

AI in the service of climate

Spring 2021

A call with Vinnova, Formas, The Swedish Energy Agency and the Swedish National Space Agency in collaboration.

Registration number: 2021-00027

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Revision History

Date	Revision

1 The offer in summary

Climate change is one of the great challenges of our time. We are in dire need of a transition to a climate-neutral society, and the time to achieve real effects in society is critical. The climate issue is global in nature, and it is important that local solutions can also be disseminated and scaled nationally and internationally. Sweden has great opportunities in acting as a pioneer country through expertise in climate, environment, digitalization and AI, and to develop solutions that can create climate benefits at an international level.

By using artificial intelligence (AI) in the service of the climate, Sweden can use new technologies to address climate changes, and also contribute to building competence and strengthening environments within AI and climate and create conditions for development of new tools for problem owners. AI has shown great potential in the use of large amounts of data, for example in applications such as precision culture, image analysis, energy technology and autonomous vehicles. In many areas, AI has the potential to create an acceleration in a transition to a climate-neutral society.

The call targets consortia that wish to implement projects that, with the help of AI, contribute to significant reductions in greenhouse gas emissions. In this call, Vinnova, Formas, the Swedish Energy Agency and the Swedish National Space Agency support research and innovation projects that will contribute to achieving the overall goals of the national research program on climate¹. In order to achieve set targets, emission reductions need to start today, and the call therefore strives to increase the use of AI to provide a powerful impact as quickly as possible. This call focuses on reducing greenhouse gas emissions, and climate adaptation projects will not be funded.

The purpose of the call is to take research ideas and knowledge to a higher degree of maturity that results in data-driven solutions with the potential to provide significant emission reductions. See section 4 for more information on the limitations of the call.

In the projects, real needs and problems will be addressed by a consortium where several participants contribute with complementary skills. Therefore, problem owners have an important role in the projects, and active participation is a prerequisite. We want to achieve collaboration between, for example, academia, research institutes, problem owners in the business sector and the public sector, as well as AI intermediaries. We also want to create new collaborations between the

¹ [Research for meeting the challenges of climate change - Formas](#)

arenas in the climate domain and existing AI environments in Sweden. The participant constellations must consist of at least three parties, of which at least one must be a research organization and at least one must be a company or public organization.

Vinnova, Formas, The Swedish Energy Agency and the Swedish National Space Agency are investing SEK 67,5 million in a call for the period 2020-2023, with an offer for financing up to 80 percent of a project's eligible costs. We intend to finance projects with a term of 2-3 years and grants of between four and seven million SEK.

The following dates apply to the call:

Please note that the dates are preliminary. For current information see www.vinnova.se

Call opening	March 9, 2021
Submission deadline	June 9 14:00 2021
Latest decision date	October 6, 2021
Project start at the earliest	October 15 2021
Project start at the latest	October 25 2021

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Current information on the call and a link to our proposal portal can be found at www.vinnova.se, as well as www.formas.se, www.energimyndigheten.se and www.rymdstyrelsen.se.

2 What do we want to achieve with this call?

With this call, we want to support projects that will contribute to achieve the overall goals of the national research program on climate². Through the call, we want problem owners and research organizations to collaborate and strengthen existing initiatives in the AI and climate fields. The projects will aim to develop solutions where there is potential to realize significant emission reductions in business or public organizations.

Projects are to develop solutions that will contribute to a climate neutral society through significant emission reductions in business or public activities at local, regional, national or international level. It is the global potential of solutions that is of interest, which means that scalable solutions with broad applicability will be given priority. The projects will demonstrate the climate benefits of the solution through basic validation and verification. The purpose of the call may imply that applicants need to look beyond the current system solutions and not allow current legislation and regulations to be restrictive.

2.1 Background and rationale

Climate change presents society with major challenges. Greenhouse gas emissions need to be significantly reduced to limit global warming and its negative effects. Sweden has signed the Paris agreement to keep the increase of the global average temperature well below 2 degrees, and that we will work to keep it at 1.5 degrees. Sweden has also adopted a number of national targets for emission reductions. The change of society needs to be made quickly, fairly and in concert with measures to achieve other sustainability goals within Agenda 2030. In order to achieve the 1.5-degrees goal, measures and solutions need to be implemented as soon as possible.

