



RISEEnergy
Research Infrastructure Services for Renewable Energy

RISEEnergy Workshop on Metadata Management

Lazher Mejdi | Forschungszentrum Jülich

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**Hands-on Session
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Introduction to Metadata

What is Metadata?

Information that **describes, explains, or gives details** about something else (“**data about data**”).

Other examples:



Data: picture



Metadata: date taken, camera type, location, file size, etc.



Data: book



Metadata: author, title, publication year, ISBN, etc.

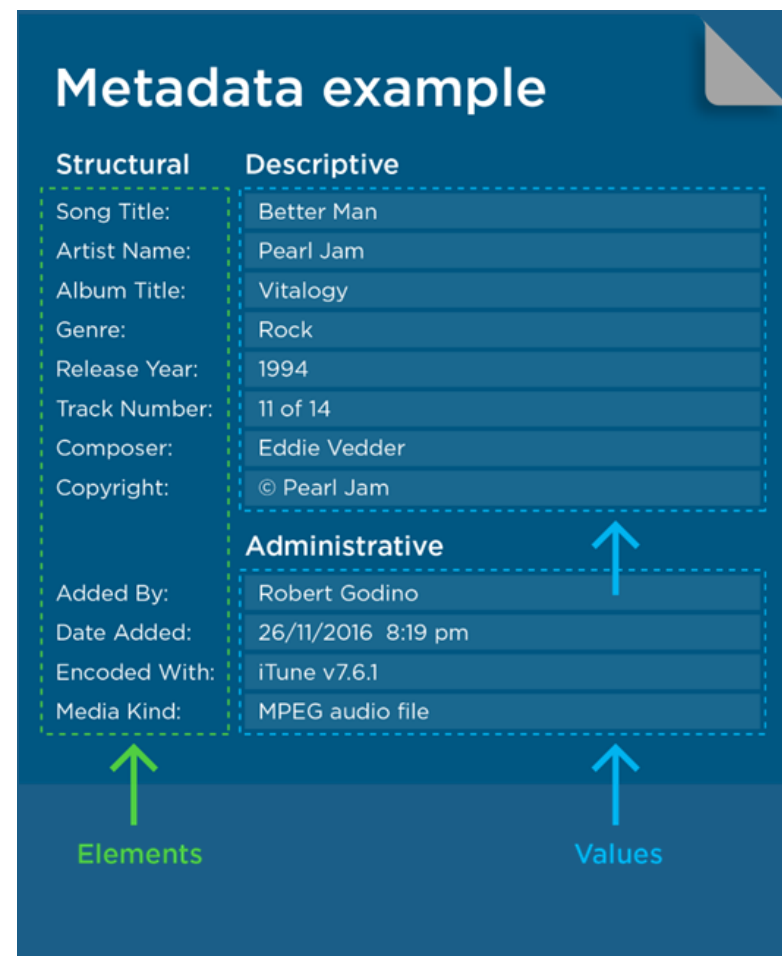


Data: email



Metadata: sender, receiver, time sent, subject, etc.

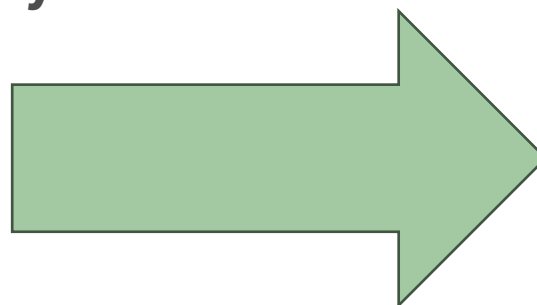
 Metadata answers **what, when, where, and who.**



Introduction to Metadata

Why is it important?

