# *Annual Report 2023*

# CRESYM – Annual Report 2023

## Foreword of the President

*In 2022, when it was being born, CRESYM received very good feedback from external parties, especially the European commission (« a dream come true »).*

*The dream became reality quite fast: incorporation in September 2022 with eight founding fathers (and now twelve members overall), first R&I roadmap in November 2022, two first staff in January 2023, two first projects in April.*

*And by the end of the year, nine projects, all privately funded, have been launched (instead of the four initially planned), ranging from power system stability to multi-energy issues, and involving skills in energy systems engineering and applied maths (optimisation, machine learning…).*

*CRESYM is also partner of two projects funded by the European Commission's Horizon Europe program.*

*With more than 30 doctoral fellows or post-doc researchers involved, CRESYM is hence about to manage its first own, cross-project doctoral networks (our "DoNets"), about power system stability, multi-energy system simulation, DC component interoperability.*

*CRESYM's framework to manage project results on the long run as "commons" for the scientific community in basically ready and available to serve TwinEU (the European power system digital twin, gathering 77 partners) and other projects funded by EC's Horizon Europe program.*

*Overall, CRESYM's budget topped a turnover of 1405 k€ in 2023, with a budget net balance of 137 k€. Uncovered overhead costs are limited to 70 k€. This means 1150 k€ spent for R&I (including the first 100 k€ from the Association's common pot).*

*In 2024, CRESYM's budget will double at about 3 M€, including 400 k€ of its own budget earmarked for new R&I projects, with plans to tackle distribution matters, control room of the future issues, High Performance Computing and Quantum computing potentials.*

*CRESYM has thus proved to be a successful forum for innovation on energy systems, and we would welcome new members, ready to share business needs and resources to solve them together.*

## 1. Introduction

After its incorporation 12th September 2022, CRESYM has come to life on **1st January 2023**, with the hiring of its two first staff.

Celebrating its first birthday, the Association is hence pleased to here release its first annual report.

## 2. CRESYM in a nutshell

### 2.1.    What is CRESYM?

CRESYM (Collaborative Research on Energy System Modelling) is a **non-profit** association, gathering **industry players** & **research organisations** and aiming at undertaking **research actions** and ultimately solving the coming challenges for the future, fast-evolving European energy system.
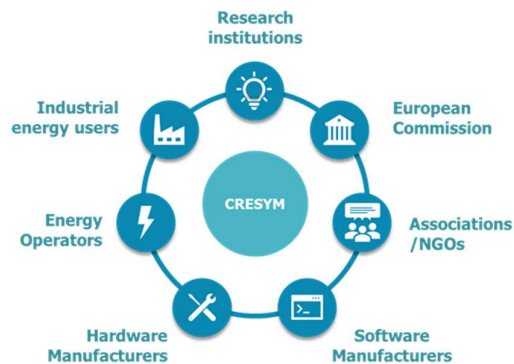
### 2.2.    CRESYM's mission

CRESYM aims at **uniting** all need-owners and solution-developers to **catalyse** the development of energy system modelling and simulation **opensource**, non-contaminating bricks in order to meet the energy transition challenges and contribute to the European Commission's grid action plan and to the European Green Deal.

CRESYM fosters collaborative R&I actions to deliver opensource energy system simulation tools on low-TRL R&I issues of general interest (the '**Projects**').

CRESYM shall maintain useful technological building blocks available for all researchers & engineers (the "**Assets**"). As of 2024, COLib (the Collaborative Opensource Library of power system component models) and CReDIT (Common Results, Data, Information and Tools) shall start operation.

CRESYM manages thematic doctoral networks, be they supported by the EU Horizon Europe program or self-funded by CRESYM, to augment the value of our R&I actions for researchers and fosters serendipity (the "**DoNets**").

### 2.3.    CRESYM's values

CRESYM is **non-profit** and acts **transparently** for the **general interest**, addressing new and/or complex, **low TRL**, technical challenges.

CRESYM reconciles **security** and IPRs when developing **opensource** deliverables. Opensource, non-contaminating licences are key to ease the dissemination among operators, manufacturers and vendors in a fair, neutral manner.
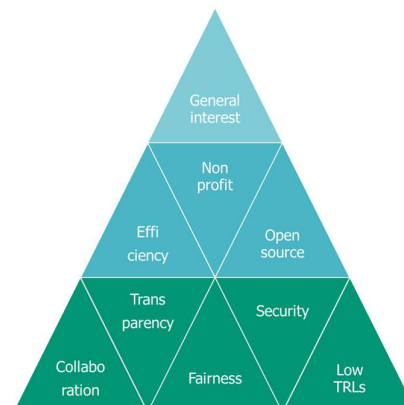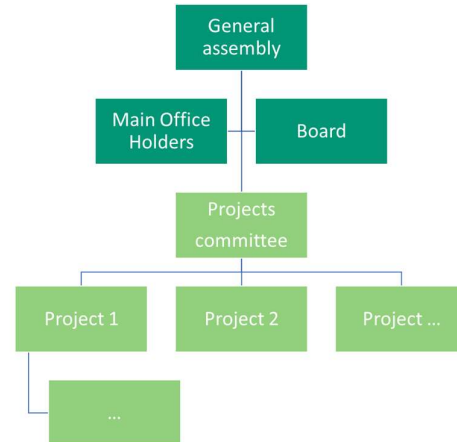
CRESYM organises **collaborative**, **efficient** R&I works, with practical intermediary outputs. CRESYM builds up on, as well as comfort, support and promote other existing opensource initiatives.

