User Manual of the CKAN Data Server of PEARL PV

Introduction

This user guide contains instructions for the use of the web interface of the CKAN data server of COST Action PEARL PV. This data server has been established to publish and upload data of monitored installed PV systems and to quantitatively evaluate the long-term performance and reliability of these PV systems in Europe and elsewhere.

First and foremost, we thank you for uploading and providing access to your collected data. Once your data is published, other users can use CKAN's search features to browse and find the data they need, and preview it using maps, graphs and tables.

Datasets and resources

On the CKAN-based site, data is published in units called "datasets". A dataset is a parcel of data and has two different elements: metadata and resources:

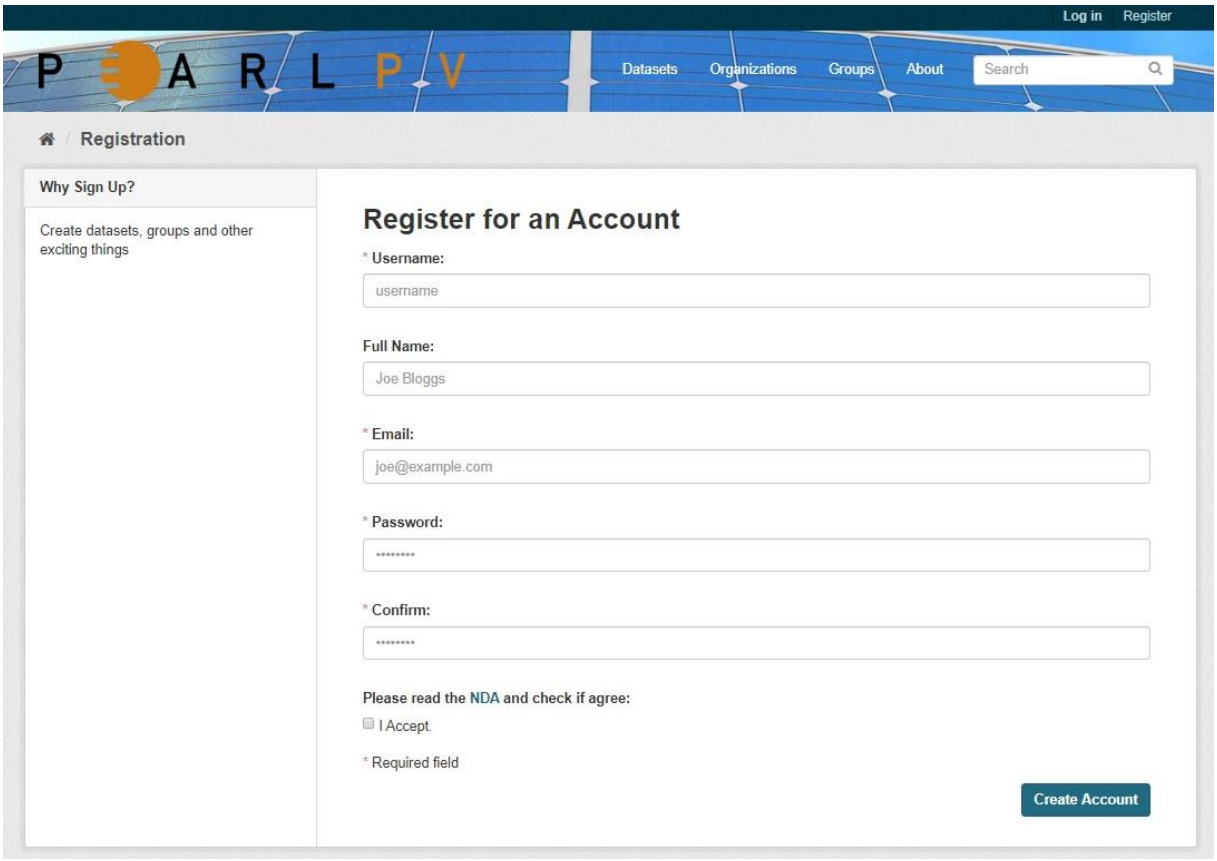
- "metadata" cover information about the data. For example, the title and publisher, date, what formats it is available in, what license it is released under, etc.
- "resources" hold the data itself. A resource can be a CSV or Excel spreadsheet, XML file, PDF document, image file, linked data in RDF format, etc. A dataset can contain any number of resources. For example, different resources might contain the data for different years, or they might contain the same data in different formats.

Registering and logging in

Registration is needed for most publishing features and for personalization features, such as "following" datasets.

To create a user ID, use the "Register" link at the top of any page. CKAN will ask for the following:

- Username – choose a username using only letters, numbers, - and _ characters. For example, "jbloggs" or "joe_bloggs93".
- Full name – to be displayed on your user profile
- E-mail address – this will not be visible to other users
- Password – enter the same password in both boxes



If there are problems with any of the fields, CKAN will tell you the problem and enable you to correct it. When the fields are filled in correctly, CKAN will create your user account and automatically log you in.

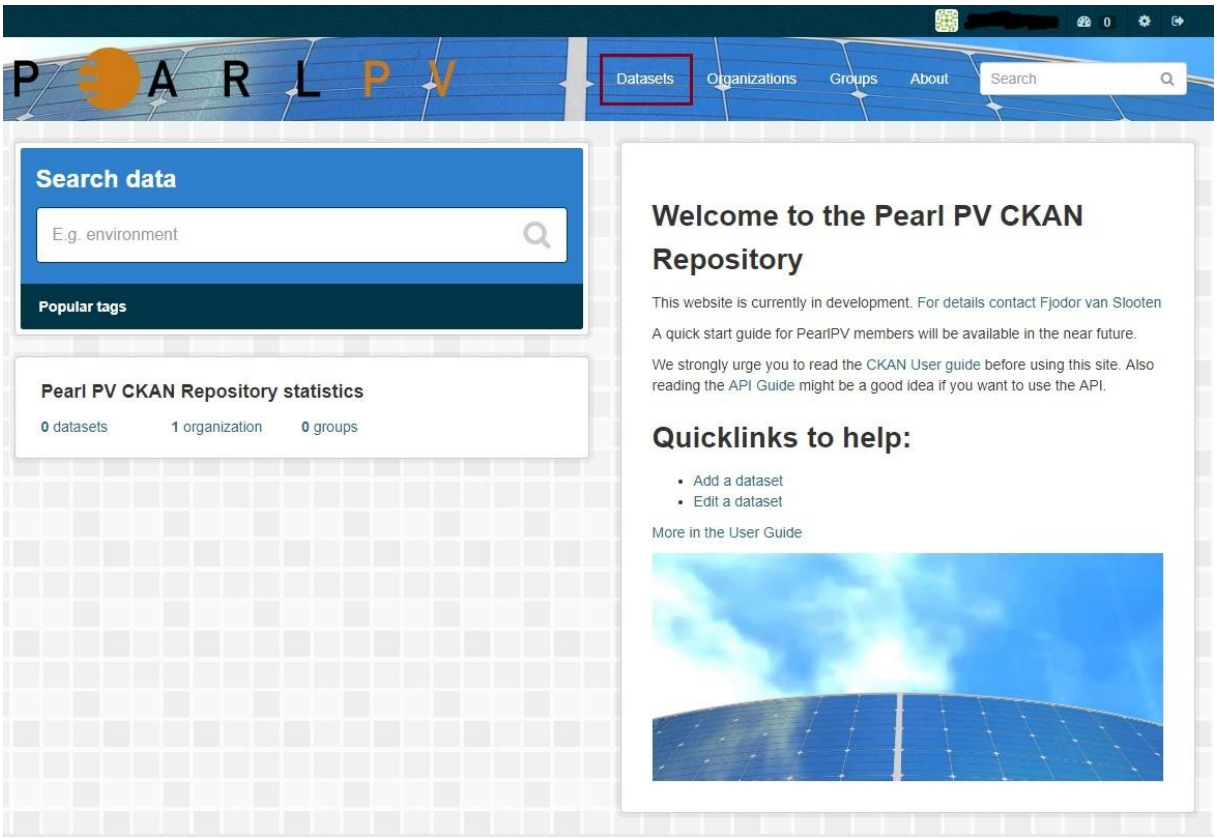
It is perfectly possible to have more than one user account attached to the same e-mail address. For this reason, choose a username you will remember, as you will need it when logging in.

