

# **AI in the service of climate**

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Vinnova reserves the right to adjust this text at any time during the advertising period and without specific information. However, no changes will be made in the last two weeks before the deadline. All potential applicants are therefore advised to obtain up-to-date information on the call's website before the deadline.

## Revision History

Date	Revision
2020-04-03	Broken link in chapter 7 fixed.

## 2. The offer in summary

Climate change is one of the great challenges of our time. We are in dire need of changing into a climate-neutral society, and the time to achieve real effects in society is critical. However, Sweden accounts for only a small part of the world's total emissions, and we will also need to identify adaptations to climate changes that we cannot prevent.

By using artificial intelligence (AI) in the service of climate, Sweden can use new technologies to address climate changes, which also contributes to building competence and strengthening environments in AI and climate. Furthermore, it will create the 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 agriculture, image analysis, energy technology and autonomous vehicles. In many areas, AI has the potential to create an acceleration in a shift towards a climate-neutral society.

This call for proposals targets a consortium which wishes to implement a project that, with the help of artificial intelligence (AI), contributes to significant greenhouse gas emissions reductions or that society is adapted to the climate changes we cannot prevent in the future. In this call, Formas and Vinnova support research and innovation projects that will help to achieve the overall goals of the national research programme on climate<sup>1</sup>. To achieve set targets, emission reductions need to start today, and the call is therefore striving to increase the utilization of AI to provide powerful impact as quickly as possible.

The purpose of the call is to take research ideas and knowledge to a higher degree of maturity that contributes to data-driven solutions for decision support at the strategic, tactical or operational level. These tools and solutions should in the long term be used in society with the potential to provide significant emissions reductions or necessary adaptations to climate change. See section 5 for more information on the limitations of the call.

In the projects, real needs will be addressed by a consortium where several participants contribute with complementary skills. Therefore, the 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 climate area and existing AI environments in Sweden. The participant constellations shall consist of at least three parties, of which at least one shall be a research organization and at least one shall be a company or public organization.

Vinnova and Formas are investing a total of SEK 90 million, which will be allocated to two calls, of which this is the first. The total budget for

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<sup>1</sup> <https://www.formas.se/en/start-page/analyses-and-results/reports/2019-05-14-research-for-meeting-the--challenges-of-climate-change.html>

the call is SEK 45 million 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 five 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](http://www.vinnova.se)

Call opening	April 1, 2020
Application deadline	August 25, 2020
Last decision date	November 9, 2020
Project start at the earliest	November 10, 2020
Project start at the latest	November 20, 2020

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Technical questions about your application in the eServices Portal  
Tel: 08-473 32 99  
[helpdesk@vinnova.se](mailto:helpdesk@vinnova.se)

Current information on the call and a link to our application service can be found at [www.vinnova.se](http://www.vinnova.se) (as well as [www.formas.se](http://www.formas.se))

### **3. What do we want to achieve with this call?**

With this call, we want to support projects that will help to achieve the overall goals of the national research programme on climate<sup>2</sup>. Through the call, we want to get 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 emissions reductions or climate-related adaptations for important needs of business or public organizations. This includes contributing to the digital restructuring and transformation of the business sector towards climate neutrality.

Project results will be utilized through the development of decision support that can contribute to climate change through significant emissions reductions or climate adaptation in business or public sector at local, regional, national or international level. This may mean that you need to look beyond today's system solutions, and not allow current legislation and regulations to be limiting.

### **Background**

Climate change presents major challenges to society. 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 done 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 power has increased very rapidly, which has significantly improved the conditions for AI applications in various domains. Evaluations indicate that the use of AI has great potential, and that AI can strengthen Swedish competitiveness and create positive societal effects.

