

SIO Grafen: Collaboration on commercial applications with graphene - autumn 2022

A call within the strategic innovation program SIO Grafen.

The strategic innovation program SIO Grafen is part of Vinnova's, the Swedish Energy Agency's and Formas' joint investment in strategic innovation areas. The purpose of the investment in strategic innovation areas is to create conditions for international competitiveness and sustainable solutions to global societal challenges.

SIO Grafen takes the materials of the future from the lab to the industry. We aim for Swedish companies to become world leaders in developing and using graphene and other 2D materials. In our vision, Sweden is one of the world's ten leading countries in developing and using graphene and other 2D materials industrially.

Read more about the program and the over 170 projects that have been funded so far on siografen.se.



Med stöd från

VINNOVA
Sveriges innovationsmyndighet

 **Energimyndigheten**

FORMAS 

**Strategiska
innovations-
program**

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1 The offer in brief

Taking the material of the future from the lab to the industry

In SIO Grafen’s vision, Sweden is one of the ten leading countries in the world in developing and using graphene and other 2D materials industrially.

In this call, SIO Grafen wants to accelerate Swedish innovation related to graphene and other 2D materials by collaboration projects developing and establishing new value chains, strengthening collaboration, and stimulating Swedish graphene supply.

Requirements to prepare an application:

- An industrial need at the company/companies in the project.
- An identified solution where graphene or another 2D material gives an obvious benefit.
- Partners with ability to develop a value chain supporting future implementation and use.
- A number of partners in the project according to the project form.
- At least one Swedish¹ company in the project.

All projects in the call should contribute to SIO Grafen’s vision and effect logic, Appendix 1. SIO Grafen focuses on graphene and other 2D materials. Material types included in the call are described in Appendix 2.

Three project forms are offered within the call: *Feasibility study*, *Innovation project*, and *Demonstrator project*.

Schedule for the call

All dates are preliminary. For updated information, please go to [vinnova.se](https://www.vinnova.se).

The call opens:	21 June 2022
Deadline for applications:	8 December 2022, at 14:00 CET
Decision date, latest:	17 February 2023
Earliest date for project start:	20 February 2023
Latest date for project start:	14 April 2023

¹ “Swedish” company refers to a Swedish-registered limited liability company or a foreign company that has a branch or place of business in Sweden and where the costs of the project are attributable to the branch's or place of business's operations.

Webinar

A webinar presenting the call will take place 14 September at 14.00. Registration to the webinar is made at siografen.se, heading *Nyheter/Kalender*.

Contact person regarding the call's background, aim and effects:

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Application support:

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jon.wingborg@siografen.se

Contact person regarding the assessment process, legal issues and other questions about the content of the call:

Andrew Marais, Programme and call manager at Vinnova

Phone: 08-473 3090

andrew.marais@vinnova.se

Administrative matters:

Marie Wikström

Phone: 08-473 3179

marie.wikstrom@vinnova.se

Vinnovas IT-support:

Technical questions about your proposal in the application service portal (Intressentportalen)

Tel: 08-473 32 99

helpdesk@vinnova.se

Up-to-date information about the offer and a link to our application service portal is available at vinnova.se.

2 What does SIO Grafen want to achieve with this call?

Taking the material of the future from the lab to the industry.

In SIO Grafen's vision, Sweden is one of the ten leading countries in the world in developing and using graphene and other 2D materials industrially. SIO Grafen projects are the enablers making us fulfil the vision.

All projects should be based on an industrial need that has an identified solution where graphene or any other 2D material gives an obvious benefit. The projects should develop and establish new value chains, strengthening collaboration, and stimulating Swedish graphene supply.

Three project forms are offered within the call: *Feasibility study*, *Innovation project*, and *Demonstrator project*. The project types are described in chapter 5.

Requirements to prepare an application:

- An industrial need at the company/companies in the project.
- An identified solution where graphene or another 2D material gives an obvious benefit.
- Partners with ability to develop a value chain supporting future implementation and use.
- A number of partners in the project according to the project form.
- At least one Swedish² company in the project.

All projects financed in the call should contribute to the vision and effect logic of SIO Grafen, as shown in Appendix 1.

The call will contribute to make more results available for free and for all, scientific contributions must be published in open access.