CRESYM is committed to protect **privacy** and promote **diversity & gender equality**.

## 2.4.    CRESYM's organisation

On behalf of its General Assembly, CRESYM is run by a Board of Directors. The Board appoints a General Manager to manage daily operation.

With the support of CRESYM's Scientific Advisor, CRESYM's **Projects Committee** is in charge of the general organisation of R&I Projects: the identification of new topics, the supervision of every project agreement drafting, and the overall consistency of the R&I work program, ensuring that all critical issues are addressed – by CRESYM or other organisations –, efficiently and with **no overlapping** of efforts.

**Every project is independent** from another and is managed by its participants autonomously, though obeying to one same agreement structure as all others launched by the Association.

CRESYM is represented by its President, Prof. Antonello Monti, and Vice-President, Prof. Peter Palensky.
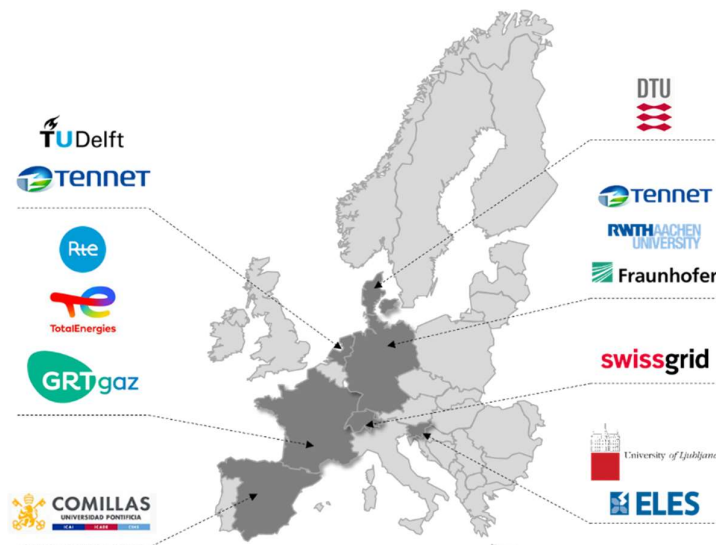
## 3. Membership & partnerships

### 3.1. 8 founding fathers end 2022, 12 members end 2023

CRESYM has been founded in 2022 by four research institutions and four industrial players, namely four TSOs:

- RWTH Aachen
- TU delft
- the University of Ljubljana
- the Fraunhofer Gesellschaft

and:

- ELES
- RTE
- swissgrid
- TenneT

Four new members joined the Association in October 2023, with the launch of the MUESSLI project:

- Comillas
- DTU

- GRTgaz
- TotalEnergies OneTech

Next round of expansion is April 2024. Four to six new members are expected to join the Association, especially distribution network operators and solution developers.

## 3.2. An attractive association

CRESYM is about **leveraging** to make R&I happens on energy systems.

Thanks to its light weight, the **Project's Committee** offers every two weeks a remotely-run forum to discuss business & research needs.

Thanks to our standard legal framework – and especially our **project agreement** template – and our standard, quarterly invoicing and payment procedure, the Association makes launching a project a mere discussion between engineers and scientists, alleviating the burden on legal and accounting departments.

The **common pot** funding helps projects lacking funding to start earlier, and already sponsored 100 k€.

**Small fees** make every member fully in control about its actual financial involvement.

Thanks to the **fund pooling**, every industrial sponsor gets for every euro spent a value of about minimum 2 to 1, and most often more than **3 to 1**.

With about 2 M€/year of R&I expenses, the payback for every research institution involved is on average **70 to 1**.

As a result, talks are opened with ten to thirty organisations. New members would however only join if they can take immediate advantage of the Association, also if joining a project at the same time; and provided that the Association's balance (50% research institutions/50% industrial partners) is ensured.

## 3.3. Partnerships

In August 2023, CRESYM became member of the **Linux Foundation for Energy** (**LFE**).

Both LFE and CRESYM focus on the digitalisation of the energy sector and promote open-source philosophy and methodologies to achieve it; and both have to date two founding fathers and five member organisations in common.



CRESYM and LFE complete each other, as CRESYM's business is to foster, organise and implement collaborations on research works at lower TRL level; while LFE provides a framework for otherwise set-

up collaborations to develop their action at higher TRL level, according to the best development standards.

CRESYM has also entered discussion with other organisations with the perspective of defining strategic partnerships, especially with **DG ENER** (coordination of research efforts on energy systems), **G-PST** (efforts coordination about energy simulation bricks & tools mapping) or **EES-UETP** (training on power systems).

CRESYM also supports the world-wide open energy modelling initiative (**openmod**), loosely gathering researchers on energy system modelling and simulations, promoting and implementing open access and opensource principles for data, methods and tools.

# 4. R&I projects

## 4.1. A light but effective organisation

CRESYM's first objective it to catalyse research on disregarded energy system modelling and simulation issues and hence to launch research projects.

