

GERMAN-DUTCH
JOINT CALL FOR PROPOSALS ON
“ELECTROCHEMICAL MATERIALS AND PROCESSES FOR
GREEN HYDROGEN AND GREEN CHEMISTRY”

Opened jointly by the Dutch Research Council (NWO), the German Federal
Ministry for Economic Affairs and Climate Action (BMWK) and the German
Federal Ministry of Education and Research (BMBF)

Submission deadline:

February 7th, 2023 14:00:00 CET

NWO website:

<https://www.nwo.nl/en>

BMBF website:

https://www.bmbf.de/041022_ECCM

BMWK website:

<https://www.energieforschung.de/antragsteller/foerderangebote>

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Applicants are advised to carefully read the entire document as well as the corresponding national documents (German texts called “Förderbekanntmachung” and the NWO's Dutch annex) before submitting research project proposals.

CONTEXT AND GENERAL DISPOSITIONS

Both Germany and the Netherlands are committed to net-zero CO₂ emissions by 2045 and 2050, respectively. This is an enormous technological and economic challenge, requiring intensification in the deployment of renewable energy across all productive sectors. Green hydrogen gives a strong incentive to boost the use of renewable energy. Germany has expressed its strong political interest to foster a hydrogen economy in its National Hydrogen Strategy released in June 2020. At the same time, radically new technologies and infrastructure are needed for the sustainable production of fuels/energy carriers, materials and chemical products, starting from (green) feedstock and using renewable energy.

The rapid implementation of a net-zero economy requires enormous efforts in research, development and innovation towards large-scale deployment of cheap and robust energy storage systems and conversion technologies. **Germany and the Netherlands are home to one of the world's most powerful industrial clusters, making it an outstanding candidate to develop new climate-neutral technologies.** By combining research efforts, a close cooperation between the two countries can help accelerate these goals. For these reasons, a joint call for proposals in the area of electrochemical materials and processes for green hydrogen and green chemistry is issued by the Dutch Research Council (NWO), the German Federal Ministry for Economic Affairs and Climate Action (BMWK) and the German Federal Ministry of Education and Research (BMBF).

The aim of this joint call is to **promote research across the Dutch-German border that facilitates advances in electrochemical materials and processes for green hydrogen and green chemistry. The main focus is on technological innovation; interdisciplinary research projects and addressing socio-economic and societal aspects are strongly encouraged.** The priority areas of this call for proposals follow the “Call to Action to foster collaboration between Germany and the Netherlands on green hydrogen & green chemicals” published in the Netherlands on April 1, 2021.¹ This call for proposals therefore covers the five key priority areas for Dutch-German collaboration, namely: electrolysis (including hydrogen storage), electrosynthesis, materials and catalysis, engineering/ manufacturing of cell equipment, and system design and integration (see “Scope of the Call”).

On the Dutch side, this call is set up in the framework of the Knowledge and Innovation Covenant (KIC) 2020-2023.² On the German side, it is based on the existing calls for proposals by BMWK and BMBF under the German Federal Government's 7th Energy Research Programme “Innovations for the Energy Transition”.³

The projects funded under the framework of the present joint call are expected to promote high-quality research collaborations among researchers in the Netherlands and Germany in order to provide highly innovative solutions for Electrochemical Materials and Processes for Green

¹ <https://www.co2neutraalin2050.nl/wp-content/uploads/Call-to-action-GER-NED-Hydrogen-and-Green-Chemistry-April-2021.pdf>

² <https://www.nwo.nl/en/researchprogrammes/knowledge-and-innovation-covenant>

³ Published by BMBF, BMEL and BMWK on <https://www.bmwk.de/Redaktion/EN/Publikationen/Energie/7th-energy-research-programme-of-the-federal-government.html>. For the corresponding calls, see next section.

Hydrogen and Green Chemistry. Next to technical aspects, the consortia are invited to address economic and societal challenges related to their priority area as well.