The evolution of artificial intelligence (AI) is moving fast and has the potential to lead to radical changes in our lives, in working life and in society as a whole. Applications of AI have already been of great importance for the development of Internet platforms, information search, image recognition and automatic translation. On the other hand, the practical impact of AI in service of climate has been limited in major parts of the business community and in the public sector in Sweden. Over the past decade, access to data in electronic form and computing performance has increased very rapidly, which has significantly improved the conditions for AI applications in various domains. Evaluations indicate that the

² [Research for meeting the challenges of climate change - Formas](#)

use of AI has great potential, and that AI can strengthen Swedish competitiveness and create positive societal effects.

The innovational value of the solution developed in the project must be high, which means that it is at the forefront in relation to international state of the art, ie that corresponding solutions do not already exist in Sweden or internationally. The proposal should clearly state the position of the solution in relation to existing solutions.

This call explores the possibilities of using AI to contribute to reduced greenhouse gas emissions. We want to achieve this goal without any negative effects on other areas of society, and the energy use of the proposed AI-based solution should be considered in relation to the expected decrease in emissions. With the call, we intend to create societal benefits and strengthen Swedish competitiveness by building up new knowledge, skills and ideas about solutions within public organizations, companies and in Swedish research organizations. To achieve these goals, common systems and business models may need to be challenged, for example, by creating new forms of collaboration and value chains.

Utilizing the skills and knowledge of the entire population is a prerequisite for innovation and sustainable societal development. Therefore, gender mainstreaming is important both in terms of idea, actors and implementation. Gender equality and general equality are also prerequisites for sustainable growth and can be found in Agenda 2030, as goals in themselves, but also as perspectives that should permeate the work on all goals. Therefore, a gender equality and equality³ perspective should be integrated into the project's planning and implementation⁴.

In this context, it means to ensure;

- that different groups are equally given the same conditions to take part in the grant
- that different groups participate equally in the implementation of the approved projects and as a target group
- that project results contribute to increased equality

The long-term impact goals of the call are to:

- develop AI-based solutions for reduced emissions of greenhouse gases in line with national and international emission targets

³ Gender equality refers to equality between the sexes. Equality refers to the equal value of all human beings, regardless of gender, gender identity or gender expression, ethnicity, religion or other belief, disability, sexual orientation or age.

⁴ [NOVA - norm creative innovation | Vinnova](#)

- use new knowledge and competence to develop or open up areas that contribute to increased sustainability through reduced resource utilization, increased circularity and significant societal benefits
- contribute to strengthening Sweden's international position in AI and climate research.

The short-term impact goals for the call are to:

- develop new knowledge that can form the basis for instruments, policies, behavioral changes or contribute to the development of new services, products or processes
- develop new solutions with high potential for decreased emissions of greenhouse gases, in an international context
- create and deepen collaboration between public organizations, companies and research organizations
- ensure that collaboration occurs between industries, sectors and research disciplines
- ensure that collaboration occurs between established AI environments and climate-focused research environments
- ensure ideas, knowledge and constellations can be further developed in other national and international initiatives.

Collaboration, concentration and innovation will be crucial to achieve the goals in Agenda 2030. Through this call, we aim to increase the development of their innovation ability through collaboration and create new solutions that contribute to the goals, within the framework of the call's priorities.

Results from research and innovation that are made openly available provide an increased opportunity for more actors to contribute to solutions to societal challenges. The call shall contribute to more results being made freely available for everyone and scientific publication shall take place with open access.

3 Who is eligible to apply in the call?

The call is for legal persons and at least three project partners are required, of which at least one must be a research organization⁵ and at least one must be a public organization or a company (a problem owner).

⁵ If you can answer YES to all the following statements, and have evidence to support it, you can classify yourself as a research organization in our call:

- The organization's main purpose is to conduct independent basic research, industrial research or experimental development and disseminate its results through teaching, publication or knowledge transfer.
- Any profit from knowledge transfer is reinvested in the primary operation (education, independent R&D and extensive dissemination of R&D results).

Sweden's climate goals within the climate policy framework are included in Sweden's 16 environmental goals through the environmental goal “Limited climate impact”⁶. The authorities that within the environmental goals system have assignments from the government in their instructions to contribute to achieving the environmental goals are encouraged to take active roles in relevant project proposals.