A project can be out of 3 kinds:



- Common project: sponsored by its industrial participants, as well as CRESYM, provided that the General Assembly agrees to it
- Special project: 100% funded by the project' participants.
- External project: answering a call for project by one (or more) European or national agency(ies) and 100% sponsored by such third party(ies).
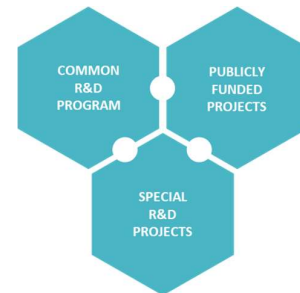
**Every project is independent** from another and is managed by its participants autonomously, though every common and special project obeys one same agreement structure as all others launched by the Association. Such a standard simplifies the decision-making, limiting it to technical issues and alleviating the burden on legal and accounting departments. CRESYM is party to such project agreement, in charge of managing the quarterly invoicing and payment procedure and often to act as PMO.

The project **results shall be opensource**, in a non-contaminating manner, either based on Apache 2.0 or Mozilla Public License v2, depending on their nature. Common (resp. special) project results are owned in equal shares by all CRESYM members (resp. by all project participants), except CRESYM. The project participants mandate CRESYM to maintain and make publicly available the results on the web on a long-term basis as "**commons**".

The **Projects committee** meets on a bi-monthly meeting basis and explores new research action needs at cruise speed since September. Topics are proposed by individual Members to others or stem from CreSem sessions. Experts are organised per field of interest and invited on a case-by-case basis.

Beyond our code of conduct and especially 'antitrust' guidelines for meetings, the following rules also apply to ensure efficiency, fair-play and networking opportunities:

- When staffing projects, skills shall prevail and, where contributors look equivalent, a long-term balance between research institutions' involvement should serve as guidance. Every research institution member should be involved in at least one project every year.

- Where possible, project tasks should be split on two or more contributing entities, as long as every task remains consistent and motivation is preserved. Especially, no individual should be hired less than 0.5 FTE/year on a project.
- Specifications, developments and tests must also be shared on different shoulders.
- Networking between members shall also be fostered. In particular, every project should show a different set of participants to intermingle members.

## 4.2. 9 Member-sponsored projects launched in 2023

CRESYM launched its first two projects in Spring 2023, three more in the Summer and four others in Autumn.
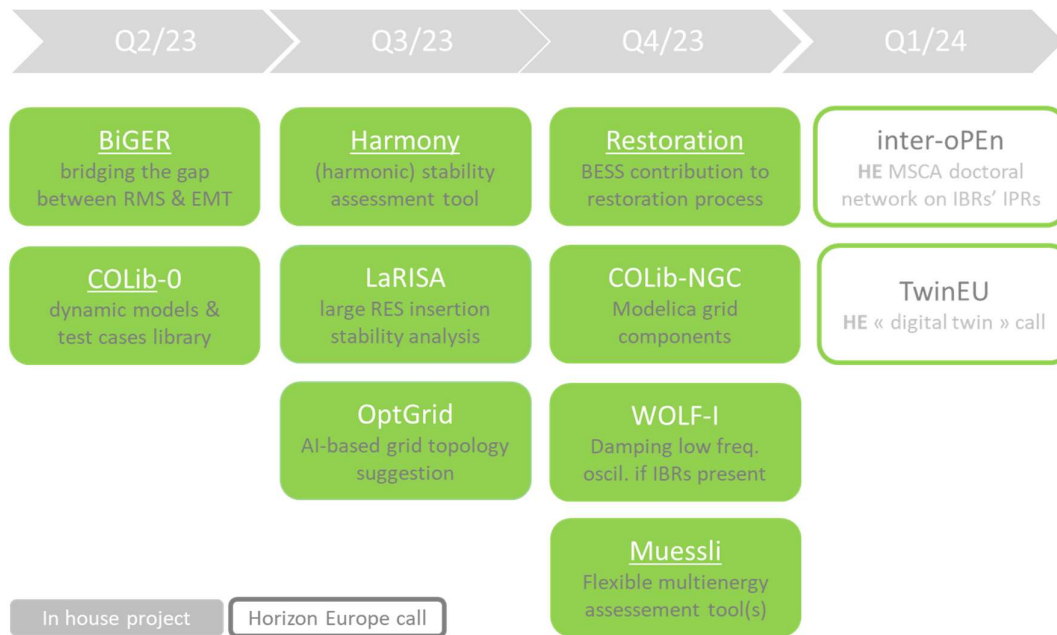


**COLib** is a web library of opensource, verified power network component models for power system stability analyses and related test cases. Its prototype with first basic component examples is available. It will be further populated in 2024, with detailed power electronics devices' models already developed by TU Delft, new models commissioned from Fraunhofer Gesellschaft IEE (**COLib-ngc**), and possibly results of Horizon Europe funded projects.

Five other projects are about power system stability:

- **BiGER-explore** shall bridge the gap between EMT and RMS modelling, for stability studies and daily operation of fast, active components-dominated power systems.
- **Harmony** is a toolkit for easy *harmonic* analyses of (local EMT), to assess multi-terminal HVDC power systems, TSO-DSO interface, controller interoperability and HVDC protection.
- **LaRISA** stands for Large RES Integration Stability Analysis, focusing first on the development of 1 GW of photovoltaic generation on the Slovenian ground. The methodological issues shall feed BiGER and Harmony and conversely LaRISA will be a trial test for the developed solutions.
- **Restoration** shall explore the potential benefits of BESS within the actuation of power system restoration plans relying on generic and detailed validation models of electrical grids.