1. Helps you find information quickly
2. Gives meaning and context
3. Keeps data organized
4. Enables automation
5. Improves data sharing
6. Helps with security and tracking
 - Who edited a file
 - When it changed
 - Access permissions



Findable



Accessible



Interoperable



Reusable



Introduction to Metadata



Metadata Schemas/Standards

A metadata schema is simply a standard way of organizing metadata
A template that says *what information should be recorded and how.*

Examples:



800+ types of Digital Objects

Dublin Core Elements		
Rights	Contributor	Creator
Subject	Coverage	Title
Publisher	Identifier	Description
Type	Date	Source
Relation	Format	Language

Person

```
{
  "@context": "https://schema.org",
  "@type": "Person",
  "name": "Dr. Maria Schneider",
  "jobTitle": "Energy Systems Researcher",
  "affiliation": {
    "@type": "Organization",
    "name": "Fraunhofer Institute for Energy Economics and Energy System
  },
  "email": "maria.schneider@example.org",
  "knowsAbout": [
    "Renewable energy",
    "Smart grids",
    "Energy optimization"
  ],
  "sameAs": [
    "https://orcid.org/0000-0002-1234-5678",
    "https://www.linkedin.com/in/maria-schneider"
  ]
}
```

Dataset

```
{
  "@context": "https://schema.org",
  "@type": "Dataset",
  "name": "The SOLETE Dataset",
  "description": "Dataset supporting research on smart energy systems",
  "author": {
    "@type": "Person",
    "name": "Daniel Vázquez Pombo"
  },
  "datePublished": "2022-01-19",
  "dateModified": "2023-04-11",
  "publisher": {
    "@type": "Organization",
    "name": "Figshare"
  },
  "url": "https://figshare.com/articles/dataset/The_SOLETE_dataset/176",
  "license": "Open Data License",
  "keywords": [
    "energy systems",
    "smart grids",
    "energy data",
    "time series"
  ]
}
```

ResearchProject

```
{
  "@context": "https://schema.org",
  "@type": "ResearchProject",
  "name": "RISEnergy",
  "description": "European research project supporting innovation and access",
  "funding": "Horizon Europe Programme",
  "keywords": [
    "energy transition",
    "research infrastructures",
    "renewable energy"
  ],
  "url": "https://risenergy-project.eu/",
  "status": "Active",
  "foundingDate": "2024",
  "sponsor": {
    "@type": "Organization",
    "name": "European Union"
  }
}
```



Overview of Coscine & AIMS platforms

Coscine



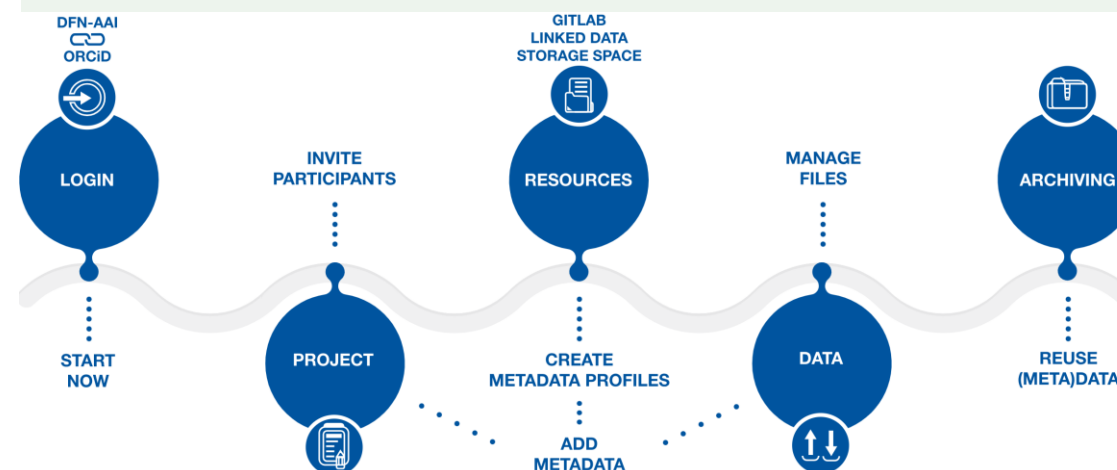
Coscine is an **online platform** designed to **manage** research **data** and **metadata** throughout the lifecycle of scientific projects. It provides:

- **Cloud storage** for securely storing raw research data
- A portfolio of **metadata templates ("profiles")** used in the scientific community
- **APIs** that enable **automated** data **upload** and **download**, metadata **management**, and data **discovery**
- **Collaborative workspaces** with full administrative control and customizable access rights for project members
- **Archiving** of data up to 10 years

AIMS



AIMS is an **online platform** for **designing custom metadata** profiles. It also provides **APIs** that enable **automation** of profile creation and management processes.



