PowerizeD

Digitalization of Power Electronic Applications within Key Technology Value Chains

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Table of contents

1 Publishable summary

The PowerizeD Final Data Management Plan (DMP) details the completed strategy for handling all data generated, shared, and reused throughout the project's lifetime. In line with the FAIR principles of Findability, Accessibility, Interoperability and Reusability, this plan ensures that PowerizeD data is managed in a way that promotes transparency, collaboration and innovation. The DMP facilitated efficient data sharing between consortium partners via internal platforms, supported secure storage practices for sensitive information, and ensured compliance with data protection regulations (GDPR) under the guiding principle of "as open as possible, as closed as necessary."

This final plan builds on the initial DMP (D5.4 [1]) and its update (D5.5 [2]), incorporating reviewer feedback and insights gained during project execution. It details the data collection methodologies, how data was analysed and interpreted in alignment with project objectives, and how the results feed into exploitation and long-term preservation. The DMP also encourages the re-use of external datasets and the creation of new high-quality datasets that advance the state of the art in power electronics. PowerizeD has enhanced project outcomes and maximised the potential impact of results by fostering a culture of open science.

2 Introduction & Scope

2.1 Purpose and target group

The Final Data Management Plan presents the concluding data management strategy of the PowerizeD project. This is intended for consortium members, project evaluators and external stakeholders interested in how the project's data are handled and preserved. The document serves as a reference for partners to follow best practices in data management and as evidence of compliance with Horizon Europe Open Science requirements [3]. It will also be useful for any future projects or researchers who may reuse PowerizeD data or adopt its data management approach.

The purpose of the DMP is to systematically document all types of data involved in PowerizeD and the procedures for their handling. This includes detailing what data have been collected or generated, in what formats, how they are stored securely, who can access them, and under which conditions they can be shared or published. It also defines the metadata standards and repositories used to ensure data findability and reusability. The DMP's primary function is to ensure that all project data is managed in accordance with the FAIR principles and open science guidelines, while protecting any sensitive information. It provides guidance to the consortium on making data available to the research community and industry in a responsible way, thereby amplifying the project's impact.

The development and implementation of the DMP has been a collaborative effort involving all project partners. Each partner contributed information about the data they handle, ranging from technical R&D data to dissemination materials, through structured questionnaires and regular updates (as introduced in D5.5). Researchers from academic partners (e.g., universities and research institutes) provided details on experimental datasets, simulation results, and software outputs generated in Work Packages WP2 and WP3. Industry partners, comprising both large companies and SMEs, contributed information on data from demonstrators and use cases in WP1, as well as internal data management practices and constraints (such as proprietary data or trade secrets). Partners also identified their Key Exploitable Results (KERs) and related data outputs via exploitation questionnaires. This has informed how datasets of high value are managed and preserved.

The project's data management team compiled these inputs and maintained the DMP. They ensured that partner contributions were harmonised, using common templates and standards for describing data. For instance, all partners documented the types of data they produce, the formats and volumes, and their plans for sharing or archiving that data. This inclusive process ensures that the final DMP reflects the real practices and needs of the consortium. It captures a variety of data sources, ranging from laboratory measurements and simulation data to communication materials, and ensures that each partner's data is handled properly. Partner contributions were essential in identifying which datasets could be made open access and which required restricted handling, in line with each organisation's exploitation plans and confidentiality obligations.

2.2 Contributions of partners

Explain which partner were involved and their activities in their various sections:

TABLE 1: CONTRIBUTIONS

Chapter	Partner	Contribution
all	All	Via Deliverable D1.6
all	All	Questionnaire

2.3 Relation to other activities in the project

The partners contributed information on the data they handle, ranging from technical R&D data to dissemination materials, via structured questionnaires and regular updates (as outlined in D5.5). Academic partners (e.g. universities and research institutes) provided details on experimental datasets, simulation results and software outputs generated in Work Packages WP2 and WP3. Industry partners, including large companies and SMEs, contributed information on demonstrator and use case data in WP1, as well as on their internal data management practices and constraints (e.g. proprietary data or trade secrets). Partners also identified their Key Exploitable Results (KERs) and related data outputs via exploitation questionnaires.

The project’s data management team compiled these contributions and maintained the DMP. They ensured that partner contributions were harmonised by using common templates and standards for describing data. For instance, the partners reported on the types, formats and volumes of data they produce, as well as their plans for sharing or archiving it. This inclusive process means that the final DMP reflects the consortium's real practices and needs. It encompasses a variety of data sources, ranging from laboratory measurements and simulation data to communication materials, and guarantees that each partner’s data is handled appropriately. Partner contributions were vital in determining which datasets could be made openly accessible and which required restricted handling, in line with each organisation’s exploitation plans and confidentiality obligations.