- **WOLF-I** (Wide-area Oscillations of Low Frequency with presence of IBRs) aims at gaining a deeper understanding of the role of IBRs in the damping of inter-area oscillations and develop methods and tools to design POD controllers for new devices and develop guidelines for TSOs.

**MUESSLI** (MultiEnergy System Smart Linking Integration) aims at "smart-linking" simulation tools to perform cross-sector, actually scalable, simulations of multi-energy systems and enable the optimal development and operation of an holistic "energy system" (power, heat, transportation, etc.) with electricity and hydrogen as main carriers.

**OptGrid** is about the optimisation of the power grid configuration (topology) in operation procedures to ensure an acceptable level of reliability of the electricity supply using machine learning techniques.

## 4.3. 2 EC-subsidised projects granted in 2023

CRESYM is also partner to two projects funded by EC's Horizon Europe program:

- **TwinEU** is about the development of a digital twin generic platform for the European power system (HORIZON-CL5-2023-D3-01, 77 partners, including 7 CRESYM members).
- **Inter-oPEn** is a Horizon Europe MSCA doctoral network (8 beneficiaries, 21 partners, including 3 CRESYM members) about interoperability of HVDC equipment with open models.

As for in-house projects, CRESYM shall take over the projects' open-source results and ensure their long-term maintenance and public availability, through COLib or CReDIT.

## 4.4. Perspectives

Beyond support to its members wanting to apply to calls for projects, CRESYM means to support or to launch one MSCA application every year.

- In 2023 CRESYM is partner of a consortium applying for MSCA funding about High Performance Computing (HPC).
- End 2024, the plan is to run an MSCA application about risks for future energy systems and investigate associated **economic** matters: **CREAM**.

Several actions are envisaged to build the control room of the future, complementary and interlinked to the **TwinEU** project:

- **TraiSim** is about an AI-based training simulator.
- **DiSST** (Distribution Systems Standards and Tools) invites distribution grid operators to join CRESYM and develop solutions to meet the 3Ds (digitalisation, decarbonation, decentralisation), eventually made available at TwinEU standards: default location, low voltage (LV) photovoltaic panels output setting, HT/MT zonal automaton for transit &/o voltage control, etc. DiSST will be aligned with Twin-EU. It has been advocated to the ISGAN community in Nov/23.
- **REVEAP** (Revitalisation of Emergency Active Power Balancing) further develops the concept of frequency-based load-shedding, accounting for generation connected to distribution grids and control capabilities of IBRs.

Complementary to HPC, CRESYM also envisages to investigate the opportunities of **quantum computing** and quantum communicating technologies for energy system operation.

Any research action's need or suggestion is welcome in Projects Committee, in other to transform it into a project of CRESYM's (or prior to its own, independent undertaking by the concerned member(s), if only one PhD is at stake).

In 2024, CRESYM will review key-organisations' visions and perspectives to refine its roadmap.

# 5. Training & Education

## 5.1. Training offer

CRESYM pools its **academic members' offer**.

CRESYM also made available to its members end 2023 an independent one-day training offer ("*Power system dynamics, control and stability: hands-on workshop based on case studies*") open to all organisations, with attractive prices for its own members.

CRESYM will also team up with **EES-UETP**, and possibly other alliances as the case may be, to further develop the possibility for its own members to access cutting-edge training offer for its members' staff.

## 5.2. CRESYM DoNets

CRESYM's own nine common and special projects gather research more than twenty PhD students or researchers end 2023.
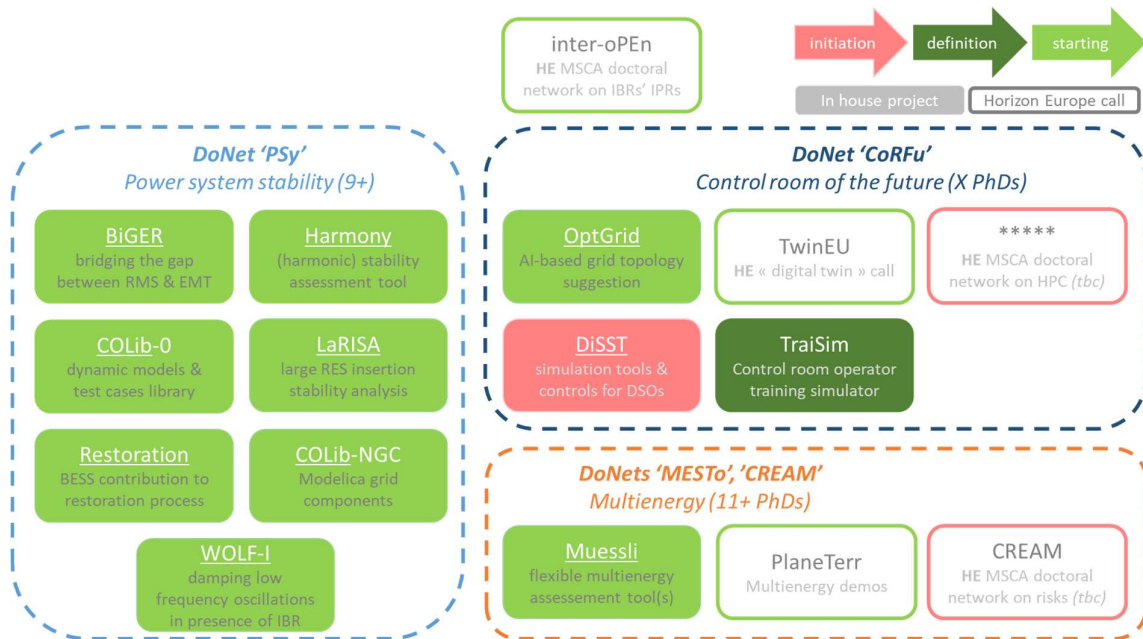