Getting Started with Coscine



RISEnergy

Create Account

1. Navigate to the Coscine login page: <https://coscine.rwth-aachen.de/login> (see Figure 1).

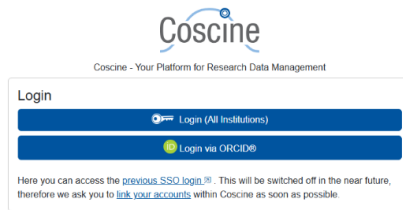


Figure 1: Coscine login options.

2. Click on “Login (all institutions)”.

Important: Do not log in directly via ORCID from the main page, as your email address may not be correctly associated with your account.¹

3. You will be redirected to the page shown in Figure 2.

Welcome

You have been forwarded here by a service to authenticate yourself.

Coscine

Select home organization

ORCID ID

Remember Home organisation

Proceed

Login with other identity providers:



Figure 2: Login options after selecting “Login (all institutions)”.

¹This appears to be a platform-related issue.

4. In the search bar, look for your organization and select it.

- If your organization is listed, select it and log in. Your Coscine account will be created automatically.
- If your organization is **not** listed, choose one of the alternative identity providers at the bottom of the page:
 - “Helmholtz ID” (if available), or
 - “ORCID”.

5. If you select “ORCID”, you will be redirected to the ORCID login page (Figure 3). Log in using your ORCID credentials.

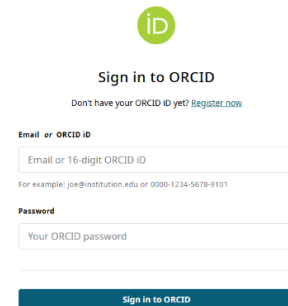


Figure 3: ORCID login page.

6. After logging in, you will be redirected to the terms of use page (Figure 4). Read the terms and click “Confirm” to proceed.

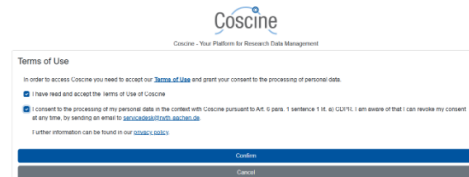


Figure 4: Terms of use page.

Complete User Profile

1. Open your user profile:

- Click your name in the top-right corner and select “User Profile”, or
- Use the direct link: <https://coscine.rwth-aachen.de/user>

2. The most important section is “Personal Information” (see Figure 5).

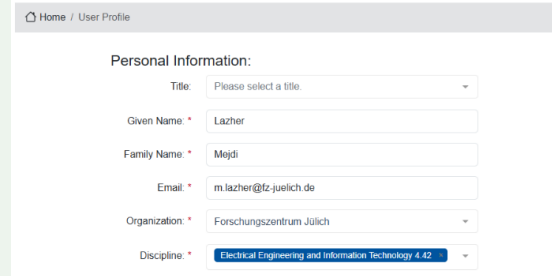


Figure 5: User profile page with the Personal Information section.

3. Fill in the required fields:

- “Given Name”
- “Family Name”
- “Email”
- “Organization”
- At least one “Discipline”

4. Click “Save” at the bottom-right corner of the page.²

Join RISEnergy Project Space

After creating your account:

1. Send the email address used for registration to m.lazher@fz-juelich.de.
2. You will be added to the “RISEnergy” project in Coscine.
3. Once added, the project will appear in your project list (see Figure 6).