Foreign actors, such as multilateral organizations, are welcome to participate in the projects, but a prerequisite for receiving a grant from Vinnova is that the project partner is active and has an establishment or branch in Sweden.

4 What do we finance?

4.1 Activities eligible for funding

In light of the purpose of the call, we finance innovative knowledge and skill development in collaboration, which leads to solutions with verified potential for reducing greenhouse gas emissions. The knowledge and competence being developed should be able to apply and generate significant societal and climate benefits, but this is a long-term impact goal rather than a result that will be achieved as part of the project. However, the climate benefit of the solution must be validated and verified in a basic manner to provide an early confirmation of the solution's value and potential.

4.2 Limitations

AI

There is no clear and generally accepted definition of artificial intelligence, but in this call, we refer to the ability of a machine to emulate intelligent human behavior. Today, data-driven innovation often occurs in conjunction with machine learning and other AI technologies. Examples include interfaces (APIs) for making real-time data available, data useful for AI, specialized data factories that create open and synthetic data, classification and annotation of particularly valuable data sets, tools for sharing data, etc. The purpose of the call is to promote data-driven solutions for the climate and help existing collaborative

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- Companies that can exercise a decisive influence on the research organization, for example in the capacity of shareholders or members, have no precedence over the results achieved by such an organization.
 - If the organization also conducts financial activities, the financing, costs and revenues of that activity are reported separately (as made clear by, for example, the annual report).

⁶ [SWEDEN'S ENVIRONMENTAL OBJECTIVES -AN INTRODUCTION. ISBN 978-91-620-8820-0. \(swedishepa.se\)](https://www.swedishepa.se/8820-0)

environments develop competencies and practical skills in the intersection between AI and climate.

In the call, we finance further development of research ideas within AI for climate to a higher maturity together with one or more need owners. With the call, we want to create a bridge with other initiatives, not least the data labs that are now establishing and developing in Sweden. The proposal should therefore be based on the knowledge that exists from previous and ongoing research projects linked to AI or climate, for example within the framework of the Swedish Research Council, the Foundation for Strategic Research, the Wallenberg AI (Autonomous Systems and Software Program), the Foundation for Knowledge and Competence Development, Formas, Vinnova, the Swedish Energy Agency, the Swedish National Space Agency or other research funding agencies.

Climate

Reduced emissions of greenhouse gases

All sectors must contribute to reducing greenhouse gas emissions. In Sweden, the largest sources of emissions are in transport, industry, agriculture and energy, but the transition must also take place in other sectors. Some sectors also have the potential to contribute to negative emissions, such as forestry, and the capture and storage of carbon dioxide from biofuel combustion (bio-CCS). Sector-wide solutions and measures at system level are needed. Projects aimed at developing emission reduction (or negative emission) solutions should clearly identify a problem area where the solution can contribute to significant emission reductions, with opportunities to upscaling nationally and internationally.

Modeling and monitoring

Access to reliable and realistic models and data is an important part of climate change adaptation and mitigation. It may be models and forecasts that aim to predict, detect and monitor greenhouse gas emissions or modeling that in other ways have the potential to indirectly reduce greenhouse gas emissions. These models can be based on satellite, geo, environmental and sea data. Projects that focus on modeling and monitoring also need to have a clear link to one or more measures that lead to emission reductions. Therefore, the new models and forecasting tools that are developed need to be able to contribute to reduced greenhouse gas emissions - projects only focusing on optimizing climate models or similar will be rejected.

4.3 Eligible costs

Our financing is through grants. Grants to organizations engaged in financial activities are covered by state aid rules⁷. The rules govern, among other things, the types of costs and the proportion of those that may be covered by grants.

For this call, grants are given with the grant category "industrial research".

5 What are the grants?

- In this call, a minimum of SEK 4,000,000 in grants can be granted per project.
- In this call, a maximum of SEK 7,000,000 in grants can be granted per project.

The minimum co-financing at the project level is 20 percent.

To be eligible as a small or medium-sized company, the size of the company must be verified through the certificate (model declaration) attached to the application, see the link below. If a certificate is not attached, then the company will be classified as a large company.