As of 2024, they shall be grouped in two thematic doctoral networks – our so-called **DoNets**: one about power system stability (**PSy**); another about multi-energy matters (**MESTo**).

As for a HE MSCA, the objective of such DoNet is to provide opportunities for **networking** and emulation, more efficient **dissemination**, **training** and education, and a strong interface to **industry**. A DoNet is as **transverse** as possible (international, transdisciplinary, cross-sector, cross-projects, with

multiple partners, both academic and industrial) and shall ease the **recruitment** of highly skilled people by industry.

Such DoNets also welcome sole doctoral fellows hired independently by our members for other research actions: The ER-PG project (Economic regulation of future European power & gas systems, by one PhD student, under the aegis of two CRESYM members, starting early 2024) or the PlaneTerr project (with four PhD students, sponsored by the French agency ADEME, gathering three of CRESYM's members and starting end 2023) are components of MESTo.

In 2024, when DiSST will start, a third DoNet about the control room of the future shall also be set up: **CoRFu**.

## 6. Assets ("commons")

### 6.1. Upcoming common opensource IT assets

CRESYM addresses **low-TRL** R&I matters, that competitors have a joint interest to solve jointly and would disregard separately. Every project's results are due to **opensource** and **non-contaminating**, either based on Apache 2.0 or Mozilla Public License v2, depending on their nature. And CRESYM is meant to **maintain** and make **publicly available** such results on the **long-run**, as **common** assets of general interest for the scientific community.

Such IT assets would be mostly methodologies, algorithms, prototypes, possibly basic tools for modelling and simulation of energy systems.

Beyond its own projects, CRESYM may also be mandated by any third-party owning a research asset, in order to take care of it on their behalf, alleviating the maintenance burden from the inventing institution, provided that the asset is made available opensource.
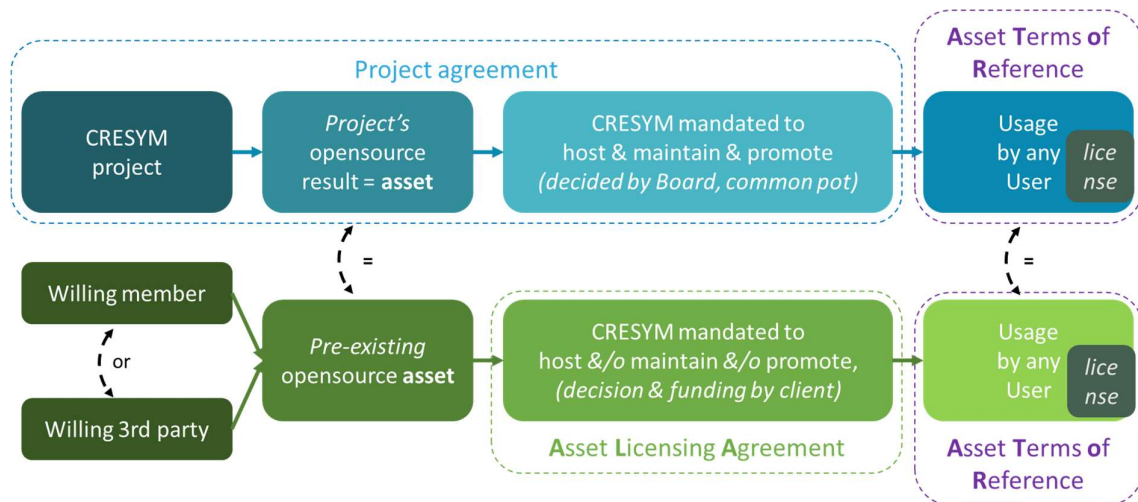


Researchers or organisations willing to use any asset would have to agree with its attached opensource license; and will have access to a series of standard **services**, as defined by the related Asset Terms of Reference (**AToR**).

In 2024, CRESYM will run the **ComOn** project, to test its ability to welcome third-party invented assets, of different kind (source code, running prototypes, etc.) with a different span of services attached (from mere promotion to hosting, basic maintenance, and possibly debugging or documentation).

## 6.2. CReDIT

CReDIT (Common Results, Data, Information & Tools) shall be the primary **portal** for opensource research results on energy systems. It shall host CRESYM's own projects' results, but also give access to, and interconnect with, existing or past initiatives (e.g. the European Open Science Cloud). The portal has been specified in 2023 for first development and demo deployment in 2024, with **COLib** and through the **ComOn** project.

CReDIT intends to complement, for **yet-to-industrialise research results**, what is developed for ready-to-use tools by other initiatives, such as G-PST for power system simulation tools or LF-Energy or Openmod for energy system tools.