The call is open for participation to research institutions (university or non-university research) and companies as well as other organisations providing research contributions. The national guidelines and conditions for participation are explained in section “Eligibility”, in the Dutch annex and in the underlying German documents. In order to translate research results into solutions of practical relevance, involvement of partners along the entire innovation chain from research, to industry, to end users is encouraged.

This call for proposals wants to support and promote active collaboration between German and Dutch partners. Partners will work together as a joint team, bringing together complementary competences in one common project and creating a joint output. Consortia should demonstrate real synergy between all partners and at all stages of the project, i.e.: co-design (formulation of the proposal), co-create (active involvement in the execution of the project and knowledge exchange) and co-produce (joint promotion of results in communication and impact). The contributions and scientific inputs of the partners between the two countries should be well balanced.

Project monitoring will be done by the agencies NWO and Project Management Jülich (Projektträger Jülich, PtJ) according to national rules.

Each agency will cover expenditures for its respective national consortium side according to its own rules:⁴

- On the German side, these rules can be found in the funding announcements for the “7th Energy Research Programme “Innovations for the Energy Transition” of the Federal Government”³. The funding announcements (Förderbekanntmachungen) are published here:
 - funding by BMWK: <https://www.bmwk.de/Redaktion/DE/Downloads/B/bekanntmachung-forschungsfoerderung-im-7-energieforschungsprogramm.html>
 - funding by BMBF: <https://www.bmbf.de/foerderungen/bekanntmachung-2337.html>

The funding announcements explain who can apply, requirements for being granted, nature, scope and rates of funding, and their grant provisions.

The Federal Ministry for Economic Affairs and Climate Action and the Federal Ministry of Education and Research will both support projects within this joint call. The distribution of proposals between the ministries according to the respective responsibilities will be done after the joint selection process (see “Evaluation”).

- NWO’s funding regulations are set out in the Dutch Annex to this call.

Consortia must be composed of at least two Dutch and two German partners. On the Dutch side, this means that there must be at least one applicant who fulfils the criteria of paragraph 3.1 of the Dutch annex and at least one co-funder who fulfils the requirements of paragraph 3.1.2 of the Dutch annex. On the German side, there must be at least one applicant who is a research partner and at least one applicant who is a company.⁵ Further partners, such as civil society organizations,

⁴ In case of discrepancies between this document and national documents, the latter are legally binding.

⁵ „Unternehmen der gewerblichen Wirtschaft“

can also participate as additional funded partners on the German side. Collaborating (“associated”) partners providing input without receiving funding, are welcome on both sides. Consortia are encouraged to think carefully about their composition and to include partners relevant for the project at hand. This could mean looking further than the immediate network, towards partners that are perhaps more distant in terms of geography or type of organisation, but can add significant extra (interdisciplinary) expertise and diversity.

Projects with a duration between 2 and 4 years are welcome, however shorter projects are not precluded. The requested project subsidy must range between 300,000 EUR and 1,000,000 EUR per country, i.e. between 600,000 EUR and 2,000,000 EUR per joint project.⁶ The co-funders contribute a total of minimum 30% of the Dutch project budget as co-funding. In order to increase support for implementation of the projects, Dutch funding rules call for a users’ committee to be appointed per project, more details are provided in the Dutch annex. German partners are encouraged to attend the users’ committee meetings. Each project will start with a common kick-off meeting.

The call is supported by comparable shares from NWO on the one hand and the German Federal Ministries BMBF and BMWK on the other hand. The available budget at NWO side is 5,000,000 EUR.

This call for proposals is valid for the entire duration of the projects awarded.

SCOPE OF THE CALL

Funding will be provided to collaborative projects between German and Dutch partners that conduct application-oriented basic research (roughly corresponding to a technology readiness level of TRL 1-6)⁷ aiming at highly innovative proposals on Electrochemical materials and Processes for Green Hydrogen and Green Chemistry. Projects have to create added value from the German-Dutch cooperation.

Research to be funded shall address one of the following five key priority areas. Subtopics are provided as a guidance and proposals addressing other challenges within the same key priority areas are also welcome, if well motivated.