Contribution to Agenda 2030

SIO Grafen encourages the actors to collaboratively develop their innovation capacity and create new solutions that contribute to the goals for sustainable development stated in Agenda 2030.

Projects within SIO Grafen contributes to reach the goals for sustainable development in Agenda 2030³. Examples of contributions from projects within SIO Grafen are: improved resource effectiveness by extending products' lifespan, increased energy effectiveness by improved batteries, and fighting infectious

² "Swedish" company refers to a Swedish-registered limited liability company or a foreign company that has a branch or place of business in Sweden and where the costs of the project are attributable to the branch's or place of business's operations.

³ See <https://www.vinnova.se/m/agenda-2030/>

diseases by creating anti-bacterial surfaces. The application should describe how your project contributes to reach the Agenda 2030 goals, evaluated in the assessment process.

The projects are expected to contribute to gender equal development by ensuring that both women and men take part in grants in an equal way, that they have influence over the project and that they actively participate in the project's implementation. The projects financed in the call should prepare to integrate this perspective in future work.⁴

One other aspect concerns analysing whether gender aspects are relevant for the intended solutions problem area and utilization. This is a question mandatory to answer for all applicants and can be found under the heading “Projektuppgifter” in the application. The question will not be evaluated for this call.

For more information, a webinar on “How to create equal projects” was held in connection to a SIO Grafen call in 2020. The webinar (in Swedish) is available using the link <https://www.gotostage.com/channel/siografen>.

3 To whom is the call directed?

The offer is directed to companies, research institutes, universities, or other legal entities who, in collaboration, would like to develop graphene and other 2D materials for industrial applications.

The required number and type of partners in the project consortium depend on the project form:

- Feasibility study: at least **two partners**, of which at least **one company**.
- Innovation projects: at least **three partners**, of which at least **two companies**.
- Demonstrator projects: at least **three partners**, of which at least **two companies**.

One Swedish company⁵ is required to be part of the project consortium for all three project forms.

Foreign actors, without a registered branch or place of business in Sweden, can be included as project partners if they are an important part of the project's value chain. The application should motivate in what way the organization contributes

⁴ Find out more about what Vinnova's work for equal innovation means for those who are applying for funding from Vinnova: <https://www.vinnova.se/en/m/equal-innovation/>

⁵ Swedish" company refers to a Swedish-registered limited liability company or a foreign company that has a branch or place of business in Sweden and where the costs of the project are attributable to the branch's or place of business's operations.

to a value chain that supports Swedish industries and their competitiveness. Participation in the project is on equal terms as other partners with the exception that the foreign actor cannot receive support from Vinnova. However, the in-kind work of the organization is included in the total budget of the project, meaning that they are co-financing at least 50 percent of the projects total eligible cost not financed by Vinnova.

4 What is funded?

4.1 Activities eligible for funding

The type of project activities that can be funded in this call should be included in one of the support types **Feasibility study** (Feasibility study), **Industrial research** (Innovation project), or **Experimental development** (Demonstrator project). A short description of the different support types are found in [Stödnivåer, definitioner m.m. för bidrag enligt Vinnovas stödordning](#) (in Swedish).

The project should relate to one of SIO Grafen's areas of strength: Biotechnology, Composites, Electronics, Energy, Manufacturing, or Surface coatings.

The project should develop applications of graphene and other 2D-materials demanded by the companies in the consortium. The applications should be based on development of graphene or any other 2D materials to improve material properties or functions:

- of the graphene or 2D material,
- for a composite with graphene or any other 2D material,
- in the manufacturing process,
- or in the function of a product or application.

SIO Grafen do not finance project proposals based on using or integrating an already developed graphene product in an application.

SIO Grafen covers all types of 2D materials. When the call text states graphene, it includes all other types of 2D materials according to the definition in Appendix 2.

4.2 Conditions for receiving funding

Our funding is provided in the form of grants. Funding for organizations that operate economic activities is subject to regulations regarding state aid.⁶ These

⁶ Read more about state support on Vinnova's website: <https://www.vinnova.se/sok-finansiering/regler-for-finansiering/statligt-stod/>. There you will also find Vinnova's general terms and conditions for grants and an instruction to eligible costs: <https://www.vinnova.se/sok-finansiering/regler-for-finansiering/allmanna-villkor/>

regulations govern which costs and what proportion of these costs may be covered by the grant. The basic conditions for a cost to be eligible are that it must:

- Be carried by the applicant organization.
- Be attributable to the project.
- Have arisen during the project period.
- Be determined in accordance with the applicant's usual accounting principles and good accounting practice.
- Be in accordance with the applicant's internal policies and guidelines.