Data management in PowerizeD is closely linked to the project's technical and dissemination activities. In terms of input, the DMP draws directly on other work packages (WPs) and tasks. WP1 (Use Cases) provided real-world data from demonstrators in areas such as mobility, renewables, grids, lighting, and industrial drives. These use case datasets, comprising sensor readings, operational logs, and test measurements, required processing, storage, and sharing among partners. WPs 2 and 3 (the Research and Development streams) generated data in the form of simulation outputs, design files, models and validation test results for new power electronic components and methodologies.

In terms of outputs, the DMP has supported and enhanced various project activities by enabling secure and efficient data sharing across the consortium. Due to the internal data infrastructure implemented, partners have been able to exchange research results, large datasets and trained models in a controlled manner useful e.g. for collaborative tasks such as the development of predictive maintenance algorithms and the conduct of federated learning experiments involving the data of multiple partners. Data and insights generated by PowerizeD are being made available to external stakeholders via open repositories and the project website, ensuring that the benefits extend beyond the project's internal work. The synergy between the DMP and other project activities guarantees that data management is an enabling framework that supports PowerizeD' s technical goals and mission to have a lasting impact, rather than an isolated administrative task.

3 PowerizeD Data Management Questionnaires and Update

3.1 Introduction

In the second year of the project, an extensive **Data Management Plan questionnaire** was conducted (as detailed in D5.5) to capture the consortium's data practices and needs. This final DMP builds on that foundation, now incorporating the **fully analysed results of the questionnaire** [4], [5], [6], and the actual data collected through the end of the project.

Data analysis and interpretation followed the procedures described in the technical work packages (see D1.6 [7] for evaluation results), with the DMP providing a reference to ensure traceability. The origin of each dataset, the processing steps involved, and how it was used to achieve project objectives were documented. This addressed feedback from project reviewers who called for clearer documentation of how the project's conclusions were underpinned by data. This final plan therefore not only lists datasets, but also details their journey: how the data was generated, how it was used for validation and innovation, and how it will be preserved for future use.

3.2 Data Summary – Collected Data Types

PowerizeD generated and handled a broad array of data types, reflecting the project's interdisciplinary nature and the mix of research and industrial activities. At a high level, we can distinguish two major categories of data in the project: (A) Project Communication and Dissemination Data, and (B) Research Data. In addition, PowerizeD leveraged some external datasets (pre-existing data from outside the consortium) to enhance its research, and created new datasets internally which are intended for future reuse. Below we summarize each category and provide detailed tables of the datasets and channels involved.

3.2.1 Project Communication and Dissemination Data

Communication and dissemination data encompass all materials and outputs that PowerizeD used to share knowledge, report results, and engage with stakeholders. This includes scientific publications, conference papers, public deliverables, presentations, newsletters, social media posts, and website content produced during the project.

Research publication channels: PowerizeD partners have published and plan to publish project findings through respected research channels. These include peer-reviewed journals (e.g., IEEE, Elsevier journals in power electronics and energy), conference proceedings (such as PCIM Europe, ECCE, EuroSimE), and open-access archives (like ArXiv or institutional repositories). **Fehler! Verweisquelle konnte nicht gefunden werden.** below provides a summary of the key publication channels used by consortium members for disseminating research findings, along with the access mode for each channel. All academic publications arising from PowerizeD follow the project's open access strategy: partners are encouraged to choose green or gold open access routes whenever possible.

Several partners have already published results in IEEE conferences and journals, ensuring at least green open access via self-archiving in repositories (for example, University partners deposit papers in their institutional repositories in compliance with OpenAIRE guidelines). Where publications are in subscription-based venues, the green open-access version or a summary is provided via the project website or other open platforms. Every publication is associated with metadata (authors, title, DOI, etc.) and is indexed on the PowerizeD website's publication list for findability.

The number of publications presented in this submission is not yet complete and will be updated prior to the final review of the project. A comprehensive list of publications will be included in Deliverable D4.5. [8]

TABLE 2: KEY PUBLICATION CHANNELS FOR POWERIZED RESEARCH FINDINGS (12/25)

Number of Publications	Research Channel	DOI	Access Model
17	IEEE	17	Golden - 1 Green - 8 Closed – 8
7	Universities	-	Golden - 7
7	Research Gate	7	Golden 1 Green - 6
9	VDE, Scientific.net, MDPI others	9	Golden – 7 Green – 1 Closed - 1

Communication platforms: In addition to formal publications, PowerizeD has actively used various platforms to communicate project progress and outcomes to both consortium-internal and public audiences. **Fehler! Verweisquelle konnte nicht gefunden werden.** summarizes the main communication channels and tools employed:

TABLE 3: PROJECT COMMUNICATION CHANNELS AND PLATFORMS

Channel / Platform	Description & Usage	Access and Audience
PowerizeD Internal Data Share	Secure cloud storage for partners (e.g., Nextcloud or similar platform managed by the coordinator). Used for sharing deliverables drafts, large data files, and confidential results among consortium members.	**Access:** Restricted to consortium (login required). **Audience:** Internal (all partners, with permission controls for sensitive sub-folders).
Project Website (powerized.eu)	Public website hosting project information, news, and downloadable public deliverables. It features a publications list, news articles, and a repository of public results. Updated regularly by the dissemination team.	**Access:** Open to public. **Audience:** General public, industry stakeholders, research community.
LinkedIn and Social Media	PowerizeD LinkedIn page and partner social media accounts used to share announcements, blog posts, and achievements (e.g., reaching project milestones, publishing deliverables). Content includes short articles, graphics, and links to publications.	**Access:** Public (via social networks). **Audience:** Professional network in relevant industries, researchers, policymakers.
Workshops and Webinars	Virtual and physical meetings where project findings were presented (e.g., a webinar series "PowerizeD Talks"). Slide decks and recordings are shared either publicly via the website or internally if containing sensitive info.	**Access:** Public for open events; internal or invitation-only for consortium workshops. **Audience:** For public events, the research and industrial community; for internal workshops, project partners and invited experts.
Newsletters and Press Releases	Periodic newsletters emailed to subscribers and press releases issued for major breakthroughs. These summarize project progress and direct readers to more detailed reports or publications.	**Access:** Public. **Audience:** Subscribers (industry, academia, media) and general public via media outlets.
Internal Meetings & GA	Regular General Assembly meetings and technical meetings where data and results are presented among partners. Minutes and presentations are stored on the internal platform for reference.	**Access:** Consortium only. **Audience:** Project partners (for coordination and knowledge exchange).

Through these channels, the project ensured continuous dissemination and communication. A multi-channel approach was taken: while peer-reviewed publications target the academic and technical community, the website and social media provided more accessible updates to a broader audience. Importantly, all public communication materials that contain data (graphs, charts, etc.) have been cross-linked to their source datasets or publications when possible. For example, if a newsletter highlights a performance improvement (with a chart), the underlying dataset or deliverable is referenced (and made available if public). This practice improves transparency and reusability of communicated information.

Finally, all public deliverables (including this D5.6 report) are published on the project website for download, and they will remain available for at least 3 years after project completion. This ensures that the dissemination content itself (text, tables, and figures describing data) is preserved and accessible, complementing the preservation of the raw and processed data described in the next section.

3.2.2 Research Data

Research data in PowerizeD refers to the data generated or collected to carry out the project's scientific and technical objectives. This includes a wide variety of datasets such as experimental measurements, simulation results, design files, software source code, trained machine learning models, and more. We outline below the main types of research data handled, and then detail how these data are managed.

- Data generated by experiments and prototypes: Many use cases and R&D tasks produced raw and processed data from experiments. For example, WP3's reliability testing of power semiconductor devices yielded lifetime data of MOSFETs under power cycling; WP2's development of new algorithms for control systems generated datasets like motor control and sensor data logs. Use case demonstrators in WP1 (e.g., an EV charger prototype) collected operational data such as voltage, current, temperature readings over time. These data are typically numeric, time-series or waveform datasets, often stored in CSV, MAT or HDF5 formats. The volume ranges from a few megabytes for smaller tests to several gigabytes for long-term monitoring data.
- Simulation and modelling data: Both design and validation activities involved simulation. For instance, partners ran finite element simulations for thermal behaviour of power modules, or circuit simulations for converter designs. Outputs include simulation result files, model parameter datasets, and CAD files (for mechanical/thermal designs). Formats here include MATLAB data files, SPICE netlists, CAD formats (e.g., STEP files), etc. While individual simulation outputs are modest in size, parametric sweeps and design space exploration can accumulate large sets (a full set of simulation results for a design optimization could be tens of gigabytes).
- Software and algorithm outputs: PowerizeD also generated data in the form of software code, configuration files, and logs from algorithm training. For example, the development of AI algorithms for predictive maintenance produced trained model files (which are data files, e.g., TensorFlow models or weight matrices) and evaluation datasets (ground truth vs. prediction). Additionally, the project employed federated learning (FL) in certain tasks – notably for battery health prognosis – where models are

trained on distributed data. In such cases, intermediate model parameters (which are data) were exchanged instead of raw data. This approach generated its own data: e.g., model weight updates, performance metrics per federation round, etc., typically stored in JSON or binary formats. The code repositories themselves (stored in Git by partners) and associated documentation are part of the research outputs to be preserved, often under open-source licenses.