This call explores the possibilities of using AI to contribute to reduced greenhouse gas emissions and improved adaptation to climate change. We want to achieve this without having any negative effects on other areas of society. With the call, we intend to create societal benefits and strengthen Swedish competitiveness by

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<sup>2</sup> <https://www.formas.se/en/start-page/analyses-and-results/reports/2019-05-14-research-for-meeting-the--challenges-of-climate-change.html>

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 is also a prerequisite for sustainable growth and can be found in Agenda 2030, as a goal in itself, but also as a perspective that should permeate the work on all goals. In the same manner, the broader concept of equality<sup>3</sup> should be addressed.

In this context, it means that;

- different groups (within the term equality) are given the same preconditions to take part in the grant
- different groups (within the term equality) participate in the implementation of the grant projects and as target groups
- the project results contribute to increased gender equality.

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

- develop and create AI-based decision support for reduced climate impact or climate adaptation
- develop or open areas that contribute to resource efficiency and significant societal benefits, with new knowledge and skills
- 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 knowledge as a basis for priorities regarding strategic or policy decisions for continued development
- 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 research environments with the climate in focus
- ensure ideas, knowledge and constellations can be further developed in other national and international initiatives.

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<sup>3</sup> <https://www.do.se/om-do/vanliga-fragor/fragor-om-diskriminering/vilka-ar-diskrimineringsgrunderna/> in Swedish.

## **4. Who is the call for?**

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

Authorities that are covered by the Regulation (2018: 1428) on the authorities' climate adaptation work are invited to take an active role in any project proposals.

Foreign players, 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.

## **5. What do we finance?**

### **Activities eligible for funding**

In light of the purpose of the call, we finance innovative knowledge and skills development in collaboration. The knowledge and competence that is 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.

### **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 announcement is to promote data-driven solutions for the climate and help existing collaborative environments develop competencies and practical skills in the intersection between AI and climate.

In the call, we finance the further development of a research idea 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 application should therefore take off in 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 or other research funders.

## Climate

### Climate change mitigation

All sectors must contribute to reducing climate 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, while some sectors such as forestry also have the potential to contribute to negative emissions. Sector-wide solutions and measures at system level are needed. Projects aimed at developing emission reduction solutions should clearly identify a problem area where the solution can contribute to significant emission reductions, with opportunities to scale nationally and internationally.

### Climate change adaptation

Human activity has so far caused a global warming of approx. 1.0 °C above pre-industrial levels. We are already seeing the consequences, for example in the shape of more extreme weather activity, rising sea levels and declining sea ice in the Arctic. Changes in precipitation can lead to drought, floods, infectious risks and poor health, as well as degraded water quality or lack of water. Forestry, food supply, energy supply and social security are affected. Our infrastructure will be put under enormous pressure. We need to think about how we plan our cities and communities. Without adaptation measures, the consequences for our competitiveness, labor market and economy will be great. Projects that aim to develop solutions that contribute to climate adaptation should clearly address a real need for the business or public sectors and the expected societal benefits. The application can be at corporate, local, regional or national level, with international relevance.

### Climate 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 aimed at predicting climate change as well as monitoring climate adaptation/mitigation. These models can be based on satellite, geo, environmental and sea data as well as data collected via modern sensor technology (IoT). The call aims to promote decision support that leads to concrete climate benefits. Therefore, projects that aim to develop new models and forecasting tools are expected to clearly show how they can be used in decision support leading to societal benefits - projects that are solely focusing on optimizing climate models and the like will be rejected.

## 6. Eligible costs

Our funding is through grants. Grants to parties engaged in economic activities (for example, companies) are covered by the rules on state aid and are granted on the basis of section 9 of Regulation (2015: 208) on state aid for research and development and innovation, i.e. support for research and development projects pursuant to Article 25 of Commission Regulation (EU) No 651/2014.<sup>4</sup> For this

<sup>4</sup> Read more about state aid on our website: <https://www.vinnova.se/en/apply-for-funding/rules-for-our-funding/state-aid-to-companies/>. There you will also find our general terms and conditions



call, grants are expected to be given with the grant category "industrial research". The rules govern, among other things, what types of costs and what percentage of them may be covered through grants.