Adding a new dataset

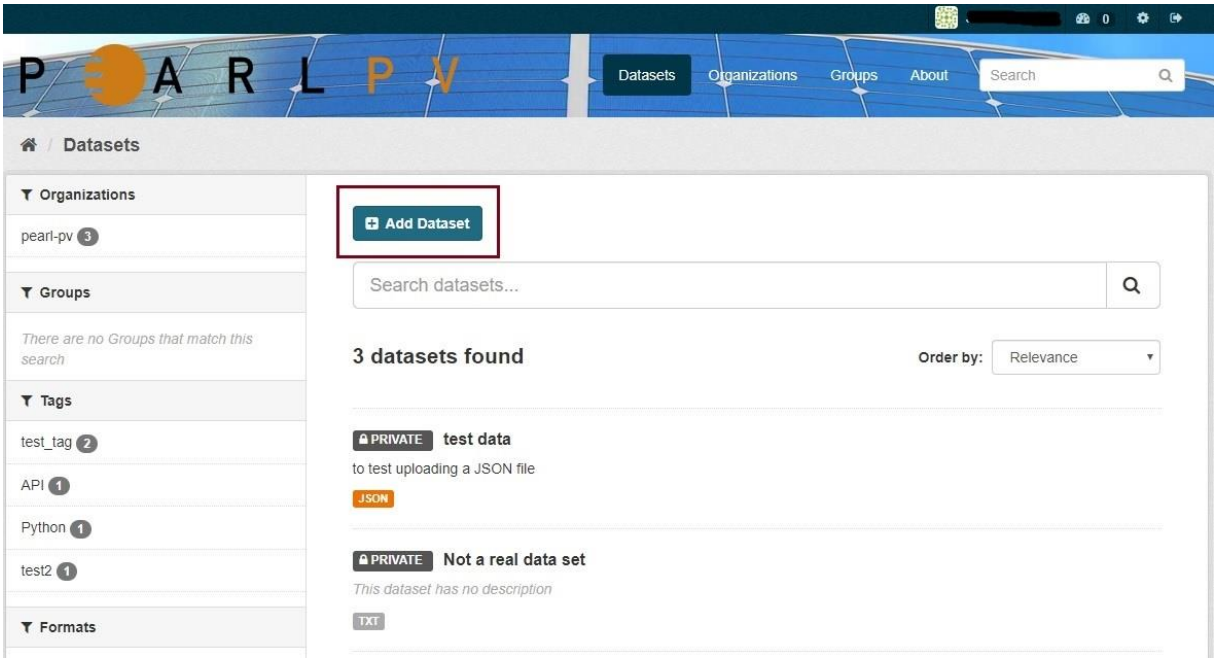
Step 1.

You can access “Create dataset” screen in two ways after logging in/registering.

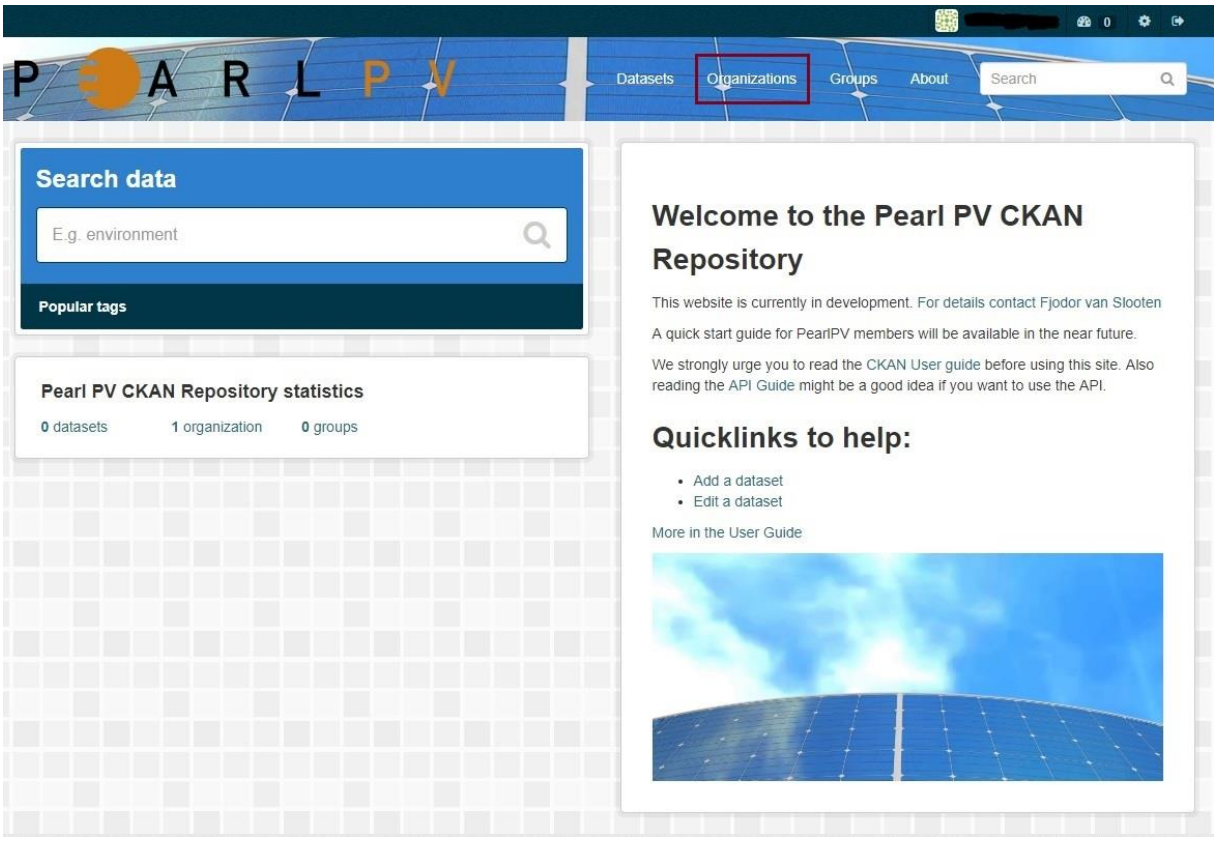
a. Select the “Datasets” link at the top of any page.



