevance and adaptability over time.

Introduction

In recent years the EU has advanced its digital policies to create a more interconnected and sustainable energy market with a particular focus on managing an energy system with increasing shares of renewables. Central to these initiatives are the EU Data Act and the European Wind Power Action Plan. Both underscore the importance of efficient data management and sharing data within the energy sector. Given this context, the implementation of a robust unified data classification scheme within the wind industry is crucial.

This position paper outlines WindEurope's stance on the adoption of such a scheme, aiming to enhance data security, facilitate collaboration, and optimize the management of wind energy data. The goal is to ensure that the wind energy sector can meet legislative requirements, support innovation, and contribute effectively to the EU's renewable energy targets[3].

EU Data Act (EU) 2023/2854

The EU Data Act facilitates access to and reuse of data across sectors by mandating that data generated by connected devices and related services should be accessible to users and third parties. This legislation seeks to unlock the economic potential of data, driving innovation and competition while ensuring robust data protection and security. The Act emphasizes the need for clear data governance frameworks to handle the complexities of data sharing, usage rights, and privacy concerns.

European Wind Power Action Plan

The European Wind Power Action Plan highlights the pivotal role of data in driving the rapid expansion of wind energy to achieve the EU's renewable energy goals. It underscores the importance of robust data management and cybersecurity, emphasizing that effective data sharing and secure practices are key to optimizing wind farm operations, enhancing grid integration, and strengthening cross-border collaboration. The plan advocates for the implementation of data security and cybersecurity provisions as prequalification criteria in wind energy auctions. WindEurope has issued its guidance[4]on how these

[1] EU Data Act (EU) 2023/2854, December 2023

[2] European Wind Power Action Plan, October 2023

[3] Wind energy digitalisation towards 2030_.pdf (windeurope.org), November 2021

[4] WindEurope-response-design-elements-of-renewable-energy-auctions.pdf, March 2024

criteria should be implemented in the wind sector. A commonly agreed and used wind energy data classification scheme would be necessary for the implementation of this guidance.

1 Data sharing in the wind energy sector

As it stands, the wind energy industry faces significant challenges in stepping up data sharing practices[5]. This is partly due to the non-harmonised implementation of international data standards e.g. IEC61400-25/-26 by the industry which makes difficult to understand, utilize and extract value from shared data. It is also due to commercial and contractual constraints often stemming from concerns about intellectual property loss.

This lack of data fluidity hinders the development of new digital technologies and the optimization of wind farm operations. It also limits collaboration opportunities, restricting the industry's ability to collectively address challenges such as predictive maintenance, performance benchmarking and resource assessment. Addressing these issues is crucial for enhancing the overall performance and growth of the sector.

1.1 The benefits of implementing a data classification scheme

To facilitate the implementation of the forementioned legislative frameworks in the wind energy sector and compliance by concerned stakeholders, a wind energy data classification scheme would be necessary. Such a scheme should categorize data based on sensitivity, criticality and intended use thereby facilitating more efficient data management and compliance with legal requirements. By implementing a robust data classification system, the wind industry can:

- **Strengthen data security and privacy**: by classifying data, organizations can identify sensitive and confidential information in a streamlined and universal manner. This can reinforce knowledge exchange and collaboration to develop robust security practices and transparent compliance with data protection provisions in the EU Data Act.
- **Facilitate data sharing and collaboration**: A unified data classification scheme can significantly facilitate data sharing among stakeholders and the achievement of the European Wind Power Action Plan's objectives on improved cooperation and integration within the EU energy market.
- **Enhance data management and utilization**: By categorizing data based on its sensitivity and intended use, organizations can more efficiently allocate resources in data management. This can result in more efficient operations and informed decision-making processes.

Wind energy data include data from all life cycle stages of wind farms including their design and development, operation, repowering and dismantling. Table 1 lists the major categories of wind energy data:

[5] Grand challenges in the digitalisation of wind energy , June 2023

Table 1: Major categories of wind energy data

- **Wind Resource Assessment Data**: Data on wind characteristics at a location, including wind speed, direction, and variability, essential for assessing potential energy output and project feasibility.
- **Energy Production Data (Control and Command Data):** Information on electricity generated by wind turbines, covering energy output, capacity factors, efficiency rates, and production variations.
- **Turbine and Wind Farm Operational Data:** Details on turbine and wind farm performance, including rotor speed, power output, downtime, faults, maintenance, and overall efficiency.
- **Grid Integration Data:** Data on how wind energy systems connect and interact with the grid, covering power quality, grid stability, load balancing, and energy storage.
- **Forecasting and predictive Data:** Data used to predict future wind conditions and energy production, including meteorological forecasts, historical trends, and models.
- **Economic and Market Data:** Financial and market information related to wind energy projects, including costs, revenue, pricing, market demand, investments, and incentives.
- **Environmental Impact Data:** Information on the environmental effects of wind projects, including wildlife interactions, habitat changes, noise, visual impacts, and ecological footprint.
- **Maintenance and Reliability Data:** Information on the maintenance schedules, reliability, and performance issues of wind turbines and associated infrastructure.
- **Regulatory and Compliance Data:** Data related to compliance with local, national, and international regulations, standards, and policies affecting wind energy projects.
- **Community and Social Impact Data:** Information on the social impact of wind energy projects, including community engagement, public acceptance, and social benefits.
- **Trade Secrets:** Trade secrets data in the wind energy sector includes confidential information like proprietary designs, technologies, and strategies that offer a competitive advantage.
- **Raw Data from Wind Turbines:** Raw data from wind turbines includes unprocessed information on operational metrics like wind speed, power output, and turbine performance.
- **Construction Data:** Data related to the cost, timeline, materials, suppliers, risk management and commissioning
- **Development Data:** Data related to the information collected and analysed during the planning and construction phase of a wind energy project, including site selection, environmental impact assessments, permitting, design specifications, and project timelines.
- **Repowering Data:** This type of data refers to information related to the upgrading or replacement of existing wind turbines with newer, more efficient technology to extend the lifespan and improve the performance of a wind energy project.
- **Decommissioning Data:** This type of data refers to information concerning the process of safely decommissioning and removing wind turbines and associated infrastructure at the end of a wind farm's operational life, including details on procedures, costs, environmental impacts, and site restoration.
- **Personal Data:** Personal data in the wind energy sector refers to information that identifies or relates to individuals involved, such as employees, contractors, or customers.
- **Data Related to security**: Data related to security in the wind energy sector involves information on measures to protect systems, infrastructure, and data from threats and vulnerabilities.