Accounting for project costs must be separated in the accounting from the applicant's other transactions.

Please observe that different support types can be applicable depending on the activities in the project. Because of this, the maximum level of support per partner could vary. Read more in [Stödnivåer, definitioner m.m. för bidrag enligt Vinnovas stödordning](#) (in Swedish).

5 Project forms

Three types of projects can be applied for:

- Feasibility study
- Innovation project
- Demonstrator project

The project forms support different phases in the development of an idea towards a product, and therefore involve different demands on the level of technology maturity, maximal budgets and longest possible project time.

Figure 1 shows how the project forms relate to the Technology Readiness Levels, TRL. TRL is a method to describe the maturity level of a technology.

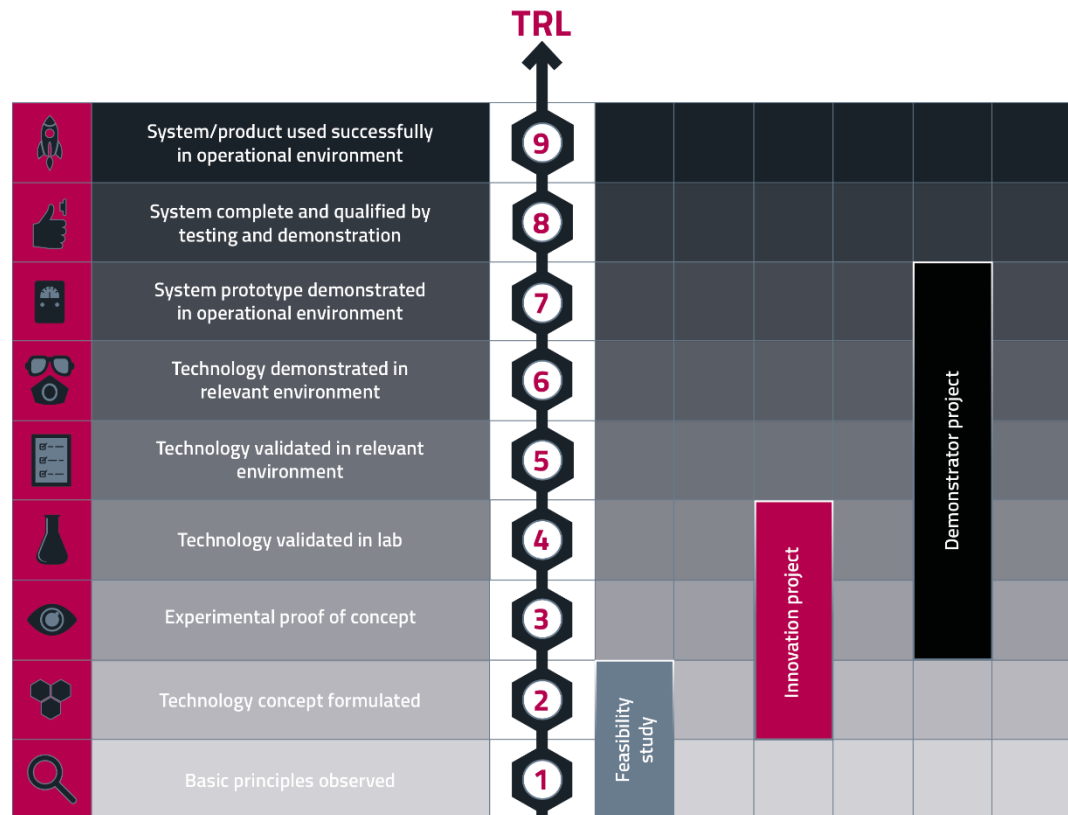


Figure 1 The three project forms in the call related to TRL.

SIO Grafen is further planning project calls covering all three types of project forms in 2023 and 2024. No calls are planned after 2024.