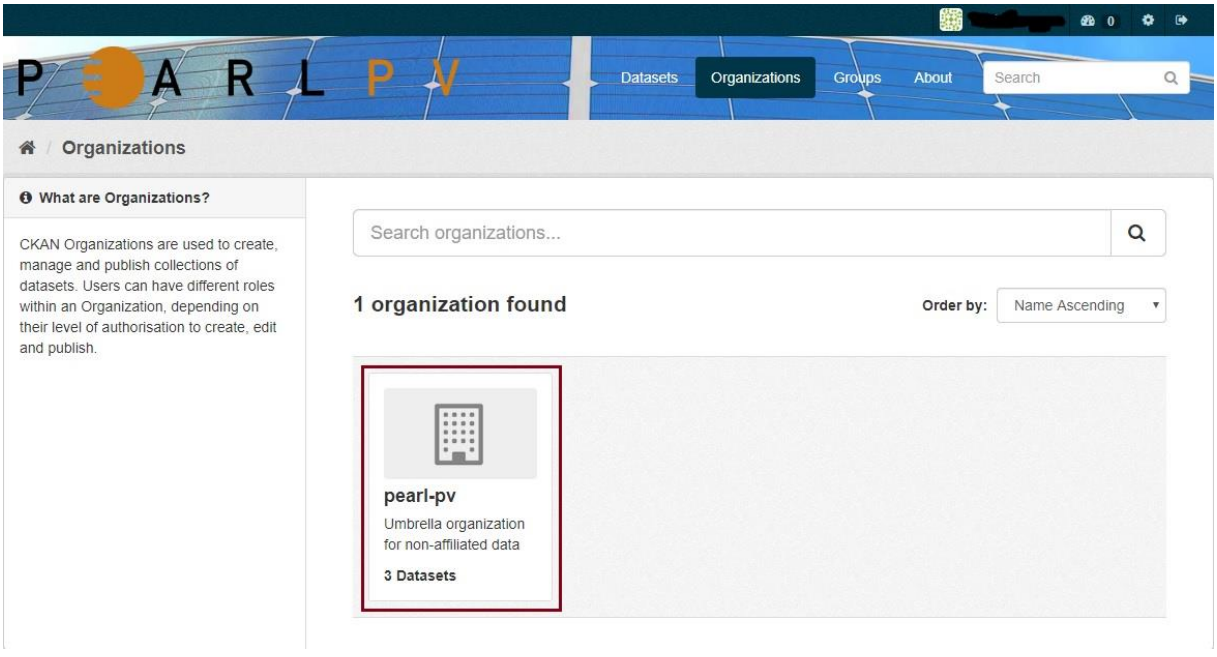
From this, above the search box, select the “Add Dataset” button.



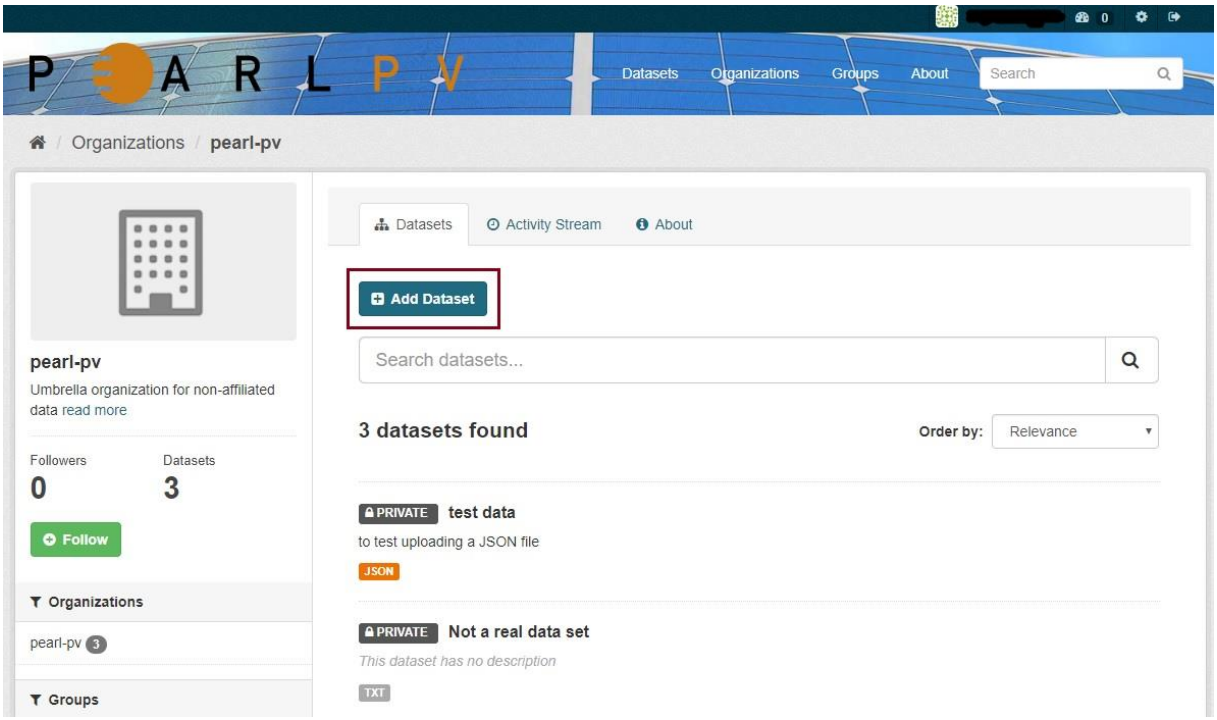
b. Alternatively, select the “organizations” link at the top of a page.



Now select the page for the organization that should own your new dataset.



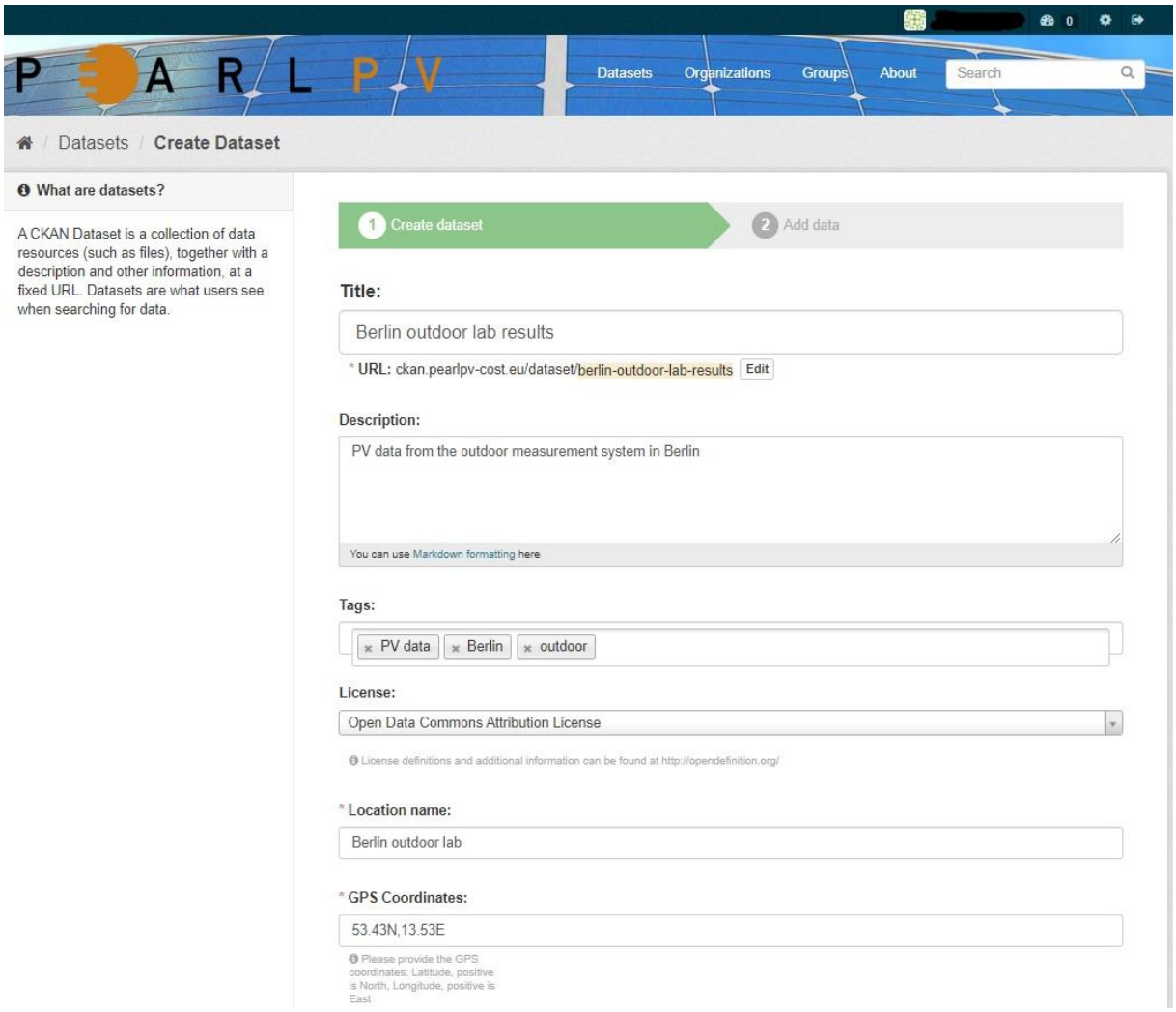
Provided that you are a member of this organization, you can now select the “Add Dataset” button above the search box.