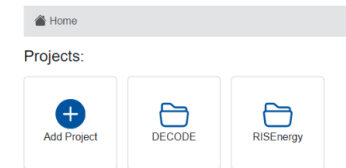


Figure 6: List of projects on the Coscine homepage.



Getting Started with Coscine

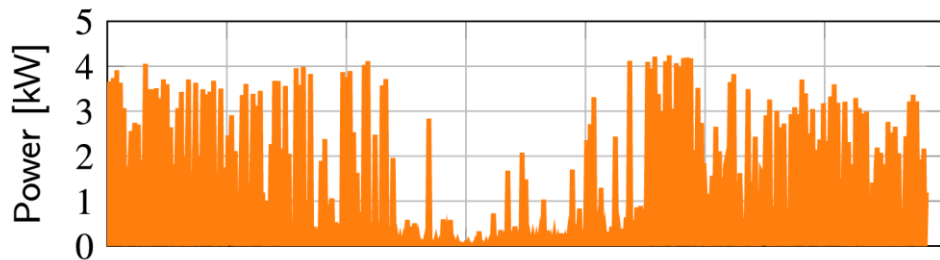


RISEnergy

Add a resource: the SOLETE dataset (DTU SYSLAB)

DTU Data

a) Solar PV



c) Weather data



Air Temperature

24°C
75°F



Relative Humidity

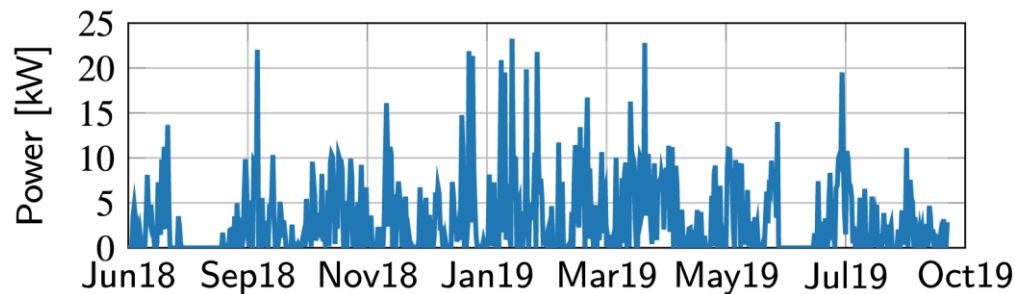
65%



Pressure

1015 hPa
29.97 inHg

b) Wind Turbine



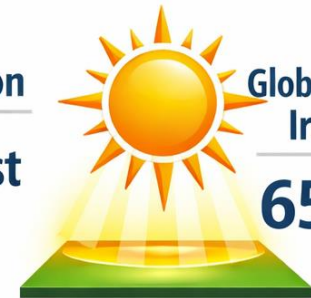
Wind Speed

15 km/h
9 mph



Wind Direction

Southwest



Global Horizontal Irradiance

650 W/m²

Fig. 6. Sample piece from the SOLETE dataset.