## 6.3. COLib

**COLib** (Collaborative Opensource Library) is a web library of opensource, verified power network component models for power system stability analyses and related test cases.

It is an example of the various resources CReDIT can contain.

Its prototype with first basic component examples is available end 2023. It will be further populated in 2024, with detailed power electronics devices' models already developed by TU Delft, new models commissioned from Fraunhofer Gesellschaft IEE (**COLib-ngc**), and possibly results of Horizon Europe funded projects.

# 7. Corporate matters & general administration

## 7.1. Corporate

Six months after its incorporation in September 2022, CRESYM was basically set up. Last of its **governing bodies**, the Projects committee started working in February and went full speed in September 2023 with brainstorming about research actions opportunities every two weeks.

The Association opened up to new business needs and expertise (hydrogen, CCUS…), when welcoming four **new members** in October 2023.

As expected, the Association proved to be an efficient melting pot to trigger swiftly **new R&I actions**. The standard project agreement template, hub-procedures for invoicing and payment and the common pot proved effective with the quicker launch of our first projects.

**Cross-activities** have developed quicker than expected with the framework for commons basically ready end 2023 a year earlier than expected. The development of DoNets, doctoral networks of its own with a strong industry involvement is a side-effect of the larger than expected R&I program, and an additional value of the Association.

The Association also receives a **positive appreciation** from EC/DG ENER and will contribute to the European Commission's grid action plan and the European Green Deal.

## 7.2. General Management

Registrations, accounting and corporate services have been hired by end December 2022, so as to start operation with two first staff in January 2023 as expected.

The Association's contractual framework has been developed throughout 2023, with the support of a legal counsel and all members' legal departments delegates. Its first piece is the Project Agreement template, which proved to be efficient to catalyse research projects' set up. End 2023, it is completed with the Asset Licensing Agreement and Asset Terms of Reference ready to welcome the Association's first assets.

A code of conduct, especially antitrust guidelines for meetings and IT development guidelines are also available to meeting & project participants.

After a bit more than a year's feedback, the management schedule seems adequate, with Board meetings every quarter, the Association's dashboard reporting every month and a short weekly meeting of the main office holders.

Accounting & administrative tools & procedures are documented.

## 7.3. Finances

In 2023, CRESYM's **turnover** is 1405 k€, including 180 k€ of membership fees.

General budget expenses (staff, offices & IT, corporate…) are 510 k€, of which 482 k€ (80%) are earmarked to support R&I activities, leaving 70 k€ of net general **expenses**. Covering at least 80% of the general, especially staff, expenses through projects or commercial activities is a KPI of the Association.

The **net balance** in 2023 is about 137 k€. The **common pot** contributes for about 60 k€ to this positive net balance, though an Association's KPI is to have it 100% balanced year on year.

| | total budget | | R&I projects | | common pot | | comments |
|---|---|---|---|---|---|---|---|
| **incomes** | **1405** | a | **1148** | o | **161** | s | a=b+c+d |
| membership fees | 180 | b | | | | | o=c-l |
| projects direct funding | 1065 | c | 1065 | c | | | |
| contribution to common pot | 161 | d | 83 | -l | 161 | s | |
| | | | | | | | |
| **expenses** | **-1269** | e | **-1148** | p | **-101** | t | e=j+k+l+m |
| staff | -441 | f | | | | | p=q+k+l |
| office & IT | -41 | g | | | | | t=u+m |
| corporate | -26 | h | | | | | t/s = 63% (<100%) |
| events & meetings | -2 | i | | | | | |
| general budget | -510 | j | | | | | j=f+g+h+i |
| general budget to projects | | | -407 | q | | | q/j= 80% |
| R&I suppliers contribution | -657 | k | -657 | k | | | |
| common pot to projects | -83 | l | -83 | l | -83 | u | |
| common pot to DoNets | -18 | m | | | -18 | m | |
| | | | | | | | |
| **balance** | **137** | n | **0** | r | **59** | v | n=a+e, t=o+p, v=s+t |

*2023 Profit & Losses, simplified*

The total **project budget** is 1065 k€ (summing up the directly collected funding and the contribution from the common pot). 657 k€ are directly hired from research institutions. 90 k€ are seconded personnel from industrial members to research institutions to undertake a PhD work, via CRESYM's budget. 318 k€ are PMO support to projects plus in-house prototyping of COLib.
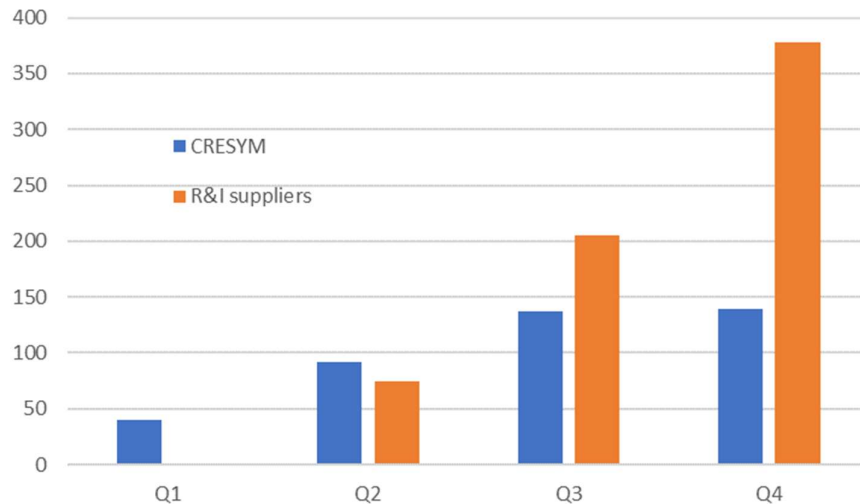
CRESYM R&I project expenses (k€/quarter)

## 7.4. Human resources

CRESYM is **five staff** end 2023.

