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EnergySHR: A platform for energy dataset sharing and communications

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Abstract

Because the energy transition is a critical and urgent issue that is increasingly reliant on data, the Center for Energy System Intelligence (CESI), a Convergence collaboration between TU Delft and Erasmus University Rotterdam, has developed a platform where researchers on the energy transition can share, publish, and/or find energy-related datasets and algorithms: EnergySHR. This platform aims to accelerate energy transition research into intelligent, data-driven algorithms. In this demonstration, we present the EnergySHR platform as both a platform for storing, accessing, managing, and archiving datasets as well as a tool to conduct empirical research about platformization and data-driven decision-making about the energy transition.

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CCS Concepts

• **Information systems** → **Database design and models**; **Information storage systems**; **Information integration**; • **Human-centered computing** → **Interaction design**.

Keywords

EnergySHR, data sharing, energy transition, energy datasets, platformization

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1 Introduction

As the world shifts from fossil fuels to renewable energy sources, technological solutions play a pivotal role [8]. These solutions rely heavily on data, which serves as the backbone for innovation and decision-making in the energy sector [6]. Energy data ranges from optimization [9] and forecasting [5], energy markets [4], technologies to facilitate the management of energy [2] and grid congestion [10], to social issues like energy justice [3] and changing consumer behavior [11]. Finding relevant data can be challenging because

data is scattered across various repositories and formats, making it difficult to locate [12]. Even when data is found, gaining access is another hurdle because data may be protected by privacy policies, proprietary restrictions, or regulatory requirements, necessitating extra care and compliance for handling and sharing metadata and sensitive information [7]. To maximize the value of data in the energy transition, it is essential to adhere to the FAIR (Findability, Accessibility, Interoperability, and Reusability) principles [1]. Following these principles ensures that data can effectively support the technological advancements needed for a successful energy transition.

2 Use Case and Methodology

The Center for Energy System Intelligence (CESI), a Convergence collaboration between TU Delft and Erasmus University Rotterdam has developed EnergySHR[1], a unique platform that combines social aspects from Web 2.0 with repositories specifically for data about the energy transition. Focused on the energy transition, EnergySHR differs from other repositories because it is dynamic, allows versioning and archiving, can connect datasets to existing projects, and follows the FAIR principles for public data. In addition, EnergySHR also accelerates energy transition research using intelligent, data-driven algorithms. In this demonstration, we present the EnergySHR platform for energy transition researchers and researchers in platformization, highlighting profile creation, uploading and following datasets, integrating datasets into projects, and archiving data.

On EnergySHR, every dataset uses a Digital Object Identifier (DOI), a unique, permanent alphanumeric string assigned to digital objects. This stability supports citation integrity, data traceability, and interoperability across digital infrastructures. Moreover, this platform is purpose-built to support the sharing, discovery, and management of datasets and code within the research community. The platform emphasizes collaboration, data integrity, and robust access control, offering a comprehensive suite of functionalities designed to streamline open and reproducible science. EnergySHR also applies the FAIR principles in the following ways:

- User Authentication and Access Control
- Dataset and Code Publication
- Search and Discovery
- Version Control
- Collaboration Features
- Notification System
- Automatic Updates

Through these features, EnergySHR provides an integrated environment for open, trustworthy, and efficient data and code sharing across platformization and energy research.

3 Results

Designed for robustness, scalability, and secure data handling, EnergySHR has a resilient infrastructure layer that can support large-scale data operations. The object storage system ensures efficient and scalable storage of datasets while the metadata enables detailed data description, indexing, and retrieval, in line with FAIR principles. Users of EnergySHR can create personal collections, tag datasets, follow reearchers or projects, request to join projects, and rate datasets. EnergySHR also offers unique features like energy-specific search and filtering of data and models, and linking code versions and models models with data. Finally, EnergySHR offers a community of researchers committed to many aspects of the energy transition. This includes researchers in different types of renewables like wind, solar, offshore, and hydropower. Other topics include human aspects of the energy transition, like user classification, and energy market research. This unique mix of data, researchers, and models can help facilitate collaboration and project development across disciplines, campuses, and countries.

4 Conclusion and Outlook

EnergySHR offers a flexible and user-centric access control model 1 for dataset sharing, enabling researchers to manage visibility according to their collaboration needs and data sensitivity. Users can assign one of several predefined access levels to their datasets: Restricted, Public, Follower, Friend, and Colleague. Additionally, users retain complete control over their network by having the ability to block specific individuals from accessing their content. This nuanced permission system promotes both openness and security, aligning with FAIR principles while respecting ethical and legal requirements for data sharing.

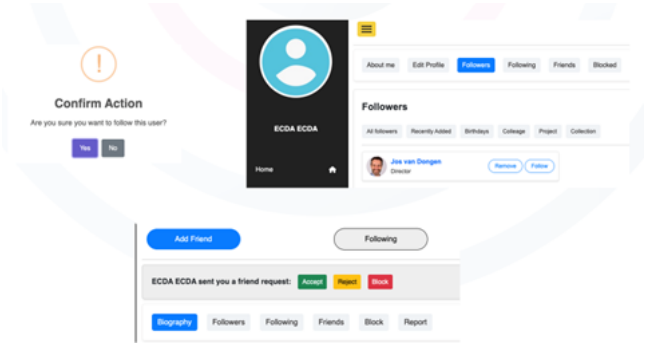

Figure 1: The flexible, user-centric access control model of EnergySHR

Finally, the EnergySHR platform is free for users and empowers researchers to share, discover, and manage data in line with FAIR principles. Its modular architecture and open-source technologies ensure flexibility, security, and scalability as well as evaluate the platformization of data for empirical research.

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[1] https:/www.energyshr.nl

[2] https://convergence.nl/convergence/about/

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