DOI: <https://doi.org/10.11583/DTU.17040767.v3>

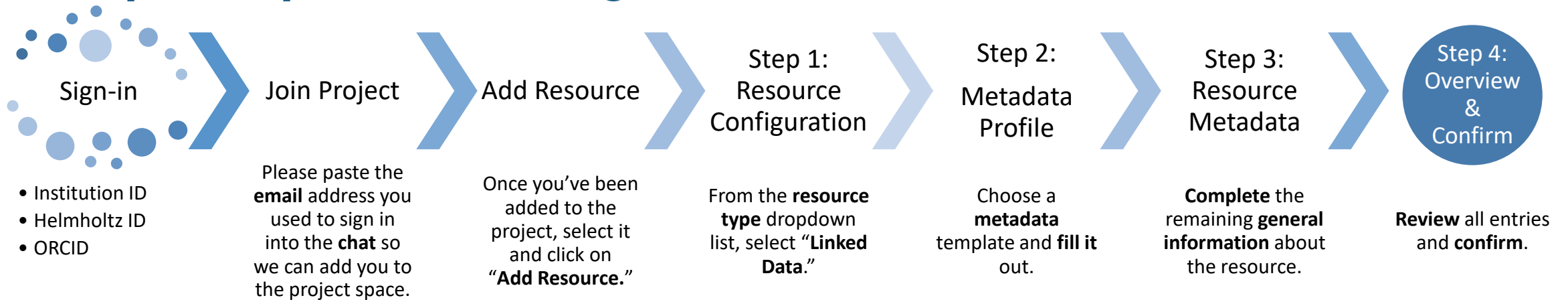
Source: Pombo, D. V., Rincón, M. J., Bacher, P., Bindner, H. W., Spataru, S. V., & Sørensen, P. E. (2022). Assessing stacked physics-informed machine learning models for co-located wind–solar power forecasting. *Sustainable Energy, Grids and Networks*, 32, 100943.





Hands-on Session (Coscine)

Complete Pipeline of Adding Resources with Metadata in Coscine



Example data/resource to use:

- Renewable power plants in Europe: https://data.open-power-system-data.org/renewable_power_plants/2020-08-25
- Timeseries of load, wind, and solar in Europe: https://data.open-power-system-data.org/time_series/2020-10-06
- Deflectometry measurements of Heliostat AB35 (DLR):
 - <https://paint-database.org/WRI1030197/AB35/Deflectometry/AB35-2021-08-19T21-10-20Z-deflectometry-result.pdf>
 - <https://paint-database.org/WRI1030197/AB35/Deflectometry/>
- PV-BESS ancillary services assessment (ERIGrid2.0-AIT): <https://zenodo.org/records/7965609>
- Electrical network benchmark models (ERIGrid2.0-AIT): <https://zenodo.org/records/5707769>



Getting Started with AIMS



RISE Energy

AIMS UI: Link: <https://coscine.rwth-aachen.de/coscine/apps/aimsfrontend/?token=#/editor>

The screenshot displays the AIMS UI interface, divided into four main sections:

- Available Metadata Profiles:** A list of metadata profiles with a search bar containing "RISE Energy". A green box highlights the "Action" dropdown menu, which includes options like "New", "Create", "Import", "Edit", "Copy", "Extend", and "New Version". A green arrow points from the text "Searching for MD profiles to start working" to this menu.
- Vocabulary Terms:** A search bar for "Search Vocabulary Terms" with a message: "No fitting vocabulary term has been found for the given input." and a button "Add a custom term". A green box highlights this section with the text "Searching for ontology terms".
- Detail View (Fields):** A section titled "(No Name Set)" with a message: "No vocabulary term has been added yet to this metadata profile. You can add a vocabulary term by dragging it from the 'Vocabulary Terms' column into this metadata profile." A green box highlights this section with the text "Created MD fields will appear here".
- Field Properties:** A configuration panel for a field with various settings like "Field Name", "Description", "Minimum Required Entries", "Maximum Possible Entries", "Position On Metadata Form", "Property Type", and "Datatype". A green box highlights this section with the text "Modifying properties related to one MD filed".



Getting Started with AIMS

Create a Part of the OEMetadata: Context

```
"context": {  
  "description": "An Object that describes the general setting, environment or project leading to the  
  creation or maintenance of this dataset. In science this can be the research project.",  
  "type": "object",  
  "fields": {  
    "title": {},  
    "homepage": {},  
    "documentation": {},  
    "sourceCode": {},  
    "publisher": {},  
    "publisherLogo": {},  
    "contact": {},  
    "fundingAgency": {},  
    "fundingAgencyLogo": {},  
    "grantNo": {}  
  },  
  "badge": "Gold",  
  "title": "Context"  
}
```

Getting Started with AIMS

Create a Part of the OEMetadata: Context

Field: Context Title

Properties

```
"title": {  
  "description": "A title of the associated project.",  
  "type": [  
    "string",  
    "null"  
  ],  
  "examples": [  
    "NFDI4Energy"  
  ],  
  "badge": "Gold",  
  "title": "Context Title"  
}
```

