Plan Overview

A Data Management Plan created using DMPonline.be

Title: Optimal Control and Operation Strategy for Multiple PV-Battery Storage based Microgrid

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Template: KU Leuven BOF-IOF

Project abstract:

The PV-battery system plays a vital role in modern electricity infrastructure as a means of increasing reliability, decreasing carbon emissions, and improving electricity access. However, the high penetration of PV (photovoltaics), with its intermittent nature, challenges grid- stability. Moreover, distributed control of PV-battery systems is able to reduce voltage and frequency fluctuations in microgrids. The state of charge, representing the energy stored in batteries, needs to be maintained within its limits to improve the performance of the battery. The optimal control of the battery operation should also consider the uncertainties in load demand and PV power generation predictions. However, it is crucial to design and operate multiple PV-battery systems while maintaining the stable and economic operation of microgrids with uncertainties.

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Optimal Control and Operation Strategy for Multiple PV-Battery Storage based Microgrid

Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.

Dataset name / ID	Description	New or reuse	Digital or Physical data	Data Type	File format	Data volume	Physical volume
		*Indicate: **N**(ew data) or **E**(xisting data)*	Indicate: **D**(igital) or **P**(hysical)	Indicate: **A**udiovisual **I**mages **S**ound **N**umerical **T**extual **M**odel **SO**ftware Other (specify)		Indicate: <1GB <100GB <1TB <5TB >5TB NA	
Load demand and renewable generation data of residential consumers	Forecasting day ahead load demand and PV generation of prosumers for uncertainty modeling, optimal control and operation of PV-battery systems	E	Digital	Numerical	csv excel	<5TB	
Develop a multi-objective optimization-based robust model predictive control of DER in low voltage distribution system	Develop an optimization problem and solve using MPC for DER control in low voltage distribution network	E	Digital	Numerical software model	csv excel	<5TB	
Validate simulation results using the historical data of electric distribution system	simulate the proposed method in various scenarios and compare the results	E	Digital	Numerical software	csv excel	<5TB	

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:

https://opendata.fluvius.be/explore/dataset/1_50-verbruiksprofielen-dm-elek-kwartierwaarden-voor-een-volledig-jaar/information/

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? If so, refer to specific datasets or data types when appropriate and provide the relevant ethical approval number.

- No

Will you process personal data? If so, please refer to specific datasets or data types when appropriate and provide the KU Leuven or UZ Leuven privacy register number (G or S number).

- No

Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, …)? If so, please comment per dataset or data type where appropriate.

- Yes

The proposed method will improve the operation of PV-battery system in low voltage distribution networks. This will significantly important for prosumers and distribution system operators.

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material or Data transfer agreements, Research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.

- No

Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.

- No

Documentation and Metadata

Clearly describe what approach will be followed to capture the accompanying information necessary to keep data understandable and usable, for yourself and others, now and in the future (e.g. in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, codebook.tsv etc. where this information is recorded).

The meta data recorded in csv file and README.txt files.

Will a metadata standard be used to make it easier to find and reuse the data?
If so, please specify which metadata standard will be used.

If not, please specify which metadata will be created to make the data easier to find and reuse.

- Yes

Data Storage & Back-up during the Research Project

Where will the data be stored?

- OneDrive (KU Leuven)
- Personal network drive (I-drive)

How will the data be backed up?

- Standard back-up provided by KU Leuven ICTS for my storage solution

Is there currently sufficient storage & backup capacity during the project?

If no or insufficient storage or backup capacities are available, explain how this will be taken care of.

- Yes

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

I always use the KU Leuven storage in my personal PC.

What are the expected costs for data storage and backup during the research project? How will these costs be covered?

Question not answered.

Data Preservation after the end of the Research Project

Which data will be retained for 10 years (or longer, in agreement with other retention policies that are applicable) after the end of the project?

In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).

- All data will be preserved for 10 years according to KU Leuven RDM policy

Where will these data be archived (stored and curated for the long-term)?

- Shared network drive (J-drive)
- KU Leuven RDR

What are the expected costs for data preservation during the expected retention period? How will these costs be covered?

Question not answered.

Data Sharing and Reuse

Will the data (or part of the data) be made available for reuse after/during the project?
Please explain per dataset or data type which data will be made available.

- Yes, as open data

If access is restricted, please specify who will be able to access the data and under what conditions.

Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)?

Please explain per dataset or data type where appropriate.

- No

Where will the data be made available?

If already known, please provide a repository per dataset or data type.

- KU Leuven RDR (Research Data Repository)

When will the data be made available?

- Upon publication of research results

Which data usage licenses are you going to provide?

If none, please explain why.

Do you intend to add a persistent identifier (PID) to your dataset(s), e.g. a DOI or accession number? If already available, please provide it here.

- No

What are the expected costs for data sharing? How will these costs be covered?

Responsibilities

Who will manage data documentation and metadata during the research project?

I will manage the data documentation and metadata

Who will manage data storage and backup during the research project?

I will manage the datasets in my PC using the ESAT account

Who will manage data preservation and sharing?

ICT

Who will update and implement this DMP?

we will update when necessary