DATA MANAGEMENT PLAN

# 1. Data description and collection or re-use of existing data

## How will new data be collected or produced and/or how will existing data be re-used?

This project aims to develop a new isolated multilevel inverter topology and the development of an optimized modulation technique to produce 15 levels of output voltage using fewer components semiconductor elements. The data in this project is divided into the following categories:

Simulation files

The data from experimental research

## What data (for example the types, formats, and volumes) will be collected or produced?

Simulation files (using PLECS or MATLAB) in (.mdl) format, and graphics, diagrams, and other visual representations of the proposed converter in (.png) format.

The data from experimental research will be recorded in the form of oscilloscope screenshots and text files (\*.csv or \*.txt) format.

The expected size of data is approximately 50 GB.

# 2. Documentation and data quality

## What metadata and documentation (for example methodology or data collection and way of organising data) will accompany data?

All the measured files will be developed and described after finished work (measurements). They will be prepared in text format. Selected data will be facilitated by an open research data repository system (The Bridge of Data from

Gdańsk University of Technology). Metadata descriptions will be stored in JSON-LD format and will be compatible with the metadata standards, especially DataCite.

## What data quality control measures will be used?

Measurements will be made according to standard procedure and proven calibration by trained personnel. Several data quality control measures can be implemented to ensure the accuracy and reliability of the research findings such as:

Simulation Validation: The proposed inverter will be simulated accurately for various conditions to ensure the stability and reliability of the inverter.

Calibration and Testing: The proposed inverter prototype will be constructed in an efficient structure to reduce the losses and experimental tests will be performed to verify the affectedness of the inverter and control technique under various operating conditions.

Peer Review: The analysis of the obtained results will be submitted to a high-quality journal and presented at international conferences to receive feedback and peer review from experts to validate the research methodology and data analysis technique.

# 3. Storage and backup during the research process

## How will data and metadata be stored and backed up during the research process?

Data will be stored on the computers connected to the measurement devices. The backup will be performed at the end of the measurement on the external hard disk (50 GB).

## How will data security and protection of sensitive data be taken care of during the research?

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# 4. Legal requirements, codes of conduct

## If personal data are processed, how will compliance with legislation on personal data and on data security be ensured?

Personal data will not be collected on any computers in the project. Accounting work will be performed by administrative staff at Gdańsk University of Technology

## How will other legal issues, such as intelectual property rights and ownership, be managed? What legislation is applicable?

The ownership and management of any intellectual property relating to the Project remain in the rights of the

University and researchers, according to the copyright law and institutional regulations (Resolution of the Senate of the

Gdańsk University of Technology No. 117/2021/XXV of 19 May 2021 https://link.pg.edu.pl/GdańskTech\_intprop). The data and results will be published in an open-access model under one of the Creative Commons licenses. The data shared in the open research data repository will have a CCBY or CC0 license assigned. Metadata descriptions for these datasets will be always available without any restrictions (CC0). No embargo or any other restrictions are necessary.5.

Data sharing and long-term preservation

# 5. Data sharing and long-term preservation

## How and when will data be shared? Are there possible restrictions to data sharing or embargo reasons?

Selected data will be systematically uploaded to the Bridge of Data repository in accordance with the publication dates of the articles that are derived from this data. Some part of the data will be published in scientific journals which may also require raw data publication.

## How will data for preservation be selected, and where will data be preserved long-term (for example a data repository or archive)?

The data used in the articles will be deposited in the Bridge of Data repository, which will also be the main place for data preservation. The repository has a CoreTrustSeal certificate that confirms its trustworthiness and sustainability.

Data deposited there will be automatically categorized for long-term storage without an expiration date. The main criteria for selecting data will be its completeness and quality. Nevertheless, all data not selected for sharing and preservation in the Bridge of Data repository will also be stored for at least 10 years after the project is finished, and access to them will be possible only with the PI's consent.

## What methods or software tools will be needed to access and use the data?

Plan s for data and publications, Free software to open the txt/csv files.

## How will the application of a unique and persistent identifier (such us a Digital Object Identifier (DOI)) to each data set be ensured?

The datasets provided in the repository will have the DOI assigned.

# 6. Data management responsibilities and resources

## Who (for example role, position, and institution) will be responsible for data management (i.e the data steward)?

Open Science Competence Center (pg.edu.pl/open science) - established by Gdańsk University of Technology will be responsible for DMP and quality of metadata descriptions of datasets deposited in the Bridge of Data repository.

Project PI will be responsible for the procedures assessment and overall data quality.

## What resources (for example financial and time) will be dedicated to data management and ensuring the data will be FAIR (Findable, Accessible, Interoperable, Re-usable)?

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