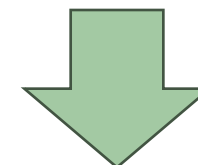
Predicate/term

```
"title": {  
  "@id": "dcterms:title",  
  "@type": "xsd:string"  
}
```



Ontology/namespace

```
"dcterms": "http://purl.org/dc/terms/"
```



Internationalized Resource Identifier

```
"IRI": "http://purl.org/dc/terms/title"
```

Getting Started with AIMS

Create a Part of the OEMetadata: Context

Field: Homepage

Properties

```
"homepage": {  
  "description": "A URL of the project.",  
  "type": [  
    "string",  
    "null"  
  ],  
  "examples": [  
    "https://nfdi4energy.uol.de/"  
  ],  
  "badge": "Gold",  
  "title": "Homepage",  
  "format": "uri"  
}
```

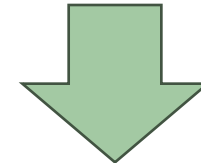
Predicate/term

```
"homepage": {  
  "@id": "foaf:homepage",  
  "@type": "xsd:anyURI"  
}
```



Ontology/namespace

```
"foaf": "http://xmlns.com/foaf/0.1/"
```



Internationalized Resource Identifier

```
"IRI": " http://xmlns.com/foaf/0.1/homepage"
```

Getting Started with AIMS

Create a Part of the OEMetadata: Context

Field: Documentation

Properties

```
"documentation": {  
  "description": "A URL of the project documentation.",  
  "type": [  
    "string",  
    "null"  
  ],  
  "examples": [  
    "https://nfdi4energy.uol.de/sites/about_us/"  
  ],  
  "badge": "Gold",  
  "title": "Documentation"  
}
```

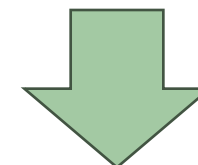
Predicate/term

```
"documentation": {  
  "@id": "ncit:NCIT_C165054",  
  "@type": "xsd:anyURI"  
}
```



Ontology/namespace

```
"ncit": "http://purl.obolibrary.org/obo/"
```



Internationalized Resource Identifier

```
"IRI":  
"http://purl.obolibrary.org/obo/NCIT_C165054"
```

Getting Started with AIMS

Create a Part of the OEMetadata: Context

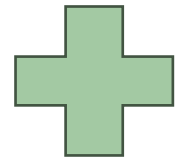
Field: Source Code

Properties

```
"sourceCode": {  
  "description": "A URL of the source code of the  
    project.",  
  "type": [  
    "string",  
    "null"  
  ],  
  "examples": [  
    "https://github.com/NFDI4Energy"  
  ],  
  "badge": "Gold",  
  "title": "Source Code"  
}
```

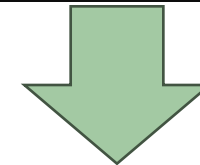
Predicate/term

```
"sourceCode": {  
  "@id": "oeo:OEO_00000091",  
  "@type": "xsd:anyURI"  
}
```



Ontology/namespace

```
"oeo":  
"https://openenergyplatform.org/ontology/oeo/"
```



Internationalized Resource Identifier

```
"IRI":  
"https://openenergyplatform.org/ontology/oeo/  
OEO_00000091"
```

Getting Started with AIMS

Create a Part of the OEMetadata: Context

Field: Publisher

Properties

```
"publisher": {  
  "description": "The publishing agency of the data.  
    This can be the OEP.",  
  "type": [  
    "string",  
    "null"  
  ],  
  "examples": [  
    "Open Energy Platform (OEP)"  
  ],  
  "badge": "Bronze",  
  "title": "Publisher"  
}
```

Predicate/term

```
"publisher": {  
  "@id": "dcterms:publisher",  
  "@type": "foaf:Agent"  
}
```