- Existing (external) datasets used: As part of the research, the consortium identified and reused high-value external datasets to validate models and approaches. Notably, for the predictive maintenance and federated learning work, partners used public datasets like the NASA battery cycling dataset and the CALCE battery aging dataset from University of Maryland. These provided baseline data for battery lifetime estimation models. In Deliverable D5.5 these data sets are shown in TABLE 4: RE-USE OF EXISTING DATA SETS.
- New datasets created by PowerizeD: In addition to leveraging existing data, PowerizeD produced new datasets that did not exist before. These are considered key research outputs of the project. TABLE 5: CREATING DATA SETS in Deliverable D5.5 provides a summary of the significant datasets created within PowerizeD, including their content, purpose, and size. Each dataset is given a unique name for reference.

Where feasible and not restricted by confidentiality, the intention has been to publish these datasets (or relevant subsets) externally for the benefit of the community (details in Section 3.2.3 on FAIR data). For example, OTH-AW battery aging data is prime candidate for open publication, as they have broad value for research on component reliability and battery analytics, respectively.

Data analysis and exploitation: After collecting and generating the above datasets, the project performed extensive analysis to extract insights and validate technical objectives. The methodologies for analysing each type of data are described in detail in the technical deliverables (notably D1.6 [7], which reports on the final evaluation of WP2/WP3 results). In summary, statistical analysis, machine learning, and domain-specific simulations were applied to interpret the data. For instance, operational data from prototypes were used to calculate efficiency improvements and were cross-checked against KPI targets defined at project start.

3.2.3 Data-Related Exploitable Results from Final Partner Questionnaires

As part of the final phase of the PowerizeD project, an updated and extended questionnaire was conducted in [7] and [4], [5], [6] to systematically identify and assess data-related Key Exploitable Results (KERs) from all partners. This targeted inquiry builds upon earlier data management activities and focuses specifically on assets that involve the generation, processing, or application of datasets, models, algorithms, and tools.

The responses provide insights into the nature, maturity, and usability of data assets across the consortium. **Fehler! Verweisquelle konnte nicht gefunden werden.** summarizes these findings in relation to the data sets including their technical character and possible data usage.

TABLE 4: DATA-RELATED EXPLOITABLE RESULTS FROM FINAL PARTNER QUESTIONNAIRES

KER ID	Partner Group	Lead Partner	Use Case(s)	Possible Data Usage	Short Summary	Data Type Category
KER-LE-03	LE	1 / IFAG	UC1.5 FCEV - Fuel cell and powertrain inverter	Advanced Gate Driver Design	Gate driver technology with increased energy efficiency, higher speeds, and improved robustness for automotive applications	Prototype
KER-LE-06	LE	1 / IFAG	UC2.4 Home and mobile PV with storage	Lifetime Modelling with Condition Monitoring	Intelligent lifetime modelling with in-module sensing for condition monitoring and performance optimization	Dataset
KER-LE-15	LE	4 / IPT	UC1.2 Traction Converters	Digital Twin for Power Electronics	Acquisition of new knowledge that will allow us to develop methods and tools for the	Simulation Model / Digital Twin
KER-LE-21	LE	13 / ALSTOM	UC1.1 Rail propulsion systems	Data-Driven Power Electronics Asset	By the elimination of standalone sensors through intelligent gate drive functions, improved data driven device,	Algorithm
KER-LE-22	LE	13 / ALSTOM	UC1.1 Rail propulsion systems	Data-Driven Power Electronics Asset	By introducing data driven and accelerated test methods the reliability growth, overall robustness and product	Service
KER-LE-24	LE	13 / ALSTOM	UC1.1 Rail propulsion systems	Federated Learning for RUL Prediction	Federated learning methods can be applied in future projects to improve operation and performance of	Know-How

KER ID	Partner Group	Lead Partner	Use Case(s)	Possible Data Usage	Short Summary	Data Type Category
KER-LE-27	LE	14 / SIGN	UC2.3 LED driver and LV DC distribution grid.	AI-Based Predictive Model	Tool chain for automatic C-code generation using PLECS.	Software / Tool
KER-LE-28	LE	14 / SIGN	UC2.3 LED driver and LV DC distribution grid.	Data-Driven Power Electronics Asset	Thermal-electrical model of LED driver.	Software / Tool
KER-LE-30a	LE	17 / IFD	UC3.1a. Industrial Drives - Prognostics for industrial drives	AI-Based Predictive Model	Data Analysis Platform (DAP) for AI-supported R&D flow automation or industrial power solutions. The platform	Demonstrator
KER-LE-30b	LE	17 / IFD	UC3.1.c Improved drivetrain efficiency for industrial drives	Data-Driven Power Electronics Asset	Demonstrator for modular and extensible software application framework for power control applications. Demonstrator enables provision	Demonstrator
KER-LE-32	LE	18 / IFI		Digital Twin for Power Electronics	System-C AMS model of the conceptual gate driver. The model will be organized in modules	Simulation Model / Digital Twin
KER-LE-33	LE	18 / IFI		Advanced Gate Driver Design	Define, design and create physical sample of an IC Gate Driver implementing the dV/dt closed	Simulation Model / Digital Twin
KER-LE-34	LE	19 / RB	UC1.5 FCEV - Fuel cell and powertrain inverter	Simulation Tool for System Optimization	Simulation co-design with digitalized tolerance data will allow for 30% faster design and pave a	Simulation Model / Digital Twin