Beyond the general manager, recruits are dedicated to steering projects and maintaining R&D assets live and ready for business. In addition, their costs shall be **sponsored** by projects.

In particular, two PhD students, each seconded by CRESYM on behalf of an industrial member to undertake their research with a research institution member.

In 2024, CRESYM and its members will look for other, converse opportunities for, and organise, **internships & exchanges** for researchers among institutions or in the industry, at an operational level, with the goal to better understand the processes and operators' issues.

In January 2024, CRESYM's IT assets & projects manager will be hired to set up the asset framework, with COLib, CReDIT and ComOn and support the TwinEU and TraiSim projects.

With its sixth recruitment, CRESYM is **gender-balanced** (see our diversity & gender equality plan).

## 7.5. Communication

CRESYM's communication is bound to be limited to its research efforts and related advocacy.

Its **website** advertises its projects and shall develop into a portal for opensource resources on energy system modelling and simulation.

CRESYM publishes a **newsletter**, with three or four issues per year, and is present on Linked In.

In March 2024, CRESYM will sponsor the **Openmod** community workshop in Grenoble and contribute to the EU SEW with first research dissemination events, and possibly a **cresCENDO** event.

## Appendix 1: 2023-2024 goals review

The Annual Strategy Note 2023-2024 sets the following goals.

Status is provided alongside.

| *Goal* | *Status* |
|---|---|
| **Membership** | |
| Enlarge the Association with at least two more industrial members, representing respectively the gas sector and distribution operators. | GRTgaz and TotalEnergies One Tech joined Q4/23 ☺ |
| Maintain an overall balance between research Institutions and all industry representatives. | 6 research institutions and 6 industrial members to date ☺ |
| **Projects** | |
| Have BiGER, Harmony, COLib signed in Spring 2023, Restoration in Autumn 2023 | BiGER-explore launched Q2/23 ☺<br><br>Harmony launched Q3/23 ☺<br><br>COLib-0 (architecture) launched Q2/23 ☺<br><br>Restoration launched Q4/23 ☺ |
| Invite non-electricity industrials to join MUESSLI and start the project by Summer 2023 | Muessli launched Q4/23, with TotalEnergies and GRTgaz ☺ |
| Start the project initiation process in Autumn 2023 | First Projects Committee meeting idea review in Jun/23 (OptGrid) ☺<br><br>Thematic experts networks invitation Sep/23 ☺ |
| Set up a proposal for the MSCA call in November 2023, if appropriate | Inter-oPEn MSCA (2022) granted in Aug/23 ☺<br><br>"Service offer" to MSCA consortia Sep/23 ☺<br><br>HPC MSCA application Nov/23 ☺<br><br>Third MSCA proposal scheduled Nov/24 ☺ |
| **Cluster activities** | |
| Structure relationships with EC, JRC and major European energy associations | Conversation about EC support as of 2025 started with DG ENER ☺<br><br>Contact but no follow-up with JRC 😐<br><br>Regular exchange with Brussel's associations 😐<br><br>No other contact formally entered in 😐 |
| Organise a first training session | First training offer proposed in Sept/23, with first session in Feb/24 ☺ *(hands on workshop on power system dynamics)*<br><br>MoU with EES-UETP ☺ |
| Feed COLib with industrial members' first test cases and standard models | First basic models in COLib Sep/23 ☺ |

| | |
|---|---|
| If appropriate, start maintaining CRESYM's first "commons" | CReDIT architecture set up ☺<br><br>IT assets' & projects' manager hired Jan/24 ☺<br><br>ComOn (CReDIT trial-test) project launched Jan/24 ☺ |
| **Logistics** | |
| Project agreement template by Spring 2023 | First project signed 30/4/2023 ☺<br><br>9 project agreements signed Dec/23 ☺ |
| Settlement, invoicing & payment processes implemented every quarter in 2023 | First settlement sent 16/03/2023 ☺<br><br>Accounting and financial procedures tested and documented in Jun/23 ☺<br><br>Belgian bank account operational end Mar/23 ☺ |
| GDPR-policy, Diversity & Gender Equality Plan ready by Mar/23 | All implemented in the first website release end Jan/23 ☺ |
| Web site revamped by Jan/23 | Website revamped end Jan/23 ☺<br><br>(+ upgraded Dec/23) |