1. a. Electrolysis, including, but not limited to

- Next generation electrolysers
- New types of electrolysers (e.g. producing more valuable co-products than oxygen)
- Catalyst materials, electrodes and membranes
- Cost reduction

b. H₂ storage, including, but not limited to

⁶ The project allowance awarded by BMBF to universities in Germany is not included in this funding budget and will be added afterwards.

⁷ https://artes.esa.int/sites/default/files/TRL_Handbook.pdf (Table 3.2.1)

- in tanks, using metal hydrides, or with liquid hydrogen carriers

c. P2X technologies and downstream processes to produce energy carriers or chemicals, including, but not limited to

- the integration of electrolysis and thermochemical processes

2. Electrosynthesis and electro-conversion, including, but not limited to

- Alternative anode reactions
- New conversion cell designs
- Conversion performance improvement
- Analysis of electrochemical reaction systems at relevant industrial conditions
- CO₂ capture and direct conversion
- Electrosynthesis beyond CO₂
- Electrolyte-free electro synthesis
- Thermal management of conversion cell
- Optimization of transport losses

including benchmarking versus thermal processes

3. Materials and catalysis, including, but not limited to

- Genesis, stability and degradation
- Development of novel materials
- Large scale data mining & analytics

4. Engineering & manufacturing of cell equipment, including, but not limited to

- Innovative and sustainable materials
- Design for recycling/reduction of scarce raw materials
- Cost reduction and efficiency increase
- Technologies for mass series manufacturing
- Cell up-scaling
- Integration of electrolytic processes with renewable energy production (e.g. photo-electrochemistry, grid integration)

5. System design and system integration, including, but not limited to

- System controls. Approaches and algorithms to address aging, safety, performance and control of scaled electrochemical systems on membrane, stack, converter and plant level
- Development of technologies and concepts for safety in hydrogen production, storage, transport and usage
- Hydrogen compressors and sensors

Scientific excellence should be clearly evident, the plan for scientific and economic exploitation should be realistic and comprehensible.

When relevant for the research questions in the proposal, addressing **societal aspects** is strongly encouraged. Questions addressed could be related to e.g. governance, acceptability and adoptability of innovations and transitions, ethics and values, regulation of energy markets, development of new business models, market analysis, behavioural change as a result of innovations, legal consequences of new energy carriers, regulating the safety of new technologies, administrative issues of new techniques. Furthermore, accompanying or cross-cutting topics like life-cycle assessments, value chain efficiency, or scenarios on usage may be included. Projects are encouraged to take into account specificities of each country's legal, economical, societal aspects and regulations if this is relevant for the topic of research.

As both sides intend to encourage researchers' mobility and knowledge exchange between the Netherlands and Germany, consortia are asked to include concepts for integrated collaboration between partners from both countries and cross-border networking (e.g. regular meetings of participating work groups, common workshops, exchange of personnel between research groups, etc.).

SUBMISSION

The Dutch and German partners will prepare a joint project proposal⁸ written in English. Each project will designate **two national coordinators**: one for the Netherlands and one for Germany. The national coordinators have to submit their joint project proposals to **Projektträger Jülich (PtJ)** and to **NWO** via their respective submission websites.⁹ The national coordinators act as contact persons before and after the project is granted. Their tasks will include the preparation of joint reports for NWO, BMBF and BMWK, respectively. Furthermore, they will represent the consortium in public and within the scientific community.

A project proposal consists of:

- **An online administrative form to be completed on each national submission platform;**
- a common **scientific document** (project description, 15 pages maximum to be uploaded to each submission website), complemented by a Dutch **annex**;
- letters of intent, in case of associated partners on the German side.

The **scientific document** should provide the elements necessary for its assessment according to the six pre-defined evaluation criteria (see "Evaluation").

The scientific document must be structured in the following order:

1. Abstract (Outline).
2. Address and contact details of national coordinators and contact persons for the individual project partners.
3. Statement of problem, themes and objectives of project proposal.