KER ID	Partner Group	Lead Partner	Use Case(s)	Possible Data Usage	Short Summary	Data Type Category
KER-LE-35	LE	19 / RB	UC1.5 FCEV - Fuel cell and powertrain inverter	Digital Twin for Power Electronics	Digital twin uses data from physical sensors during real time operation to predict the damage	Simulation Model / Digital Twin
KER-LE-37	LE	19 / RB	UC1.5 FCEV - Fuel cell and powertrain inverter	AI-Based Predictive Model	Prognostics and Health Management (PHM), which follows condition-based monitoring, analyses monitored parameters to give users	Software / Tool
KER-LE-38	LE	26 / MBAG	UC1.5 FCEV - Fuel cell and powertrain inverter	AI-Based Predictive Model	Inverter with AI-based failure prognosis. This feature enables more reliable electric drivetrains and may be	Algorithm
KER-LE-39	LE	26 / MBAG	UC1.5 FCEV - Fuel cell and powertrain inverter	Digital Twin for Power Electronics	Lifetime models for electronic control units suited for uprating by federal learning offering confidentiality and	Simulation Model / Digital Twin
KER-LE-41	LE	32 / APC		Simulation Tool for System Optimization	With the build-up of the simulation capabilities APC can support their customers in more depth	Simulation Model / Digital Twin
KER-LE-44	LE	34 / PRO	2.2 Power electronics for green hydrogen	AI-Based Predictive Model	A SiC-based power module for integration in a bulk rectifier system for industrial scale green	Other
KER-LE-49	LE	45 / MATE	UC1.5 FCEV - Fuel cell and powertrain inverter	Data-Driven Power Electronics Asset	The result will be used in the first place to print coolers with a predictable	Software / Tool

KER ID	Partner Group	Lead Partner	Use Case(s)	Possible Data Usage	Short Summary	Data Type Category
KER-LE-52	LE	49 / ANSYS	UC1.5 FCEV - Fuel cell and powertrain inverter	Digital Twin for Power Electronics	Digital twin for predictive maintenance of power electronics	Simulation Model / Digital Twin
KER-LE-55	LE	60 / RBRO		Lifetime Modelling with Condition Monitoring	Thermo-mechanical simulation of solder joint degradation in a power module during active Power Cycling.	Simulation Model / Digital Twin
KER-SME-02	SME	21 / PSC	UC3.2 Hyper-sensorized digital drive	Digital Twin for Power Electronics	Digital Twin as a time accelerator tool for power electronics	Simulation Model / Digital Twin
KER-SME-03	SME	22 / FREN	UC1.3a DC/DC Converters	AI-Based Predictive Model	High-accuracy models for magnetic components, including thermal model, core/winding loss model, capacitance model, etc.	Simulation Model / Digital Twin
KER-SME-04	SME	27 / BNT	UC1.5 FCEV - Fuel cell and powertrain inverter	Data-Driven Power Electronics Asset	Development of integrable electronics for condition monitoring using thermal impedance spectroscopy and switching behavior analysis.	Software / Tool
KER-SME-05	SME	28 / SERI	UC1.6b. Charger systems - Medium power modular stationary charger	Data-Driven Power Electronics Asset	hardware, prototypes, tools, guidelines, trademarks, know-how	

KER ID	Partner Group	Lead Partner	Use Case(s)	Possible Data Usage	Short Summary	Data Type Category
KER-SME-06	SME	30 / AQUA	UC2.1 Flow battery power electronics	Digital Twin for Power Electronics	Design and build an AquaBattery demonstrator of a relevant size (e.g., 50kW/500kWh) to test the	Software / Tool
KER-SME-09	SME	35 / XC	UC1.6a. Charger systems - Mobile inline charger (MILCA)	Data-Driven Power Electronics Asset	Multirate control design allows mapping of the control law to an outer, low-cost and an	Algorithm
KER-SME-18	SME	46 / FPG	UC2.4 Home and mobile PV with storage	Data-Driven Power Electronics Asset	Semiconductor losses reduction by >50%	Software / Tool
KER-SME-20	SME	53 / EDRM	UC1.1 Rail propulsion systems	Digital Twin for Power Electronics	An operating digital twin mimicking behavior of physical assets of power electronics	Software / Tool
KER-SME-21	SME	54 / EDRM	UC1.1 Rail propulsion systems	Data-Driven Power Electronics Asset	Physics-of-failure models based on highly detailed 3D simulation used for analyzing thermal-mechanical failure, with high/low	Software / Tool
KER-SME-26	SME	61 / PLEXIM	UC1.6b. Charger systems - Medium power modular stationary charger UC2.3 LED driver and LV DC distribution grid	Simulation Tool for System Optimization	PLECS Spice extends PLECS Standalone with SPICE-level circuit simulation, enabling the use of manufacturer netlists	Other