5.1 Feasibility study

Requirements to apply for a Feasibility study:

- An industrial need.
- An idea for an innovative solution based on developing graphene or any other 2D material (according to definition in Appendix 2).
- A need to investigate either technical, commercial, or intellectual property related conditions.
- At least **two partners**, of which at least **one company**.
- At least **one Swedish company** should be part of the consortium.
- One company in the consortium should intend to implement the result of the project in their future operations.

Examples of activities in the project:

- To perform an extended literature study.

- To investigate market potential or patent landscape.
- To find additional partners for an upcoming project.
- To perform experimental or theoretical studies to verify the idea.

Expected results:

- The projects level of maturity is minimum at TRL 2.
- Knowledge about if the idea has technical and commercial potential to move on to a new application within SIO Grafen.
- Knowledge about question that needs to be solved.
- A first idea about how the results could be implemented.
- Knowledge about which actors are needed to develop the value chain in a new project.

Maximum grant is SEK 300,000.

Longest project time is 9 months.

5.2 Innovation project

Requirements to apply for an Innovation project:

- An industrial need.
- An innovative solution at minimum TRL 2. The solution should be based on development of graphene or any other 2D material (according to definition in Appendix 2).
- Identified knowledge gaps demanding material development, concept development, and testing before the concept can be taken further.
- At least **three partners** along a value chain, of which at least **two companies**.
- At least **one Swedish company** should be part of the consortium.
- One company in the consortium should intend to implement the result of the project in their future operations.

Examples of activities in the project:

- To develop and characterize a material.
- To simulate and validate a simulation.
- To develop concepts for laboratory tests
- To develop manufacturing concepts.
- To validate a concept in the laboratory.

Expected results:

- The project has increased the concept's TRL at least one step.
- Knowledge about the concept's functionality and industrial potential.
- Knowledge beyond state of the art on graphene or other 2D materials and their applications.

- Creation of a plan for implementation of the results.
- Knowledge about new partners needed to strengthen the value chain.

Maximum grant is SEK 3,000,000.

Longest project time is 36 months.

5.3 Demonstrator project

Requirements to apply for a Demonstrator project:

- An industrial relevant concept at minimum TRL 3. The concept should be based on graphene or any other 2D material (according to definition in Appendix 2).
- At least **three partners** along a value chain, of which at least **two companies**.
- At least **one Swedish company** should be part of the consortium
- One company in the consortium should intend to implement the result of the project in their future operations.

Examples of activities in the project:

- To produce a physical prototype.
- To validate in laboratory of simulated environment.
- To demonstrate in simulated or real environment.
- To develop new concepts for manufacturing or up-scaling.

Expected results:

- The project has increased the concept's TRL at least two steps.
- Validation of the concept in relevant environment, that is the concept has reached at least TRL 5.
- Production of a physical demonstrator.
- Knowledge beyond state of the art on graphene or other 2D materials and their applications.
- Knowledge of implementation and communication of the results.
- Creation of the complete value chain.

Maximum grant is SEK 4,000,000.

Longest project time is 36 months.

6 How much funding is available?

The total budget of the call is expected to be SEK 12 million.

The maximum grant may not exceed 50 percent of the project's total eligible costs. The remaining funding shall come from participating project partners' in-kind.

Note that the maximum support level per *project* is not the same as the maximum allowable support level per *project partner*. The level of support for each project partner is limited for companies by the rules on state aid (section 4).

Feasibility study

The grant can reach a maximum of SEK 300,000 per project.

Innovation project

The grant can reach a maximum of SEK 3,000,000 per project.

Demonstrator project

The grant can reach a maximum of SEK 4,000,000 per project.

7 Prerequisites for us to assess the proposal

We will only assess applications that meet the following formal eligibility requirements:

- The project parties are legal entities.
- The coordinator is registered in Sweden.
- Project partners that apply for funding are either registered in Sweden or have a registered branch or place of business in Sweden.
- At least one Swedish⁷ company in the project consortium.
- The application strictly follows all instructions and mandatory templates and appendix given in section 10.
- The proposal is written in Swedish or English.

For Feasibility studies it is also required that:

- The project consortium should consist of minimum **two parties**, of which at least **one companies**.

For Innovation projects and Demonstrator projects it is also required that:

- The project consortium should consist of minimum **three parties**, of which at least **two companies**.