⁸ The German term is « Projektskizze »

⁹ PtJ: https://foerderportal.bund.de/easyonline/reflink.jsf?m=GLF_ENERGIE&b=DE_NL_ECCM

NWO: <https://www.nwo.nl/en/researchprogrammes/eccm-de-nl>

4. Relevance and contribution of research to funding program objectives and theme of the call.
5. Degree of innovation and technology maturity or readiness level at the beginning and (targeted) end of the project.
6. Composition of consortium including involvement of stakeholders, qualifications and expertise of the project partners.
7. Project structure, division of labour and tasks of the project partners, short description of work packages, risk management and contingency planning
8. Scientific and economic exploitation of project, expected impact and route to impact
9. Estimated total expenditure and funding requirements, broken down into personnel and material resources, per individual project partner.

The **annex** to the scientific document should present details on the Dutch part of the proposal:¹⁰

- A table detailing the contribution of each Dutch partner¹¹ to the joint project
- A detailed work breakdown and milestone chart for each Dutch partner
- The justification of costs and funding requests for the Dutch partners of a joint project¹²
- Letters of support from the Dutch co-funders (see Paragraphs 3.1.2 and 3.4.1 in the Dutch annex)¹³
- Guarantees for continuity in project management (if applicable)¹⁴
- A section describing the data management of the Dutch partners¹⁵

Templates for the scientific document and the annex to the scientific document are available to applicants on the NWO and PtJ websites.¹⁶ **Usage of the templates is mandatory.**

A project proposal will only be assessed if the online forms are filled in correctly and the scientific document and its annex are prepared and uploaded **to both submission websites** before the deadline mentioned above. Proposals that are not submitted before the deadline will not be taken into consideration at all. National coordinators are encouraged to contact their national funding agency for questions well in advance of the deadline and start the submission of the proposal well before the deadline.

¹⁰ Dutch partners are asked to give more detailed information in the annex in the first step. German partners submit proposal outlines (Projektskizzen) and will have to submit more detailed information in a second step along with a formal grant application in case they are selected for the second step (see section « Selection and funding »).

¹¹ See section 3.1 of the Dutch annex for information about the consortium participants.

¹² At the moment of submission, the letters of support appended should pledge the entire required co-funding according to the conditions described in Section 3.5.5 of the Dutch annex.

¹³ Use of the template for letters of support is mandatory. The template is provided on <https://www.nwo.nl/en/researchprogrammes/eccm-de-nl>.

¹⁴ The annex "guarantee for the appointment" is compulsory if the duration of appointment of an applicant is shorter than the intended duration of the research for which the grant is applied for (see also Sections 3.1).

¹⁵ See Section 5.1.2 of the Dutch annex.

¹⁶ NWO: <https://www.nwo.nl/en/researchprogrammes/eccm-de-nl>
PtJ: <https://www.ptj.de/projektfoerderung/angewandte-energieforschung/eccm> oder
<https://www.ptj.de/projektfoerderung/anwendungsorientierte-grundlagenforschung-energie/eccm>

ELIGIBILITY

The project proposal must fulfil the eligibility criteria common to both funding agencies, as well as the criteria specific to each agency. If either NWO or PtJ detects shortcomings after the submission phase, then they will give the national coordinators a one-off opportunity to modify the joint proposal within five working days and to upload the documents in a revised version on both websites. Proposals corrected in the right manner, submitted to both agencies and received in time, will still be taken into consideration by NWO and PtJ. Project proposals that do not meet all of the eligibility criteria - i.e. whether common to both agencies or unique to each - cannot be taken in consideration for evaluation. National eligibility criteria only apply to the respective national partners of the proposal.

1. Common eligibility criteria

- The project proposal must be submitted both by the Dutch and the German national coordinator of the project
- Both agencies must receive a complete application: i.e. the common scientific document, the Dutch annex and the specific national administrative forms submitted respectively on the online platforms of NWO and PtJ (see section "Submission")
- The project proposal must have a time span of maximum four years.
- The proposal must be written in English
- Composition of the consortium
 - o The Dutch side of the consortium shall consist of one Dutch national coordinator and at least one co-funder. Co-applicants and collaborating partners can participate on the Dutch side of the consortium as well.¹⁷
 - o The German part of the consortium shall consist of at least one German research institute (non-university or university) and one German company. One of them acts as the national coordinator for the German partners.
 - o The German part of the consortium can include end users or other civil society organisations participating as additional funded or associated (collaborative) partners or as members of an advisory board. Associated partners are asked to contribute to the project e.g. by financial, infrastructural or personal means without receiving funds. A letter of intent describing the contribution to the project is required.