Ontology/namespace

```
"dcterms": "http://purl.org/dc/terms/"
```



Internationalized Resource Identifier

```
"IRI": "http://purl.org/dc/terms/publisher"
```

Getting Started with AIMS

Create a Part of the OEMetadata: Context

Field: Publisher Logo

Properties

```
"publisherLogo": {  
  "description": "A URL to the logo of the publishing  
    agency of data.",  
  "type": [  
    "string",  
    "null"  
  ],  
  "examples": [  
    "https://github.com/OpenEnergyPlatform/organisati  
on/blob/production/logo/OpenEnergyFamily_Logo_0  
penEnergyPlatform.svg"  
  ],  
  "badge": "Gold",  
  "title": "Publisher Logo",  
  "format": "uri"  
}
```

Predicate/term

```
"publisherLogo": {  
  "@id": "foaf:logo",  
  "@type": "xsd:anyURI"  
}
```



Ontology/namespace

```
"foaf": "http://xmlns.com/foaf/0.1/"
```



Internationalized Resource Identifier

```
"IRI": "http://xmlns.com/foaf/0.1/logo"
```

Getting Started with AIMS

Create a Part of the OEMetadata: Context

Field: Email Contact

Properties

```
"contact": {
  "description": "A reference to the creator or
    maintainer of the data set. This can be an
    email address or a GitHub handle.",
  "type": [
    "string",
    "null"
  ],
  "examples": [
    "contact@example.com"
  ],
  "badge": "Gold",
  "title": "E-Mail Contact",
  "format": "email"
}
```

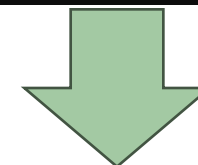
Predicate/term

```
"contact": {
  "@id": "oeo:OEO_00000107",
  "@type": "xsd:string"
}
```



Ontology/namespace

```
"oeo":
  "https://openenergyplatform.org/ontology/oeo/"
```



Internationalized Resource Identifier

```
"IRI":
  "https://openenergyplatform.org/ontology/oeo/
  OEO_00000107"
```



Getting Started with AIMS

Create a Part of the OEMetadata: Context

Field: Funding Agency

Properties

```
"fundingAgency": {  
  "description": "A name of the entity providing the  
    funding. This can be a government agency or a  
    company.",  
  "type": [  
    "string",  
    "null"  
  ],  
  "examples": [  
    "Deutsche Forschungsgemeinschaft (DFG)"  
  ],  
  "badge": "Gold",  
  "title": "Funding Agency"  
}
```

Predicate/term

```
"fundingAgency": {  
  "@id": "sc:FundingAgency",  
  "@type": "xsd:string"  
}
```



Ontology/namespace

```
"dcterms": "http://schema.org/"
```



Internationalized Resource Identifier

```
"IRI": "http://schema.org/FundingAgency"
```

Getting Started with AIMS

Create a Part of the OEMetadata: Context

Field: Funding Agency Logo

Properties

```
"fundingAgencyLogo": {
  "description": "A URL to the logo or image of the
    funding agency.",
  "type": [
    "string",
    "null"
  ],
  "examples": [
    "https://upload.wikimedia.org/wikipedia/commons/8
      /86/DFG-logo-blau.svg"
  ],
  "badge": "Gold",
  "title": "Funding Agency Logo",
  "format": "uri"
}
```

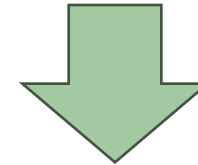
Predicate/term

```
"fundingAgencyLogo": {
  "@id": "foaf:logo",
  "@type": "xsd:anyURI"
}
```



Ontology/namespace

```
"foaf": "http://xmlns.com/foaf/0.1/"
```



Internationalized Resource Identifier

```
"IRI": "http://xmlns.com/foaf/0.1/logo"
```