KER ID	Partner Group	Lead Partner	Use Case(s)	Possible Data Usage	Short Summary	Data Type Category
KER-RE-05	RI	5 / CSIC	UC3.2 Hyper-sensorized digital drive	AI-Based Predictive Model	An AI-based digital toolkit/software for predicting remaining useful life with uncertainty quantification of electronic devices/components	Software / Tool
KER-RE-06	RI	5 / CSIC	UC3.2 Hyper-sensorized digital drive	Digital Twin for Power Electronics	A service for a few-shots learning to fast digital twin deployment and use. A MSc	Simulation Model / Digital Twin
KER-RE-07	RI	6 / FHG	UC1.5 FCEV - Fuel Cell and Powertrain Inverter	Digital Twin for Power Electronics	PowerizeD enabled FHG to gain deeper knowledge of the testing and failure of power electronics	Algorithm
KER-RE-08	RI	7 / TUDE		Digital Twin for Power Electronics	digital twin for dual active bridge dc-dc converter for EV charging application as well as	Simulation Model / Digital Twin
KER-RE-10	RI	7 / TUDE	UC1.6c, 2.1	AI-Based Predictive Model	Research on reliability concepts such as gate oxide failure mode for SiC MOSFETs, thermal/power cycling	Dataset
KER-RE-11	RI	7 / TUDE	UC1.6c, 2.1	AI-Based Predictive Model	Research on reliability concepts such as gate oxide failure mode for SiC MOSFETs, thermal/power cycling	Dataset

KER ID	Partner Group	Lead Partner	Use Case(s)	Possible Data Usage	Short Summary	Data Type Category
KER-RE-12	RI	7 / TUDE		AI-Based Predictive Model	Reliability estimation of power converter for EV charging and flow battery application using mission profile	Dataset
KER-RE-13	RI	8 / OTH	UC1.7 System of Systems	Simulation Tool for System Optimization	PowerizeD enables OTH to gain deeper knowledge of the ageing processes in lithium-ion batteries. With	Software / Tool
KER-RE-14	RI	8 / OTH	UC1.7 System of Systems	Simulation Tool for System Optimization	Due to the limited amount of publicly available battery ageing datasets over the lifetime of	Dataset
KER-RE-15	RI	8 / OTH	UC1.7 System of Systems	Simulation Tool for System Optimization	In the scope of the project, numerical battery lifetime simulations were found to be inefficient.	Demonstrator
KER-RE-16	RI	8 / OTH	UC1.7 System of Systems	AI-Based Predictive Model	In the project, OTH explores the most accurate and efficient RUL estimation algorithm and is	Algorithm
KER-RE-17	RI	8 / OTH	UC1.7 System of Systems	AI-Based Predictive Model	OTH utilises the advantages of federated learning by interconnecting multiple systems, thereby enabling AI models	Demonstrator
KER-RE-18	RI	8 / OTH	UC1.7 System of Systems	AI-Based Predictive Model	Despite the privacy advantages of the raw Federated Learning setting, challenges in	Demonstrator

KER ID	Partner Group	Lead Partner	Use Case(s)	Possible Data Usage	Short Summary	Data Type Category
					preserving privacy remain.	
KER-RE-19	RI	9 / RISE	UC1.1 Rail propulsion systems	AI-Based Predictive Model	The study shows that federated learning can successfully improve Remaining Useful Life (RUL) prediction without	Algorithm
KER-RE-20	RI	9 / RISE	UC1.1 Rail propulsion systems	AI-Based Predictive Model	Federated learning enables multiple labs (clients) , each with its own dataset, operating conditions,	Methodology
KER-RE-22	RI	9 / RISE	UC 1.1 Railway Propulsion Systems UC1.4 BEHDV Drive Inverter for High Voltage	AI-Based Predictive Model	Software tools for reliability analysis combining machine learning and physics of failure approaches for health	Software / Tool
KER-RE-26	RI	12 / UNIOVI	UC1.3a. DC/DC Converters - Energy Storage	AI-Based Predictive Model	Integration, control and reliability analysis of traction inverters in traction chains for railway including onboard	Algorithm
KER-RE-27	RI	12 / UNIOVI	UC1.3a. DC/DC Converters - Energy Storage	AI-Based Predictive Model	Design and fault analysis of dc/dc converters for the integration of high voltage-high power batteries	Algorithm
KER-RE-28	RI	12 / UNIOVI	UC1.3a. DC/DC Converters - Energy Storage	Data-Driven Power Electronics Asset	Improved optimization-based parameter identification methods for electronic power converters	Algorithm