Step 2.

PEARL PV asks the following information about your data. (The actual data will be added in step 4.)

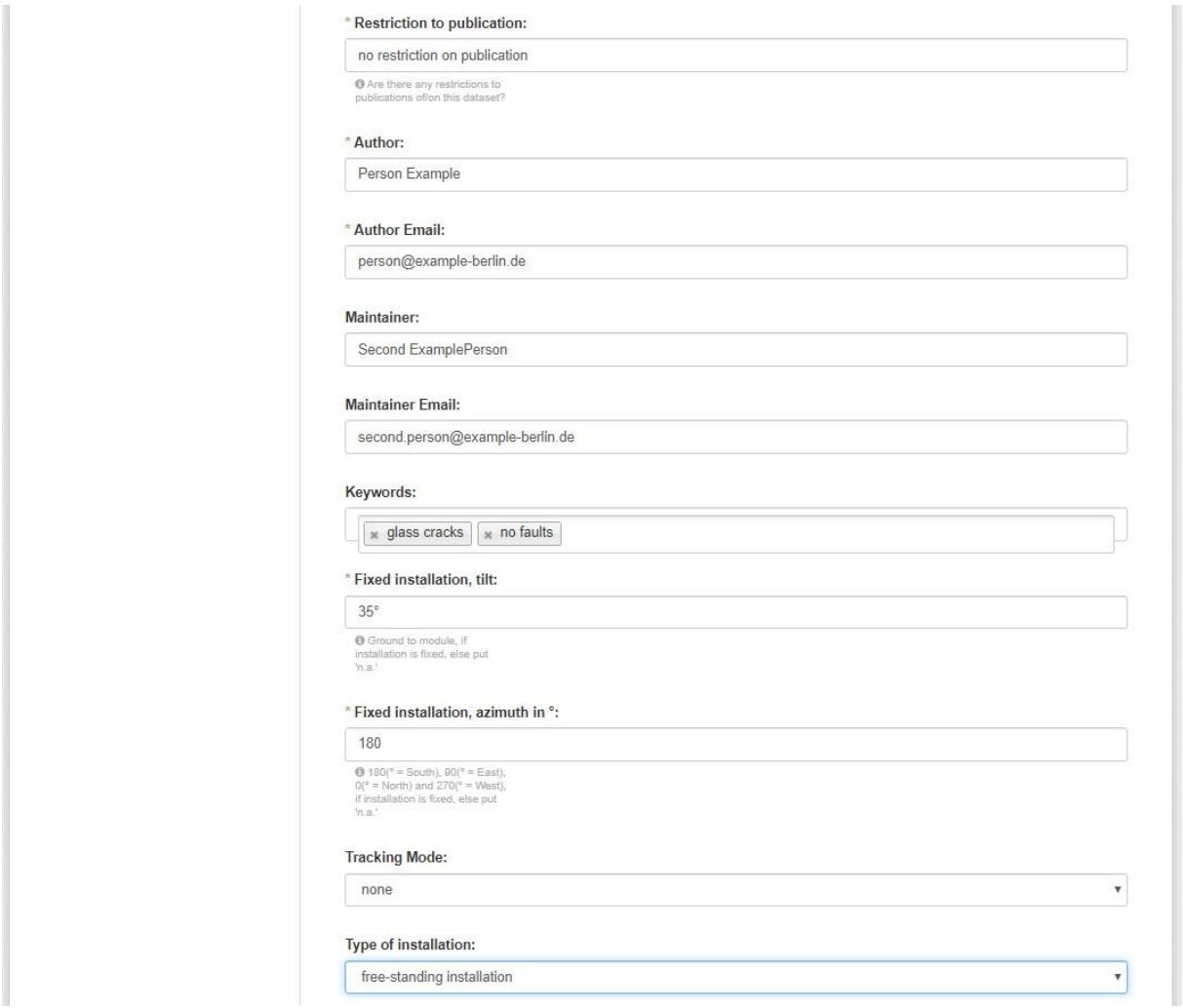
- Title – This title will be unique, so make it brief but specific. E.g. “Berlin PV data by months” is better than “PV data”.
- Description – You can add a longer description of the dataset here, including information such as where the data is from and any information that people will need to know when using the data.
- Tags – Here you may add tags that will help people find the data and link it with other related data. Examples could be “rooftop”, “CIGS”, “Berlin”. Hit the Enter button between tags. If you enter a tag wrongly, you can use its delete button to remove it before saving the dataset.
- License – It is important to include license information so that people know how they can use the data. This field is a drop-down box. If you need to use a license not on the list, contact the admin of Pearl PV site. License definitions and additional information can be found at http://opendefinition.org/
- Location name – The name of the PV field or the laboratory.
- GPS Coordinates – Here you can provide the GPS Coordinates of the site, (Latitude, Longitude, positive is North, positive is East).