Getting Started with AIMS

Create a Part of the OEMetadata: Context

Field: Grant Number

Properties

```
"grantNo": {  
  "description": "An identifying grant number. In case  
    of a publicly funded project, this number is  
    assigned by the funding agency.",  
  "type": [  
    "string",  
    "null"  
  ],  
  "examples": [  
    "501865131"  
  ],  
  "badge": "Gold",  
  "title": "Grant Number"  
}
```

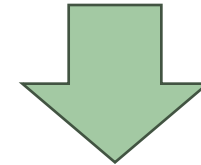
Predicate/term

```
"grantNo": {  
  "@id": "sc:Grant",  
  "@type": "xsd:string"  
}
```



Ontology/namespace

```
"sc": "http://schema.org/"
```



Internationalized Resource Identifier

```
"IRI": "http://schema.org/Grant"
```

Getting Started with AIMS



RISEnergy

Metadata Form View

Code View

Save/Submit

Editor Graph Metadata Form

Metadata Form of Context

Context Title ⓘ * +

Homepage ⓘ +

Documentation ⓘ +

Source Code ⓘ +

Publisher ⓘ +

Publisher Logo ⓘ +

E-Mail Contact ⓘ * +

Funding Agency ⓘ +

Funding Agency Logo ⓘ +

Grant Number ⓘ +

Editor Graph Metadata Form

Detail View (Fields)

Context

```
@prefix schema: <http://schema.org/> .
@prefix sh: <http://www.w3.org/ns/shacl#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix vocabterms: <https://purl.org/coscine/terms/> .
@prefix aps: <https://purl.org/coscine/ap/> .

<https://purl.org/coscine/ap/RISEnergyMetadata/Context/> dcterms:created "2026-02-10"^^xsd:date ;
dcterms:license <http://spdx.org/licenses/CC0-1.0> ;
dcterms:creator "Lazher Mejdí" ;
sh:closed "0"^^xsd:boolean ;
sh:property [
  sh:path schema:Grant ;
  sh:order 10 ;
  sh:name "Grant Number"@en ;
  sh:datatype xsd:string ;
  sh:description "An identifying grant number. In case of a publicly funded project, this number is assigned by the funding agency."@en ;
], [
  sh:path schema:logo ;
  sh:order 9 ;
  sh:name "Funding Agency Logo"@en ;
  sh:datatype xsd:string ;
  sh:description "A URL to the logo or image of the funding agency."@en ;
], [
  sh:path <https://schema.org/FundingAgency> ;
  sh:order 8 ;
  sh:name "Funding Agency"@en ;
  sh:datatype xsd:string ;
  sh:description "A name of the entity providing the funding. This can be a government agency or a company."@en ;
], [
  sh:path <https://openenergyplatform.org/ontology/oeo/OEO_00000107/> ;
  sh:order 7 ;
  sh:name "Grant Number"@en ;
  sh:datatype xsd:string ;
  sh:description "An identifying grant number. In case of a publicly funded project, this number is assigned by the funding agency."@en ;
]
```

text/turtle
application/ld+json
application/n-triples
application/n-quads
text/n3
application/rdf+xml
application/trig
text/turtle

Different schema file formats

Editor Graph Metadata Form

Field Properties

Field Name ⓘ

Field Name ⓘ en

Field Name ⓘ de

Description ⓘ

Description ⓘ en

Description ⓘ de

Minimum Required Entries ⓘ

Minimum Required Entries

Maximum Possible Entries ⓘ

Maximum Possible Entries

Position On Metadata Form ⓘ

Position On Metadata Form

Property Type ⓘ

Datatype

Datatype ⓘ

-- Please select an option --

Show String-based Properties

Show Value-based Properties

Show Administrative Properties

Show Properties For Property Pairs

Save

Download Code

Submit



Hands-on Session (AIMS)



Link to AIMS: <https://coscine.rwth-aachen.de/coscine/apps/aimsfrontend/?token=#/editor>

Link to TIB terminology service (ontology term search): <https://terminology.tib.eu/ts/>



Thank you

www.risenergy-project.eu

 www.linkedin.com/showcase/risenergy/

m.lazher@fz-juelich.de



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