2 A data classification scheme for wind energy data

WindEurope's recommendation is to use a data classification scheme consisting of 4 classes (Figure 1) that can be defined as follows:

1) **Critical Data**: Data that must be protected with the highest level of confidentiality and security measures and should only be shared under exceptional circumstances, such as for legal, regulatory, audit or security purposes.
2) **Personal Data**: Any information that can identify an individual, either directly or indirectly, such as names, identification numbers, location data, or online identifiers.
3) **Confidential Data**: Data that may be shared under specific agreements between parties but requires protection to ensure it is only accessible to authorized individuals.
4) **Public Data**: Data that can be shared freely without any restrictions or need for confidentiality.

Table 2 gives an indicative classification that may vary depending on the needs of each organization. Depending on the organisation's needs and its commercial agreements, certain data categories may contain data that will be classified into different categories.

Figure 1: Proposal for a wind energy data classification scheme

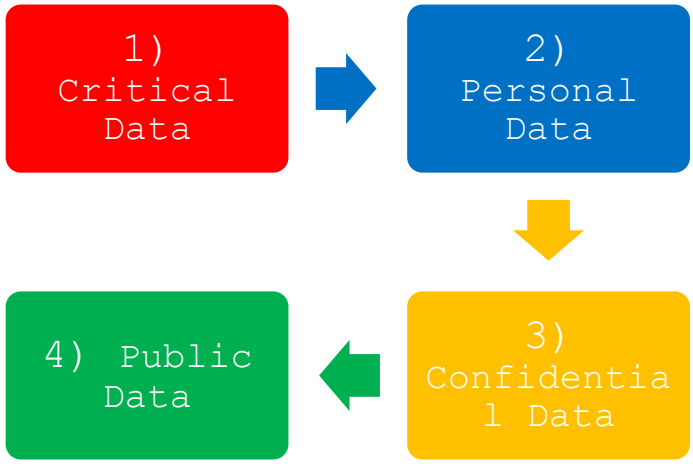

Table 2: Indicative classification of wind energy data categories

Data Classes	Wind Energy Data Categories
Critical Data	National Security, Trade Secrets, IP
Personal Data	Employee information, Customer Data
Confidential Data	Maintenance & Reliability, Operational, Regulatory & Compliance Data
Public Data	Environmental Impact, Community & Social Impact Data

3 Challenges and recommendations to implement unified data classification

Implementing a sector-wide unified data classification scheme will bring many benefits but will also require certain efforts by the industry. We identify the following challenges:

- **Volume and diversity of data**: The extensive amount and diverse nature of data produced by wind turbines can make data classification particularly intricate. Establishing and updating a classification framework capable of managing various data forms and origins will require targeted resources and probably new employee roles.
- **Data access**: Efficient data classification should ensure data findability (data easy to find and accessible with clear metadata and identifiers), accessibility (data should be openly available and retrievable by both humans and machines), interoperability (data should be structured in a way that allows integration with other datasets), reusability (data should be well-described and licensed for reuse). Achieving such efficiency will also require targeted resources.
- **Training**: Involved employees will need training to develop and use the established scheme.
- **Data migration**: When transferring large volumes of data from legacy systems or disparate sources into a new classification scheme, there will be risks of data inconsistency, mismatches or even loss of critical information. Moreover, data integrity issues could arise, where incomplete or corrupted data might be inadvertently migrated compromising the quality and reliability of the system. The compatibility between old and new systems can be another critical concern, potentially leading to time-consuming and costly adjustments. Additionally, the complexity of the migration process could result in operational downtime or disruptions, impacting our ongoing activities.
- **Competing Interests**: Different parties may wish to define the same data under different classifications which will require negotiation to reach agreement.

Ensuring that data is accurately mapped, transferred and verified is not just a technical task—it is a pivotal step to safeguard the success of the entire data classification project and prevent any downstream issues that could undermine decision-making and operational efficiency. Our **recommendation** to mitigate the above challenges are the following:

- **Create a flexible classification system** that can work with different types of data and sources. Using advanced tools like AI can help make this process more efficient. Also, making data easy to find, accessible, compatible with other data, and reusable will help to classify data correctly and extract real value from them.
- It's crucial to provide **clear and thorough training to all involved employees** ensuring they understand how to use the new system and why it's important. This will help ensure that the new system is adopted successfully.
- When it comes to moving data from old systems to the new classification scheme, **careful planning is key**. Data should be accurately mapped and checked to avoid errors or loss of information. Using automated tools can help with this process and ensure that old and new systems are compatible.

By focusing on these areas, the wind sector can effectively implement a data classification scheme, leading to better operations and decision-making.