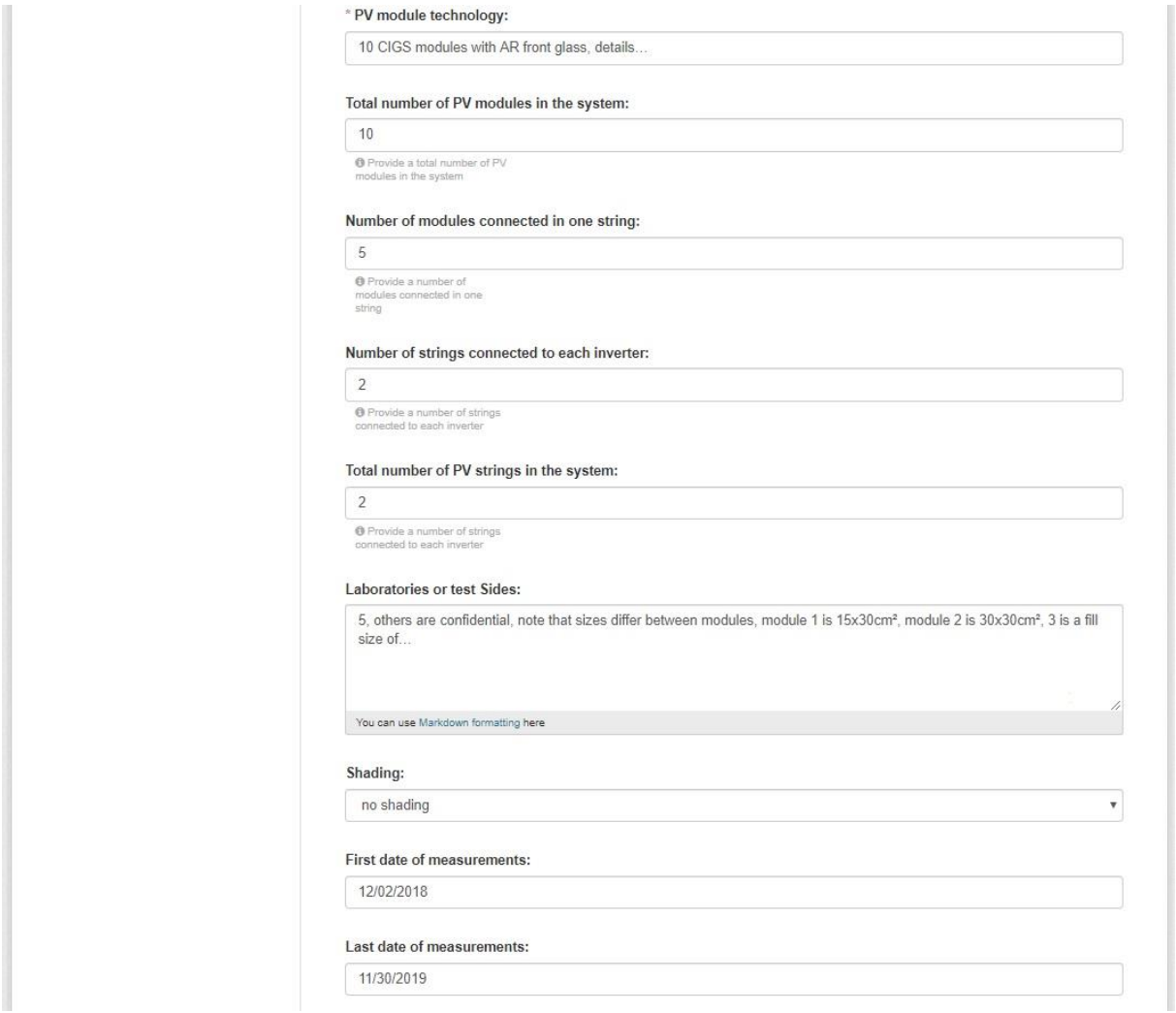
- Restriction to publication – Please provide here if there are any restriction to publication of / on this dataset, e.g. 'contact owner prior to publication'. If there is not any restriction, please write: no restriction on publications.
- Author – The name of the person or organization responsible for producing the data.
- Author Email – An e-mail address for the author, to which queries about the data should be sent.
- Maintainer – If necessary, name for a second person responsible for the data.
- Maintainer Email – If necessary, e-mail for a second person responsible for the data.
- Keywords – Field to provide any keyword(s) that describe(s) your specific dataset.

The following information should be provided for all types of installation, please start with one set of information. You will be given the option to add further sets.

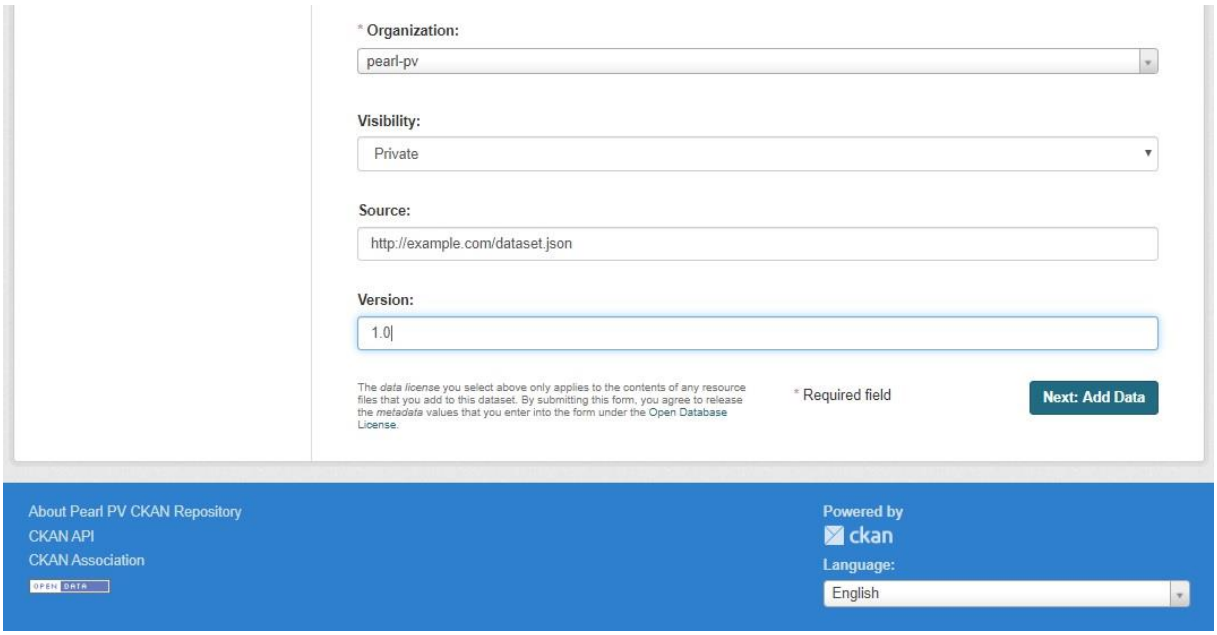
- Fixed installation, tilt – Ground to module, if installation is fixed, else put 'n.a.'.
- Fixed installation, azimuth – South (180°) to East (90°) to North (0°) and West (270°), if installation is fixed, else put 'n.a.'.
- Tracking mode – Select an option (none/1-axis/2-axis) listed in the drop-down list.
- Type of installation – Select an option (free-standing installation/BAPV tilted roof/BAPV flat roof/BAPV facade/floating) listed in the drop-down list.



- PV module technology – Provide the technology of the PV module.
    - If bifacial, please specify
        - bifaciality factor, e.g. 0.20 …
        - albedo at side, e.g. 0.20 …
        - additional comments, e.g. grassland installation
- Total number of PV modules in the system – Provide a total number of PV modules in the system.
- Number of modules connected in one string – Provide a number of modules connected in one string.
- Number of strings connected to each inverter – Provide a number of strings connected to each inverter.
- Total number of PV strings in the system – Provide a number of strings connected to each inverter.
- Laboratories or test sites – Number of PV modules in the data set - if applicable. In case your data set does not fit to this information request, give additional information in the comment field.
- Shading – Select an option (not specified/far horizon/near/no shading) and give a rough estimate on annual performance loss
- First date of measurements – In this field you can provide the first day of measurements.
- Last date of measurements – In this field you can provide the last day of measurements.