2. Specific national eligibility criteria

For specific national eligibility criteria, please see the underlying national funding announcements published by BMBF and BMWK respectively. The Dutch eligibility criteria are given in the Dutch annex to this call (section 3.4).

¹⁷ See section 3.1 of the Dutch annex for the composition of the consortium.

EVALUATION

Each eligible proposal will be evaluated by external referees and a Review Panel (RP). The RP will be composed of scientific experts named by NWO and PTJ, respectively. Details about the referee procedure and the composition of the Review Panel are given in the common annex to this call.

The NWO Code for Dealing with Personal Interests applies to all persons involved in the evaluation process.¹⁸

The evaluation criteria are:

1. Conformity with the call for proposals' aims and degree of conformity with the designated key priority areas; Description of the scientific challenge addressed and of the problem analysis; Fit of TRL level;
2. Overall impact of the project, including scientific, technological, economic and societal aspects, and strategic activities for reaching impact; Appropriateness of the description of how socio-economical aspects and/or interdisciplinary research methods are incorporated in the proposal and how relevant stakeholders are involved, where feasible;
3. Quality, competence, complementarity and completeness of the consortium to address the objectives of the project including real synergy; active involvement and commitment of all partners needed to reach the expected impact;
4. Scientific and technical quality of the research, innovativeness and knowledge gain of the joint research project; Methodology and quality of project construction, feasibility and appropriateness of the joint research project;
5. Added value of the bilateral cooperation, expected benefit for both the Dutch and the German side, balance of the cooperation, and possible contribution to the overall Dutch-German cooperation in energy research;
6. Appropriateness of resources and funding requested.

All proposals receive a qualification based on the scores of the Review Panel. Only proposals that receive the qualification *very good* or *excellent* are eligible for funding. Scores and qualifications are described in the Common Annex.

SELECTION AND FUNDING

The Review Panel will rank the proposals based on the scientific evaluation. The NWO Board for the Dutch side and BMWK and BMBF representatives for the German side will jointly select projects proposed for funding based on the recommendations of the Review Panel. In addition to the scientific evaluation, further considerations such as distribution over topical and geographical areas and innovation policies outlined in both countries' research programmes (see "Context") can be taken into account by the German ministries and NWO.

Each agency will fund grants for their respective country's partners according to its own rules and national regulations:

¹⁸ <https://www.nwo.nl/en/common/subsidies/funding-process-explained/code-for-dealing-with-personal-interests>

- **NWO's funding regulations are available at:**
<https://www.nwo.nl/en/nwo-grant-rules>
- **The underlying German national funding announcements are available at:**
<https://www.bmwk.de/Redaktion/DE/Downloads/B/bekanntmachung-forschungsfoerderung-im-7-energieforschungsprogramm.html> and
<https://www.bmbf.de/foerderungen/bekanntmachung-2337.html>
- **Explanatory note:**
 - o The German application process has two steps.
 - o The joint selection by the NWO Board and BMBF and BMWK marks the end of the first step for the German applicants.
 - o The selection of a project proposal in the first step allows the applicants in Germany to submit formal grant applications in the second step. BMBF and BMWK guidelines for grant applications and the administrative provisions concerning sections 23 and 44 of the Federal Budget Code (Bundeshaushaltsordnung) apply (see national funding announcements). Formal grant applications consist of form sheets containing a detailed cost breakdown, as well as a more detailed scientific document than in the first step. The scientific content of the proposal must not be changed with respect to the first step.
 - o At the end of the first step, NWO will inform the Dutch national coordinators about the outcome of the selection procedure. This is a provisional decision, conditional upon successful outcome of the second step for the German side of the consortium.
- The bilateral consortium cannot be funded if one national partner cannot be funded.