You can read more on Vinnova's website:

- [rules on state aid to companies](#).
- how SMEs are classified in the document "[User guide to the SME Definition](#)". **On page 46** the certificate to be used to prove the size of the company (Model declaration) can be found.
- Eligible costs in [Guide to Vinnovas terms on eligible costs - in Swedish only](#).

6 Prerequisites for evaluation of the proposal

In the evaluation process, there will be international evaluators and we therefore strongly recommend proposals to be written in English. Proposals in Swedish will be translated by external expertise and applicants will not be given the opportunity to review the translated proposal.

We will only evaluate proposals that meet the following formal requirements:

- The project must have at least three project partners, of which at least one must be a research organization and one must be a company or a Swedish authority at the municipal, regional or national level.
- All project partners are legal persons.

⁷ Read more about state aid on our website: [State aid to companies | Vinnova | Vinnova](#). There you will also find our general terms and conditions for grants and a guide to Vinnova's conditions on eligible costs: [Terms and conditions for Vinnova funding | Vinnova](#)

- The budget of the proposal must clearly show that at least 20 percent of the project's eligible costs are covered by co-financing.
- The companies' grants must be able to be provided with the grant category "Industrial Research" and correspond to a maximum of 65-80 percent of the eligible costs, in accordance with state aid rules (see previous chapter).
- Project partners must be listed in Vinnova's Stakeholder Portal where the budget is entered for all project parties. It is not enough to specify project partners in the project description.
- The proposal must contain all mandatory appendices and these must be written according to provided templates and not exceed the maximum number of pages allowed.
- No other appendices are to be included.
- The grant applied for is between SEK 4,000,000 and SEK 7,000,000 according to the rules in the chapter above.
- Projects may be planned to last between 24 and 36 months.
- The activities for which actors apply for funding have not been started.

7 Evaluation of proposals received

7.1 What we evaluate?

The proposal must be in line with the objectives and purpose of the call given in sections 2 and 4, and will be evaluated according to the criteria below. As part of the assessment, Vinnova, Formas and The Swedish Energy Agency will consider the diversity of the project portfolio with the aim of funding projects with different types of actors who in different ways develop solutions for different needs within the framework of the call themes. Crucial to the priority is the potential of the solutions to contribute to decreased emissions of greenhouse gases.

It is important that the application contains a clear link between the solutions and measures proposed and the effect on greenhouse gas emissions. The application should include a quantitative assessment of the emission reductions that the measure should lead to nationally, as well as a general assessment of the potential for emission reductions internationally.

Potential

- The potential of the project to use AI to develop solutions that will contribute to significant reductions in emissions in line with the Paris Agreement and Sweden's climate goals,
- The potential of the project to develop solutions that can contribute to societal benefits
- In the proposed solution, the project has taken into account the perspectives of problem owners and other users

- The project idea in relation to international state of the art and its potential to contribute to pioneering and transformative solutions in AI in the service of climate.
- Potential to strengthen collaboration between the climate area and AI environments - how well these areas are strengthened and cross-fertilized throughout the project
- The potential of the project to contribute to increased equality⁸.

Feasibility

- The realism of the project plan in relation to set goals, methods, activities and budget.
- The project partners' participation and relevance in the project's various work packages and activities.
- How well ethical and equality aspects are integrated into the project plan
- How well basic validation and verification of climate benefits are integrated in the project plan.

Project constellation

- The project constellation's access to expertise, partners and networks for the implementation of the project.
- Commitment from the companies and / or public sector in the project, including degree of own financing.
- Knowledge and competence of the project team to implement the project, including the parties' complementary skills in AI and climate
- The constellation's ability to disseminate, utilize and further develop the ideas, knowledge and solutions generated in the project.
- How well the project team is composed with regard to gender equality, including distribution of power and influence.

7.2 How do we evaluate?

Vinnova, Formas and The Swedish Energy Agency all participate in the evaluation process.

The proposal is assessed in competition with other proposals received and the evaluation is based on the electronic application submitted to Vinnova via the eServices Portal. The evaluation is done by Swedish and international experts and we strongly recommend proposals to be written in English. Proposals in Swedish will be translated by external expertise and applicants will not be given the opportunity to review the translated proposal.