KER ID	Partner Group	Lead Partner	Use Case(s)	Possible Data Usage	Short Summary	Data Type Category
					considering sensors' errors	
KER-RE-29	RI	15 / AIT	UC3.1a. Industrial Drives - Prognostics for industrial drives	AI-Based Predictive Model	The developed method uses AI-based event detection mechanism to reliably identify different material layers on	Software / Tool
KER-RE-30	RI	15 / AIT	UC2.3 LED driver and LV DC distribution grid	Simulation Tool for System Optimization	An automated testing environment for DC/DC converters enables fully automated simulations and evaluations. This approach	Software / Tool
KER-RE-32	RI	23/UNIBO	UC1.7 System of Systems	AI-Based Predictive Model	The developed method was tested successfully on synthetic data, but remains to be verified on	Algorithm
KER-RE-35	RI	24 / EDI	UC3.1b. Industrial Drives - Intelligent gate driver for industrial inverter	Data-Driven Power Electronics Asset	The developed algorithms allow to find the optimum gate current profiles for driving power MOSFETs	Software / Tool
KER-RE-36	RI	24 / EDI	UC1.7 System of Systems	AI-Based Predictive Model	The developed methods allow to mitigate data leakage attacks (i.e., gradient inversion attacks), to secure	Software / Tool
KER-RE-45	RI	25 / AALTO		Data-Driven Power Electronics Asset	A hybrid environmental impact assessment tool, which integrates	Software / Tool

KER ID	Partner Group	Lead Partner	Use Case(s)	Possible Data Usage	Short Summary	Data Type Category
					both economical input-output and process-based data	
KER-RE-46	RI	31 / VIF	UC1.5 FCEV - Fuel cell and powertrain inverter	AI-Based Predictive Model	With the help of federated learning and the smart bearing test rig, ViF can make	Algorithm
KER-RE-47	RI	31 / VIF	UC1.5 FCEV - Fuel cell and powertrain inverter	AI-Based Predictive Model	With the help of federated learning, ViF can generate reliable service life predictions for plain	Algorithm
KER-RE-48	RI	37/ DUTH		AI-Based Predictive Model	AI model for RUL prediction with confidence estimation incorporated through a reinforcement learning–based decision policy	Algorithm
KER-RE-50	RI	37/ DUTH	UC2.2 Power electronics for green hydrogen	Data-Driven Power Electronics Asset	MTBF recalculation	Algorithm
KER-RE-61	RI	51 / BME	UC1.3a. DC/DC Converters - Energy Storage	Data-Driven Power Electronics Asset	· new knowledge on adding aging effects (e.g. due to thermo-mechanical stresses) to the compact	Algorithm
KER-RE-62	RI	54 / PTB	UC1.6c. Charger systems - Large power stationary charger UC2.2 Power electronics for green hydrogen UC2.3 LED driver and LV	Data-Driven Power Electronics Asset	New references for wideband characterization of voltage and current sensors up to at least 100	Software / Tool

KER ID	Partner Group	Lead Partner	Use Case(s)	Possible Data Usage	Short Summary	Data Type Category
			DC distribution grid			
KER-RE-64	RI	54 / PTB	UC1.6c. Charger systems - Large power stationary charger UC2.2 Power electronics for green hydrogen UC2.3 LED driver and LV DC distribution grid	Data-Driven Power Electronics Asset	The new developed measurement infrastructure enables the extension of the existing calibration capabilities for research	Software / Tool
KER-RE-66	RI	62 / ETHZ	UC1.3 DC/DC converters, energy storage and auxiliary supply (IPT) UC1.6b - Medium power modular stationary charger (ELC)	AI-Based Predictive Model	Gained knowledge for design of multichip SiC power MOSFETs for high current capability	Simulation Model / Digital Twin

4 Conclusion

4.1 Contribution to Overall Project Goals

The Final Data Management Plan has been a vital element in achieving PowerizeD' s objectives. By providing a structured approach to handle data, the DMP ensured that every facet of the project's digital output was leveraged effectively. This contributed to the project's success in several ways.

Partners could readily share intermediate results, knowing that a secure system was in place and that data formats were compatible. This broke down silos between different work streams (WP1 demonstrators and WP2/WP3 research), allowing, for example, insights from a Mobility use case to inform a methodology in a Cross-Domain Topic.