Consortia must conclude a collaboration agreement including all Dutch and German partners. This agreement must comply with both the Dutch requirements named in the Dutch annex to this call (Section 5.1.3) as well as the German requirements ("Merkblatt für Antragsteller/Zuwendungsempfänger zur Zusammenarbeit der Partner von Verbundprojekten"¹⁹). The collaboration agreement has to be concluded before the project can start. The German national coordinator will inform PtJ when the collaboration agreement is signed within two weeks after signature. It is strongly recommended to start discussing the collaboration agreement as soon as the proposals have been selected.

¹⁹ https://foerderportal.bund.de/easy/module/profi_formularschrank/download.php?datei1=219

COMMON ANNEX

1. Evaluation Process

1.1. Process

There will be a two-step evaluation process of eligible proposals:

Step 1: Referee phase

NWO is responsible for this phase of the evaluation process. Independent, international external advisors (referees) selected by NWO and approved by PtJ provide written assessments of the proposals based on the evaluation criteria. The referees' reports are sent in an anonymised form to the Dutch national coordinator for a written defence (the rebuttal) that should be received by NWO within 5 working days after the reports were sent. The Dutch national coordinator is the contact person for the entire consortium for this part of the process and should consult with its German counterpart. The national coordinator can refrain from submitting a rebuttal. This decision has to be taken jointly by the German and Dutch side. After the deadline, the research proposal, the referees' reports and rebuttals received will be submitted to the review panel (see Step 2). If a rebuttal is not received within the deadline set, then the research proposal together with the referees' reports will be submitted to the review panel.

Dutch applicants can indicate non-referees in NWO's grant application system ISAAC when submitting the proposal. The non-referees will not be approached to assess the proposal. A maximum of three non-referees can be indicated. The Dutch national coordinator should consult with all project partners regarding the registration of non-referees.

Step 2: Review Panel

The review panel consists of independent experts from the scientific community and of PtJ staff. Taking the results from step 1 into account as well as their own independent opinions, members will prepare written assessments as well as scores for the evaluation criteria, and itemize aspects to be discussed. During the panel meeting, each proposal will be discussed and a final score will be determined.

1.2. Scores and threshold values

A scoring scale of 1 to 9 will be used throughout the evaluation process, of which 1 is the highest score. The scores correspond to qualifications in the following manner:

Score range	Qualification	Explanation
1.0 - 1.4	Excellent	The proposal fulfils the evaluation criteria in an outstanding manner.
1.5 - 3.4	Very good	The proposal fulfils the evaluation criteria.
3.5 - 5.4	Good	There are minor faults.
5.5 - 9.0	Unsatisfactory	The proposal does not fulfil the evaluation criteria.

The total score is determined from the scores for the individual evaluation criteria. All criteria weigh equally. A total score of 3.4 or higher is required to be eligible for funding, as well as a minimum score of 4.0 on each individual criterion. Scores on criterion 4 'Scientific and technical quality...' will be used to determine ranking if proposals receive a total score which is equal up to one decimal point. If the proposals still have the same total score, the Review Panel (see 1.1, Step 2) will determine the ranking via a majority vote.

2. Application of national requirement to joint projects

NWO is a signatory of the San Francisco Declaration on Research Assessment (DORA). As part of the commitment to support the recommendations and principles set out by that

declaration reviewers and panel members are expected not to judge proposals on the basis of surrogate measures such as journal impact factors or the H-index. Applicants are not allowed to mention these indicators in their proposal. With regard to publications, the Open Access regulation of the country of the main author will apply.

3. Timeline

Deadline for submission proposals	7 th February 2023 at 14.00.00 CET
Applicants can submit a rebuttal	March 2023
NWO communicates provisional granting decision to Dutch partners, and PtJ requests full proposals (“Antragsaufforderung”) from German partners for step 2	May 2023
Final decision communicated to German and Dutch partners	Q4 2023