## Appendix 2: glossary & abbreviations

| | |
|---|---|
| AI | Artificial Intelligence |
| BiGER | Bridging the Gap between EMT and RMS modelling (project of CRESYM's) |
| CCUS | Carbone Capture, Use & Storage |
| COLib | Collaborative Opensource Library of power system component dynamic models and related test cases (part of CReDIT |
| CReDIT | Common Results, Data, Information & Tools – portal to all "common assets |
| cresCENDO | CRESYM's Common Education, Networking, Dissemination Opportunities (advocacy events) |
| CreSem | Creative Seminars (internal workshop sessions of the Association) |
| cresROADS | CRESYM's Research Opportunities And Dissemination Sessions (public workshops of the Association) |
| Common pot | Additional contribution (15%) from projects sponsors available to fund common projects and cross-activities (DoNets, asset management) |
| Common project | Sponsored by CRESYM as well as other industrial participants, subject to the General Assembly's labelling. IPR's are equally shared by CRESYM members |
| CRESYM | Collaborative Research on Energy System Modelling |
| DiSST | Distribution Systems Standards & Tools (upcoming project of CRESYM's) |
| DoNet | Doctoral network of CRESYMs, with a strong interface to industry |
| EC | European Commission |
| EES-UETP | Electric Energy System – University Entreprise Training Partnership |
| External project | Answering a call for projects and 100% sponsored by the related grant |
| FTE | Full-time equivalent |
| G-PST | Global Power System transformation consortium |
| Harmony | Project of CRESYM's |
| HE | European Commission's Horizon Europe research program |
| HiPPo | High Performance Computing for Power systems (HE MSCA doctoral network – application) |
| HPC | High Performance Computing |
| IBR | Inverter Based Resources (see PE) |
| Inter-oPEn | Interoperability of Power Electronic dominated grid by openness (HE MSCA doctoral network – granted) |

| IPR | Intellectual Property Rights |
|---|---|
| KPI | Key Performance Indicator |
| LaRISA | Large RES Integration Stability Analysis (project of CRESYM's |
| LFE | Linux Foundation for Energy |
| ML | Machine Learning |
| MUESSLI | MultiEnergy System Smart Linking Integration (project of CRESYM's) |
| MSCA | Horizon Europe Marie-Sklodowska-Curie Actions |
| OptGrid | Project of CRESYM's |
| Openmod | Open Energy Modelling Initiative |
| PE | Power electronics (see IBRs) |
| PMO | Project Management Office |
| Project agreement | Standard MLA framework joining willing project participants, all industrial sponsors and/or research institutions, plus CRESYM as serving party |
| QC | Quantum computing |
| Restoration | Project of CRESYM's |
| R&I | Research & Innovation |
| Special project | Sponsored 100% by industrial participants. IPR's are equally shared by the project's participants |
| TSO | Transmission System Operator |
| TwinEU | HE project (HORIZON-CL5-2023-D3-01 – granted) |
| WOLF-I | Wide-area Oscillations of Low Frequency with presence of IBRs (project of CRESYM's) |

## Appendix 3: CRESYM in a nutshell

**WHO WE ARE**

CRESYM is a **non-profit** association, gathering **industry players** & **research organisations** and aiming at undertaking **research actions** and ultimately solving the coming challenges for the future, fast-evolving European energy system.

After its incorporation in September 2022, CRESYM started operation in January 2023, launched its first projects in April 2023, started self-funding R&I actions as of July 2023 and expanded to 12 members in October 2023.

By the end of our first year of operation, CRESYM runs R&I actions for about 600 k€/quarter and supports two doctoral networks and about 20 PhD works with 5 permanent staff.

**OUR AMBITION**

CRESYM aims at **uniting** all need-owners and solution-developers to **catalyse** the development of energy system modelling and simulation **opensource**, non-contaminating bricks in order to meet the energy transition challenges.

**OUR VALUES**

CRESYM is **non-profit** and acts **transparently** for the **general interest**, addressing new and/or complex, **low TRL**, technical challenges.

CRESYM reconciles **security** and IPRs when developing **opensource** deliverables. Opensource, non-contaminating licences are key to ease the dissemination among operators, manufacturers and vendors in a fair, neutral manner.

CRESYM organises **collaborative**, **efficient** R&I works, with practical intermediary outputs. CRESYM builds up on, as well as comfort, support and promote other existing opensource initiatives.

CRESYM is committed to protect **privacy** and promote **diversity & gender equality**.

**OUR MISSION**

CRESYM fosters collaborative R&I actions to deliver opensource energy system simulation tools on low-TRL R&I issues of general interest (the '**Projects**').

CRESYM shall maintain useful technological building blocks available for all researchers & engineers (the "**Assets**"). As of 2024, COLib (the Collaborative Opensource Library of power system component models) and CReDIT (Common Results, Data, Information and Tools) shall start operation.

CRESYM manages thematic doctoral networks, be they supported by the EU Horizon Europe program or self-funded by CRESYM, to augment the value of our R&I actions for researchers and fosters serendipity (the "**DoNets**").

**OUR ORGANISATION**

On behalf of its General Assembly, CRESYM is run by a Board of Directors. The Board appoints a General Manager to manage daily operation.

With the support of CRESYM's Scientific Advisor, CRESYM's Projects Committee is in charge of the general organisation of R&I Projects: the identification of new topics, the supervision of every project agreement drafting, and the overall consistency of the R&I work program, ensuring that all critical issues are addressed – by CRESYM or other organisations –, efficiently and with no overlapping of efforts.

Every project is independent from another and is managed by its participants autonomously, though obeying to one same agreement structure as all others launched by the Association.

CRESYM is represented by its President, Prof. Antonello Monti, and Vice-President, Prof. Peter Palensky.

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