IEA Task 43 Data Standards Roadmap
Enhancing the Value of Data in the Wind Energy Sector

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IEA Task 43

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Introduction

There is a great deal of data held by different organizations within the wind energy sector. As wind energy digitization progresses, data is becoming a more valuable resource and is starting to be approached as an asset. As part of IEA Task 43, we explore how data can become more valuable when it has more comprehensive metadata. For example, some organizations are beginning to include maintenance events as metadata, instead of storing technician logs in notebooks in wind turbine towers.

This study discusses practical problems surrounding data in the wind energy sector, gaps in the current data landscape, and proposed solutions to these problems and gaps. These solutions will enhance the value of data and the ability to share or sell data sets.

Approach

Expert Survey

A total of 30 members of the global wind energy sector were asked to describe their main barriers to data sharing in individual interviews lasting approximately one hour. This included seven owner/operators, seven researchers, and sixteen technology providers from the wind energy industry. Table 1 shows the five barriers with the highest frequencies of occurrence for each interviewee type. Some of the barriers are quite similar between types, in particular the topics of (a) standard data format/structure, (b) data availability and quality, and (c) data processing/preparation time.

Review of Existing Data Valuation Practices

Data is an actively traded commodity in the technology sector. Like any other asset[1], data can be valued as (1) value determined by buyers and sellers, (2) the "minimum" value determined based on data cost, or (3) additional cash flow generated because of data ownership. As an example of real-world data valuation, Twitter's quarterly income from licensing data is shown in Figure 1.
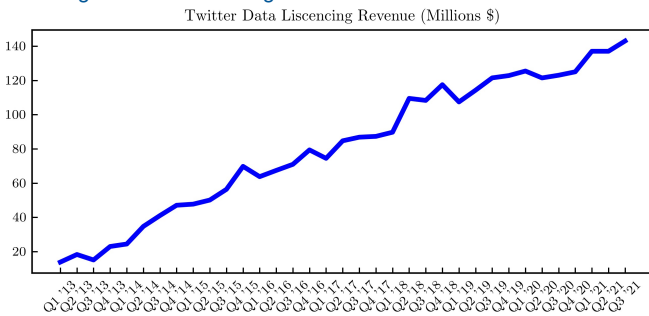

Figure 1: Twitter's quarterly revenue associated with licensing data (sourced from Statista Research Department)

Table 1: Top five barriers to data sharing resulting from expert interviews

Rank	Owner/operators	Researchers	Technology providers
1	Getting all the data in one spot	Lack of public data	Data quality (completeness, validity, etc.)
2	IT issues: servers, etc.	No standard format for analysing and processing data	Different format and structure of data
3	Cleaning/filtering raw data (different time scales and resolutions, different formats)	Poor data quality	Data filtering for analyses
4	Refining and processing data ready for machine learning model (80% of time)	Lack of willingness to share data, especially higher resolution	Data collection; different devices need to be programmed differently
5	Interfaces to collecting data reliably	Lack of change logs	Time for downloading, cleaning, and training data

Vision

Data Marketplace

There is potential for a wind energy data marketplace, where different organizations in the wind energy sector buy or sell data pertinent to operations, design, physical modeling, and mathematical modeling. Such a marketplace could create an entirely new stream of revenue for an organization, retaining enough data to stay competitive, while selling some data sets to create additional, and potentially significant, sources of income. Figure 2 depicts the flow of information in a data marketplace, where data brokers act as intermediary agents between data owners and users.
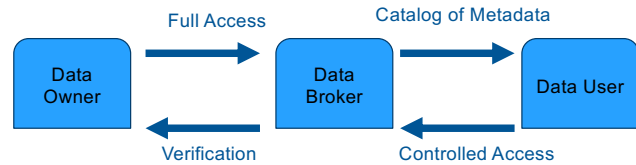

Figure 2: Flow of information within a data marketplace

Enhancing Value Through Common Semantics

In order to buy and sell data, data must be available in a standardized format. It would be most useful for the wind energy community to have a shared vocabulary and ontology for describing data that are common throughout the sector. Figure 3 shows an example of standard semantics regarding vocabulary in the wind energy sector. We identify standardized metadata and key performance indicator schemes as being crucial for the success of a wind energy data marketplace. See Poster 182 for more details.
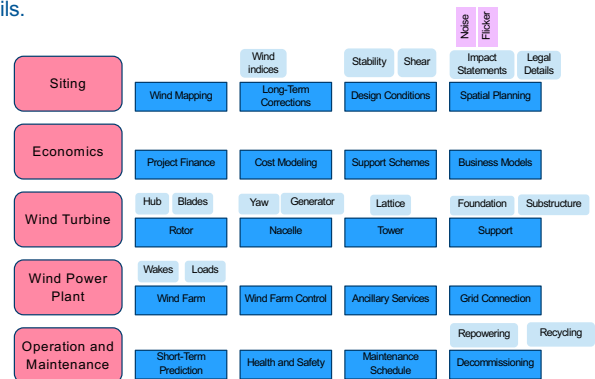

Figure 3: Example shared semantic

Next Steps

IEA Task 43 is a collaborative effort, and we encourage the broader wind energy community to become involved. The team has published a list of available open-source data sets to encourage the exploration of data use cases. We are in the process of identifying specific examples of data value within the wind energy sector. It is our hope that the wind energy sector develops shared metadata standards to enhance the value of wind energy data.

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1- National Association of Certified Valuators and Analysts. "Commonly used methods of valuation." Chapter 6. (1995)

2 - Sempreviva, Anna Maria & Dimitrov, Nikolay & Vasiljevic, Nikola & Davis, Neil & Hüser, Falco & Lavanchy, Paula. (2019). Open Science: Sharing Data, Tools and workflows A Strategy to Inspire Efficient Collaboration

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