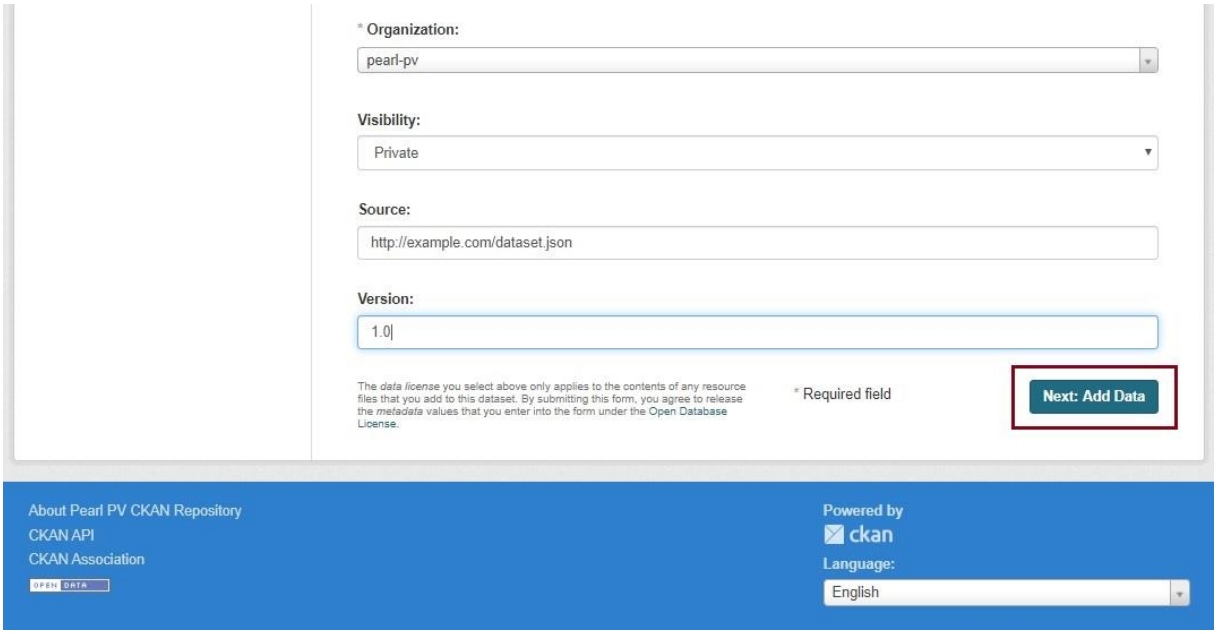


- Organization - If you are a member of any organizations, this drop-down will enable you to choose which one should own the dataset. You should ensure that you choose the correct organization for the dataset, since at present, this cannot be changed later.
- Visibility – a Public dataset is public and can be seen by any user of the site. A Private dataset can only be seen by members of the organization owning the dataset and will not show up in searches by other users.
- Source – Webpage or link where the dataset is available (if applicable). An upload option is given on the next page that you reach when clicking ‘Next-add data’ at the bottom.
- Version – The version of the uploaded dataset, please start with ‘1.0’..



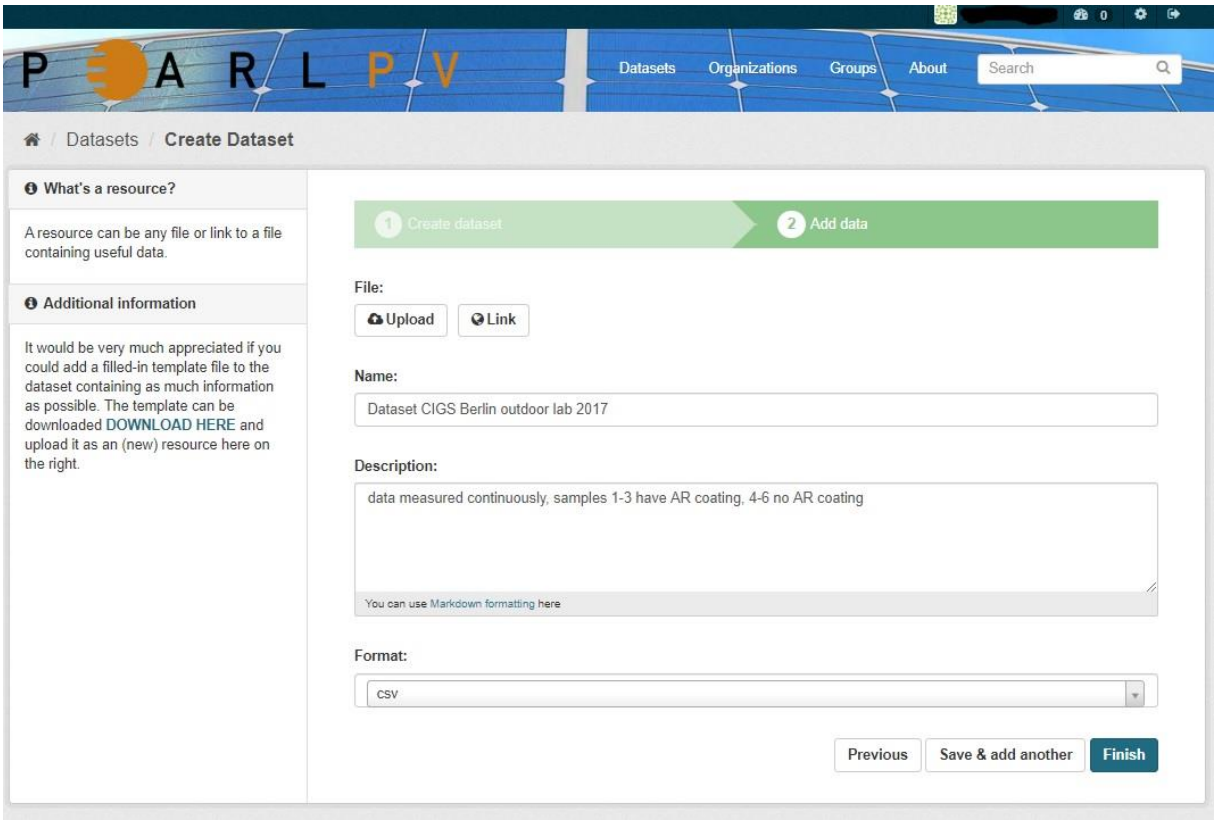
Step 3.

When you have filled in the information on this page, select the “Next: Add Data” button.



Step 4.

Now, you can see the “Add data” screen.



This is where you will add one or more "resources" which contain the data for this dataset. Choose a file or link for your data resource and select the appropriate choice at the top of the screen:

If you are giving a link to the data, like http://example.com/mydata.csv, then select "Link to a file".

If the data to be added to the system is in a file on your computer, select "Upload a file". The system will give you a file browser to select it.

Step 5.