## 7. What are the grants?

- In this call, a minimum of SEK 5,000,000 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](#).

## 8. Prerequisites for us to assess the application

In the assessment process, there will be international evaluators and we therefore recommend applications to be written in English. Applications in Swedish will be translated by external expertise and applicants will not be given the opportunity to review the translated application.

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

- The project must have at least three project partners, of which at least one is a research organization and one is a company or a Swedish authority at the municipal, regional or national level.
- All project partners are legal persons.
- The application must clearly show that at least 20 percent of the project's eligible costs are covered by co-financing.

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for grants and a guide to the eligibility terms: <https://www.vinnova.se/en/apply-for-funding/rules-for-our-funding/terms-and-conditions-for-our-funding/>

- 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 grant applied for is between SEK 5,000,000 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 companies apply for funding have not started.

## 9. Assessment of applications received

### What we assess?

The application must be in line with the objectives and purpose of the call given in sections 3 and 5, and will be assessed according to the criteria below. As part of the assessment, Vinnova and Formas will consider the diversity of the project portfolio in order to support 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 climate change mitigation or climate change adaptation measures.

#### Potential

- The potential of the project to contribute with significant reductions in emissions in line with the Paris Agreement and Sweden's climate goals, or to contribute to measures to adapt society to the climate changes we cannot prevent in the future.
- The potential of the project to develop knowledge and competence that can be transformed into societal benefits in the form of decision support, including the climate change adaptation of the business sector as well as the digital structural transformation of the business sector.
- The project idea in relation to international state of the art and its potential to contribute to pioneering and transformative solutions in AI and climate.
- Potential to strengthen collaboration between the climate area and AI environments - how well these areas are strengthened and cross-fertilized through the project.
- The potential of the project to contribute to increased equality<sup>5</sup>.

#### 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 were integrated into the project plan.

#### Project partners

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<sup>5</sup> In Swedish: <https://www.do.se/om-do/vanliga-fragor/fragor-om-diskriminering/vilka-ar-diskrimineringsgrunderna/>

- That the project constellation has access to the expertise, partners and networks needed to develop AI-based climate decision support.
- 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 and knowledge generated in the project.
- How well the project team is composed with regard to equality, including distribution of power and influence.

## How do we assess?

Vinnova and Formas both participate in the assessment process.

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

Schematically, the decision-making process looks as follows:

1. The application is submitted via the eServices Portal.
2. The applications that meet the formal requirements will be assessed based on the above criteria by Vinnova's specially appointed evaluators. The assessment as a whole results in a recommendation for financing.
3. Vinnova determines which projects to fund.
4. Decisions will be announced to applicants no later than 9/11 2020.

## 10. Decisions and terms

### About our decisions

How much each party in the project is granted in grants is evident from the decision. Grants will be granted on the basis of Regulation (2015: 208)<sup>6</sup> 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 expected to be given with the foundation "industrial research" (see the regulation - § 9 / Art. 25).

Vinnova makes a decision on financing and announces this to the coordinator. The decision cannot be appealed.

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<sup>6</sup> Read more about state aid and the regulation on our website: <https://www.vinnova.se/en/apply-for-funding/rules-for-our-funding/state-aid-to-companies/>

## Conditions for grants granted

For grants granted, our general conditions for grants apply. The terms include rules on project agreements, conditions for payment, follow-up, reporting and utilization of results.

Additional special conditions can be decided for 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.

## 11. 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 format<sup>7</sup>:

- 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 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.

**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.

**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 section 7 above for how to find the Model Insurance. If the declaration is not attached, then the company will be classified as a large company.

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

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<sup>7</sup> You can find templates for the attachments on our website: <https://www.vinnova.se/en/calls-for-proposals/ai-from-research-to-innovation/ai-in-climate-service/>

## **12. Who can read the application?**

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. Project data from approved projects will be transferred to Formas to the extent permitted by the Public and Privacy Act (2009: 400).