The DMP ensured that PowerizeD' s outcomes will feed into the wider scientific community and industry long after the project's end. This means the impact of PowerizeD is not limited to immediate deliverables or prototypes – it establishes a legacy of knowledge and data resources for future researchers and product developers. In particular, the adherence to FAIR principles means these resources are not just dumped online, but are truly findable and usable, amplifying their value.

The data management activities have supported the exploitation and sustainability of results. As detailed, partners have concrete plans to exploit key results, and the DMP has equipped them with preserved, quality datasets to do so. Whether it is an SME using the data collected to refine a commercial prototype, or a large company integrating project-generated models into their product development pipeline, the groundwork laid by the DMP (like maintaining the internal repository accessible post-project) provides continuity. Moreover, by addressing data management in conjunction with exploitation (through the integrated analysis of KER questionnaires), the project has aligned its open data strategy with business interests.

4.2 Other conclusions and lessons learned

Throughout the implementation of the Data Management Plan, the PowerizeD consortium learned important lessons and refined best practices that can benefit future projects:

- Early Planning and Continuous Update: We learned that engaging partners early via a data questionnaire (as done in D5.4 and D5.5) was invaluable. It surfaced potential issues (like proprietary data that would need special handling) well in advance. However, it is equally important to continually update the plan. As the project evolved, new data types emerged (for example, a partner deciding mid-project to collect a new type of sensor data). The iterative updates culminating in this final DMP ensured no new development caught us off-guard. Lesson: a DMP should be a living document, adapting to project changes.
- Balancing Openness with Confidentiality: We affirmed the importance of the Horizon Europe principle of openness with discretion. We established internal procedures like having the consortium agree on which datasets to publish and under what timing. Best practice: define clear criteria for openness vs. restricted data, and apply them consistently with partner buy-in.

- Federated Learning as a Data-Sharing Solution: A technical best practice emerged in the realm of data privacy: federated learning proved to be a powerful approach to glean insights from data that could not be centrally shared. By implementing FL for the battery use case, partners were able to collectively train a model without exchanging raw data. This not only preserved confidentiality but also complied with any data locality requirements. The success of this approach in PowerizeD suggests that other projects dealing with sensitive multi-partner data could adopt similar techniques. Lesson: innovative data handling methods (like FL) can mitigate restrictions and still allow collaboration – a useful practice in consortia with strict data silos.
- Importance of Metadata and Documentation: We encountered cases where lack of metadata prevented initial data use. This is addressed this by a template for metadata and README files for each dataset.
- The use of a centralized internal repository (with appropriate access controls) was a best practice we'd recommend. It was heavily used (hundreds of files exchanged, several terabytes stored by project end) and prevented loss of information. One challenge we noted was ensuring everyone follows organizational convention. Best practice: provide user-friendly, secure data sharing tools and actively encourage their use; this avoids ad-hoc unsafe sharing (like public cloud drives or email attachments) that could breach security or version control.
- Long-term Preservation Strategy: We realized the importance of committing resources to keep project data alive after the project. Infineon's commitment to maintain the site and repository for 3 years after project end is a concrete outcome. We will upload key datasets to Zenodo, which promises long-term availability. By doing both, we have redundancy (should the website go down after a few years, Zenodo copies remain).
- Addressing Reviewer Feedback: The project's reviewers highlighted areas for improvement after the mid-term review, notably the need for clearer demonstration of how data supports results and how data management aligns with exploitation. Taking this feedback on board led to a stronger final DMP. We made sure to explicitly connect data sets to deliverable findings and to integrate the exploitation analysis.

5 References

[1] H. Lepke and D. Maier, ‘D5.4 Data Management Plan’.
[2] H. Lepke and D. Maier, ‘D5.5 Updated Data Management Plan’.
[3] A. Vieira, ‘How to comply with Horizon Europe mandate for RDM’, OpenAIRE. Accessed: Dec. 05, 2025. [Online]. Available: https://www.openaire.eu/how-to-comply-with-horizon-europe-mandate-for-rdm
[4] Innovation Disco, ‘Exploitation-Questionnaire-PowerizeD-LARGE-ENTITIES’.
[5] Innovation Disco, ‘Exploitation-Questionnaire-PowerizeD-SMEs’.
[6] Innovation Disco, ‘Exploitation-Questionnaire-PowerizeD-RESEARCH-INSTITUTIONS’.
[7] Heike Lepke and All Partner in PowerizeD, ‘D1.6 PowerizeD Final evaluation report of results of WP2 and WP3’.
[8] Chatzidogiannaki, Vicky and Maier, Daniela, ‘D4.5 Final plan and report for use and dissemination of the foreground’.

6 List of figures

7 List of tables

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