Add the other information on the page. This information is not required, but it is good practice to add it:

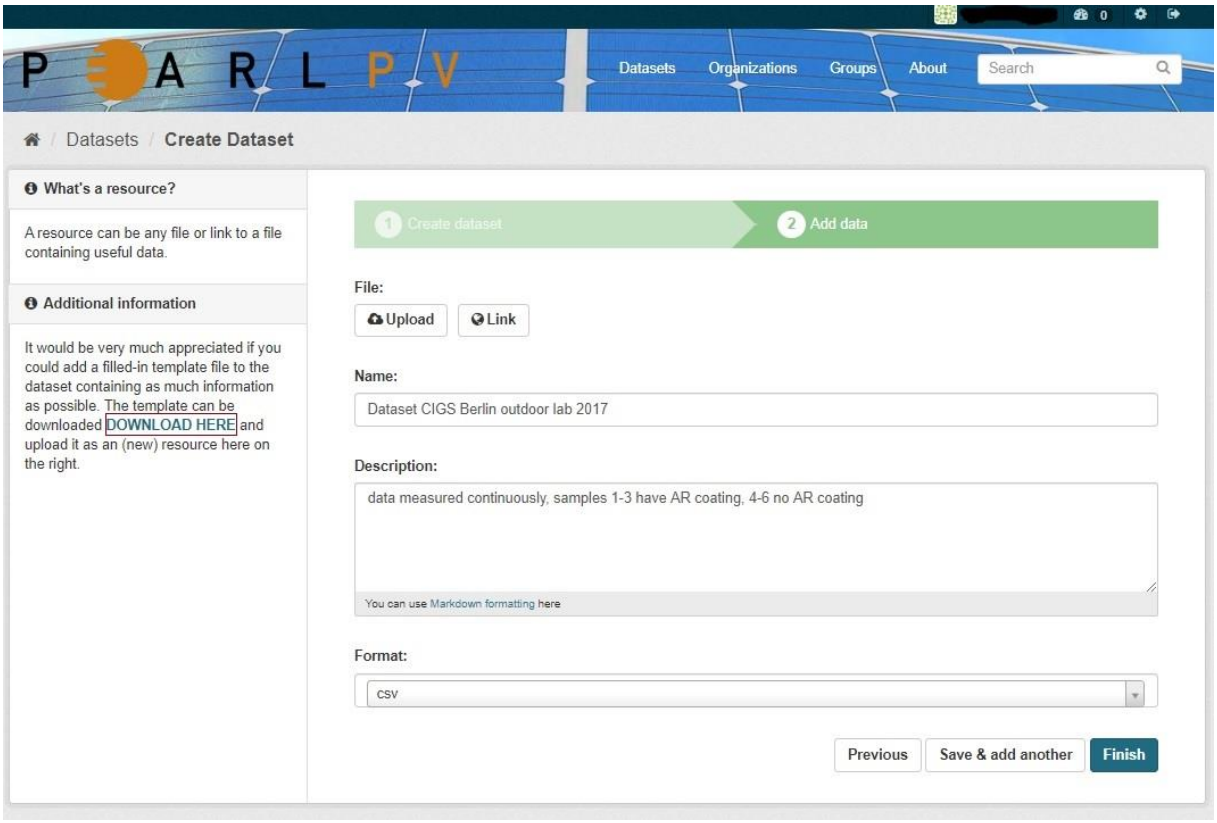
- Name – a name for this resource, e.g. "Berlin PV data outdoor 2017, CSV". Different resources in the dataset should have different names.
- Description – a short description of the resource.
- Format – the file format of the resource, e.g. CSV (comma-separated values), XLS, JSON, PDF, etc.

Step 6.

If you have more resources (files or links) to add to the dataset, select the "Save & add another" button.

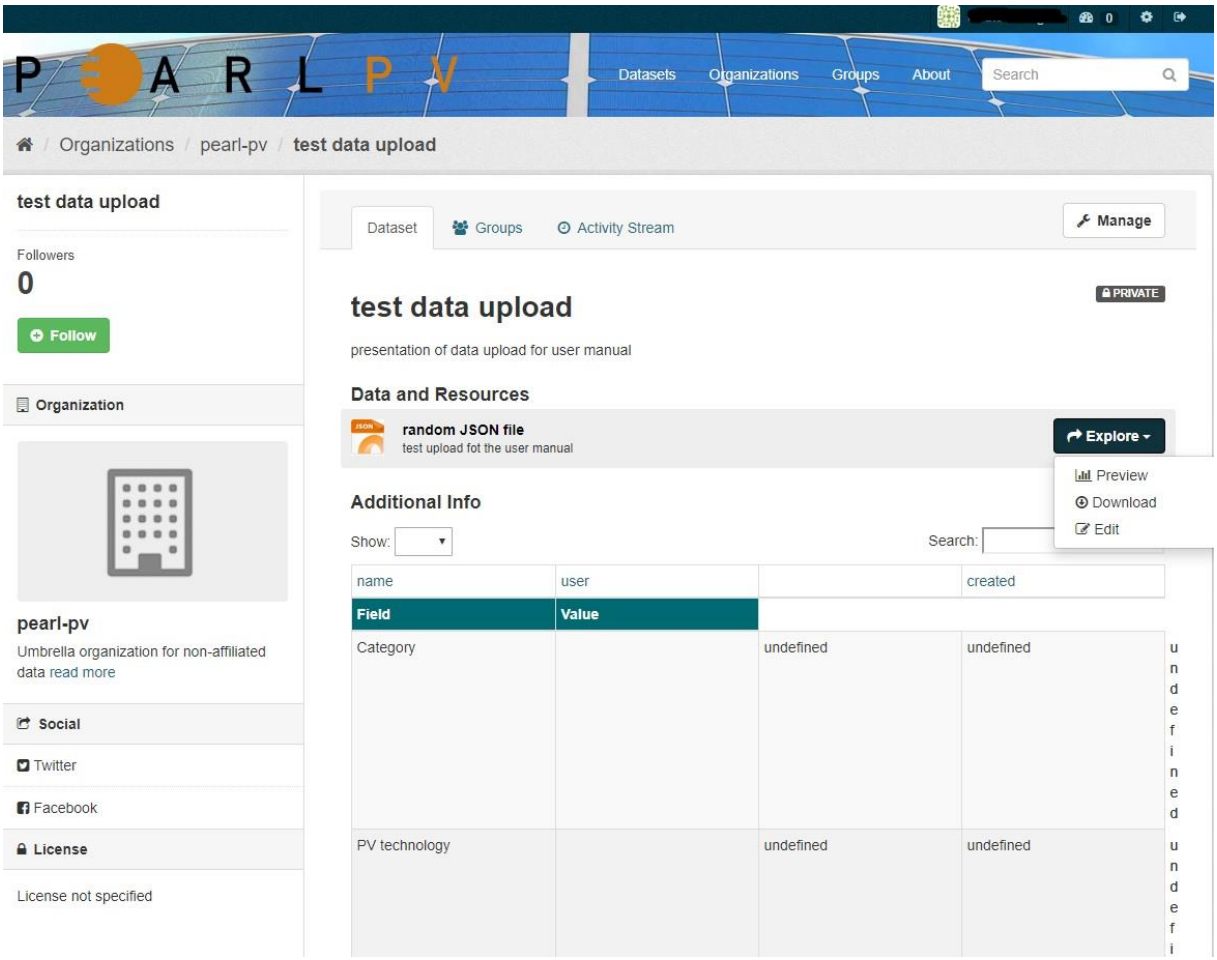
It would be very much appreciated if you could add another file containing as much information as possible on the items listed in the appendix. Use any format you want for that, e.g. an Excel file or word.

Under the "Additional information" label, you can download the appendix file of this user manual, fill in the list and upload it as it was explained in step 4 and step 5.



Step 7.

Select the 'Finish' button. The dataset was created and you can see the result. You are finished!


PEARL PV
Datasets
Organizations
Groups
About
Search
Organizations / pearl-pv / test data upload
test data upload
Followers
0
Follow
Organization
pearl-pv
Umbrella organization for non-affiliated data read more
Social
Twitter
Facebook
License
License not specified
Dataset
Groups
Activity Stream
Manage
test data upload
PRIVATE
presentation of data upload for user manual
Data and Resources
random JSON file
test upload fot the user manual
Explore
Preview
Download
Edit
Additional Info
Show:
Search:
name
user
created
Field
Value
Category
undefined
undefined
PV technology
undefined
undefined

APPENDIX

It would be appreciated if you would add additional information in step 6. The following list is an overview of what typically is needed when evaluating your outdoor data. Please, if you can, fill in this list, upload it and provide as much information as possible. It saves you from email requests.