⁸ [Protected grounds of discrimination | DO](#)

Schematically, the decision-making process looks as follows:

1. The proposals are submitted via the eServices Portal.
2. The proposals meeting the formal requirements will be evaluated based on the above criteria by Vinnova's specially appointed evaluators. The evaluation as a whole results in a recommendation for financing.
3. Vinnova determines which projects to fund.

Decisions will be announced to applicants no later than October 6 2021.

8 Decisions and terms

8.1 About our formal decisions

How much each party in the project is granted in grants is evident from the formal decision. Grants will be granted on the basis of Regulation (2015:208)⁹ on state aid for research and development and innovation. The basis for the support is stated in the decision and also controls which costs are eligible. For this call, grants are given with the grand category "industrial research" (see the regulation - § 9 / Art. 25).

Vinnova's formal decision on funding cannot be appealed.

8.2 Conditions for grants

For approved grants, our general conditions for grants apply¹⁰. The terms include rules on project agreements, conditions for payment, follow-up, reporting and utilization of results. Scientific publication shall take place with open access in accordance with Vinnova's instructions.

The following special conditions also apply to everyone who is awarded a grant in this call:

"The project must be represented by at least one Project Party at the program seminars and conferences that Vinnova, Formas, the Swedish Energy Agency and the Swedish Space Agency organize during the project.

The cost of such participation is eligible."

"The following conditions replace § 7.3 in the general conditions. When informing about the project and at each publication of project results, it must be stated that the work has been carried out within a joint venture by Vinnova, Formas, the Swedish Energy Agency and the Swedish National Space Agency.

⁹ Read more about state aid and the regulation on our website: [State aid to companies | Vinnova | Vinnova](#)

¹⁰ Current conditions can be found on our website, together with aid to understand and fulfill the conditions: [Terms and conditions for Vinnova funding | Vinnova](#)

Publication refers to e.g. publication regardless of medium and oral presentations."

Additional special conditions can apply to individual projects.

If you do not comply with our terms, you may become liable for a refund. This also applies if you have been granted a grant incorrectly or with an excessive amount.

9 How to apply

To apply for a grant, fill out a web-based form in the eServices Portal, which can be accessed through our [website](#). There you also upload the following attachments in pdf format¹¹:

- Project description (according to template)
- CV appendix (according to template)
- Model declaration (when relevant)

As the applications will be assessed by international experts, applicants are strongly recommended to use English as their language. However, the model declaration is an exception where using a Swedish or English template and language does not matter.

The project description must be a maximum of **12 A4 pages** with size 12 font text. It must be written in Swedish or English (preferably English) and in the template found on the call's website. Note that the project description template contains explanations, examples and other information to clarify what is sought under the different parts of the template. Read these instructions carefully.

The CV appendix should contain the CV for the 4 most important participants of the project, including the project manager. CVs should be written in the template that is on the call's website, and must be no longer than **1 A4** page per CV.

The Model declaration (one or more) is filled in, scanned and attached to the application. Attached if any of the project partners are to be classified as small or medium-sized companies. See chapter 5 above for how to find the Model Insurance. If the declaration is not attached, then the company will be classified as a large company.

Keep in mind that it takes time to finish a proposal. You can start filling in information, save and continue at a later time. When the proposal is complete,

¹¹ You can find templates for the attachments on our website: [AI in the service of climate - Spring 2021 | Vinnova](#)

mark it as ready. You can at any time unlock the proposal and make changes, right up to the last application time.

Mark the application as ready well in advance before the call closes.

When the call is closed and the proposal is registered with Vinnova, a confirmation will be sent by e-mail to you who are in charge of the user account, project manager and signatory / head of department. It may take a few hours before you receive the email.

Once the application period has expired, the application can only be completed on request from us.

10 Who can read the proposal?

Applications submitted to us become public documents, but we do not disclose information about an organization's business or operating conditions, inventions and research results if it can be assumed that an organization suffers damage if the information is disclosed.

All information submitted to Vinnova in connection with this call will be made available to Formas and the Swedish Energy Agency. Project data from and regarding approved projects will be transferred to Formas and the Swedish Energy Agency to the extent permitted by the Public and Privacy Act (2009:400).

Personal data will be read and processed by all authorities.