Requested Information	Type/Options	*Example*
System status	all optional	
system changes during measurement time of uploaded data	free text	*module 2 was exchanged on Jan., 1st 2011 for a similar one after breakage information on module exchanges/converter exchanges, additional implementation thereof and similar*
system downtime	free text	*every Monday due to regular inspection, and, between Feb. 2nd and 23rd 2004*
sensor failures	free text	*offset in temperature sensor by 2°C, sensors all fell off on Feb. 2nd 2004 and were reattached on Feb3rd, irradiance is given in mW/m² not as specified in table in W/cm²*
sensor outages	free text	*temperature sensors all fell off on Feb. 2nd 2004 and were reattached on Feb3rd*
cleaning events	free text	*Jan 1st 2003, Feb. 3rd 2019, March 19th 2019, …*
monitoring fraction		*0.4* *hours in the month (t) /hours of monitoring activity (t_MA):* *M = t_MA / t* *The range is 0, for no monitoring to 1, for full monitoring.*
Inverter specification PLEASE DUPLICATE AS NEEDED and give that information for each inverter in the system		
inverter technology/type	free text	SMA, type, transformerless
max AC output power in [kW]	double	3.3
AC power frequency in [Hz]	double	50
max DC input power in [kW]	double	3.6
rated max/EU efficiency [%]	options/check boxes?	99.1,98.2
1-phase/3phase	optional	

	reactive power control	free text	Yes/no
	number of independent mpp inputs	double	
	total number of inverters in the system	integer	
	data exchange protocol		
	RS485	free text	RS485
	MODBUS	free text	Not used by us
	Web interface/company specific	free text	Company specific
	BOS components: Cables and System protection		
	cabling, grounding, lightning protections	free text	*cabling: experimental setup with 4 point contacts* *grounding: yes* *lightning: roof top common lightning protection behind modules*
	energy storage system		
	energy storage system	free text	*battery connected, type of battery*
Available acquired data			
	rough length of time period of data*	free text	*minimum 1 year *2.5 years*
	PV module temperature, module Impp, string Impp, module Vmpp, string Vmpp, module Pmpp, string Pmpp, Yield, outdoor IV-curves	check boxes, at least one must be selected	*string Pmpp*
	sampling interval yield data in unit (sec)	double	*1*
	recording interval yield data in unit (sec)	double	*600*
	sampling interval IV data in unit (sec)	double	*1*
	recording interval IV data in unit (sec)	double	*100*
	provided data in uploaded file, name units if not given in file		
	Pmpp from mpp-tracking, name unit	free text	*W*
	Impp from mpp-tracking, name unit	free text	*A*

Vmpp from mpp-tracking, name unit	free text	*V*
Pmpp from IV scan	free text	*not provided*
Impp from IV scan	free text	*not provided*
Vmpp from IV scan	free text	*not provided*
Isc from IV scan	free text	*not provided*
Voc from IV scan	free text	*not provided*
Efficiency	indoor lab measurement/outdoor measurement/not available	*Indoor lab measurement*
Temperature coefficients of Pmpp/efficiency	yes(preselected)/no	*yes*
NOCT	yes(preselected)/no	*yes*
Available sensor data, transducers, power meters, imaging		
reference cell, global horizontal irradiance, global tilted plane of array irradiance, air temperature, wind speed, wind direction, precipitation	check boxes, at least one must be selected	*reference cell, global horizontal irradiance, global tilted plane of array irradiance, air temperature, wind speed, wind direction*
sampling interval meteorological data in [sec]	double	*10*
recording interval meteorological data in [sec]	double	*600*
Irradiance		
Pyranometer details	free text, optional	*CMP11*
If known: accuracy	free text, optional	*+/-10W/m²*
reference cell details	free text, optional	*Calibrated Si reference*
If known: accuracy	free text, optional	*+/-20W/m² above 50W/m², +/-50W/m² below*
Temperature		
air temperature sensor details	free text, optional	*ClimaSensorUS*
If known: accuracy	free text, optional	*1°C*
PV module temperature sensor details	free text, optional	*PT100 glued onto module back side in the center of the module*
If known: accuracy	free text, optional	*1°C*
Wind		
Wind sensor details	free text, optional	*ClimaSensorUS*
If known: accuracy of wind speed and direction measurement	free text, optional	*1 m/s*

other meteorological/environmental sensors		
Liquid precipitation/rain sensor detail and if known: accuracy	free text, optional	*ClimaSensorUS*
Solid precipitation/rain sensor detail and if known: accuracy	free text, optional	*ClimaSensorUS*
any other sensors	free text, optional	*spectrometer EKO WISER*
Current and voltage transducers		
DC current transducers details	free text, optional	n/a
DC voltage transducers details	free text, optional	n/a
AC current transducers details	free text, optional	n/a
AC voltage transducers details	free text, optional	n/a
Power meters		
DC power meter details	free text, optional	mpp tracker by LOPV
AC power meter details	free text, optional	Inverter, name supplier
IR and EL images		
additional IR/EL images available upon request	yes/no (preselected: no)	*yes*
Quality Control		
If known: what is the accuracy of your measured PV data?	free text, optional	*above 50W/m²: 2W for Pmpp, 1A for Isc, …*
What are the calibration procedures?	free text, optional	*sensors are calibrated as specified by provider, spectrometer is calibrated annually, temperature sensors calibrated upon module exchange, at least annually*
What are the data quality control procedures? / Maintenance practice?	free text, optional	*weekly visual inspection (removal of dirt if necessary)*
What are the data handling processes?	free text, optional	*Data stored in data-bank, then evaluated for scientific purposes (filtering, temperature coefficients, yield, forecast, failure prediction, big data analysis)*
surveillance of system operation	options: proprietary hardware/software // own	*own developed alert system, hardware by university Ljubljana*

	developed hardware/software

Acknowledgement

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COST Action Pearl PV

COST Action PEARL (CA16235) PV is focused on “Performance and Reliability of Photovoltaic Systems: Evaluations of Large-Scale Monitoring Data”.

The aim of PEARL PV is to improve the energy performance and reliability of photovoltaic (PV) solar energy systems in Europe leading to lower costs of electricity produced by PV systems by a higher energy yield, a longer life time eventually beyond the guaranteed 20 years as specified by manufacturers, and a reduction in the perceived risk in investments in PV projects.

This will be achieved by analyzing data of the actual monitored long-term performance, defects and failures in PV systems installed all over Europe to quantitatively determine the absolute influences of components rated performance, key design of systems, installation, operation, maintenance practice, geographic location and weather factors on the performance, performance degradation over time and failure modes of these PV systems.

Website PEARL PV: www.pearlpv-cost.eu

COST Association

COST (European Cooperation in Science and Technology) is a funding agency for research and innovation networks. Our Actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing them with their peers. This boosts their research, career and innovation.

Website COST: www.cost.eu

Contact for this publication

Dr. Carolin Ulbrich and Judit Süveges have developed this manual.

If any question or suggestion then please contact:

Dr. Carolin Ulbrich

Email:

carolin.ulbrich@helmholtz-berlin.de

Judit Süveges

Email:

judit.sueveges@helmholtz-berlin.de

Address:

PVcomB - Kompetenzzentrum Dünnschicht- und Nanotechnologie für Photovoltaik

Schwarzschildstraße 3, 12489 Berlin, Germany