⁷ “Swedish” company refers to a Swedish-registered limited liability company or a foreign company that has a branch or place of business in Sweden and where the costs of the project are attributable to the branch's or place of business's operations.

8 Assessment of applications

8.1 What do we assess?

The project proposal will be assessed on the basis of the following criteria:

Potential

- That development connected to graphene or any other 2D material (as described in Appendix 2) is part of the project.
- That the goal of the project contributes to the vision of SIO Grafen, where Sweden is one of the ten leading countries in the world in developing and using graphene and other 2D materials (as described in Appendix 2) industrially.
- That the result of the project is of importance for the competitiveness of Swedish industry.
- That implementation of the result of the project has a positive contribution to the global goals in Agenda 2030.
- That the project is innovative and contributes to knowledge beyond state-of-the-art.

Actors

- That the project consortium has the appropriate competence, ability, and commitment for the project.
- That the composition of the team is done with respect to women and men taking part in the grant and influencing the project in an equal way.
- That the project develops or strengthens the Swedish value chain for graphene or any other 2D-material (as described in Appendix 2).

Feasibility

- That the project form corresponds to the TRL of the solution developed in the project.
- That the goals set out in the project plan are clear, measurable and that the activities are described with realism, credibility and are relevant in relation to the goals.

8.2 How do we assess?

The proposals are assessed in competition with all other proposals received. The assessment is based on the electronic proposal submitted to Vinnova via Vinnova's portal (see section 10).

The proposals are evaluated by an external evaluation panel specially appointed by Vinnova. The evaluator panel gives a recommendation to Vinnova.

Vinnova decides about financing based on the recommendation of the evaluator panel, taking into account any opinion regarding the program portfolio made by the strategic innovation program SIO Grafen.

9 Decisions and conditions

9.1 About Vinnova's decisions

How much each party in the project is granted in funding is stated in the decision. Funding can be granted based on Article 25 of European Commission Regulation No. 651/2014. Funding can also be given in accordance with ordinance (2009: 1101) with instructions for the Swedish Agency innovation system. The basis for the grant will be specified in the decision letter and it determines which costs are eligible for funding.

Vinnova's decision to grant or reject a proposal cannot be appealed.

9.2 Terms and conditions for grants

For granted funding, our general terms and conditions for funding apply⁸. The terms and conditions include rules on project agreements, conditions for payment, follow-up, reporting and utilization of results. Scientific publications shall be available in open access in accordance with Vinnova's instructions⁹.

Since the call is made within the framework of strategic innovation programmes, the following special conditions also apply:

- The project must be represented by at least one project partner at Swedish Graphene Forum, organized annually by SIO Grafen.
- When informing about the project and at all publication of project results, it must be stated that: the work has been carried out within the strategic innovation program SIO Grafen, a joint effort by Vinnova, Formas and the Swedish Energy Agency.
- At the same time as the project's final reports are made to Vinnova, a public summary of the project results must also be sent to SIO Grafen via e-mail – info@siografen.se. The summary should disseminated and published freely and can therefore not contain confidential or sensitive information.

⁸ . You can find the terms and conditions, together with help to understand and fulfil the conditions [Terms and conditions for Vinnova funding | Vinnova](#). Please note that we have translated our terms and conditions from Swedish. If there are differences between the English and Swedish versions, the Swedish version applies

⁹ [Anvisningar för öppen tillgång till vetenskapliga publikationer](#)

The following also applies to the relation between the project and the program office of SIO Grafen:

- The Project Summary sent to SIO Grafen will be published on siografen.se when the project starts.
- The projects should support SIO Grafen with examples of applications and success stories that can be disseminated without restriction.
- One year after the project's final date questions regarding the effect of the project should be answered and made available to SIO Grafen.

NOTE! Project summaries at project start and end of projects must be able to be distributed and published freely and must not contain confidential or otherwise sensitive information.

Additional specific conditions may be decided for individual projects.

If you do not comply with Vinnova's terms and conditions, you may be liable to repay. This also applies if you have been awarded a funding incorrectly or with too high an amount.

10 How to apply

To apply for funding, fill in a web-based form on Vinnova's portal (Intressentportalen), which can be accessed via www.vinnova.se. In addition to the web-based form, you also upload the following mandatory attachments¹⁰:

- **The project description** according to the template found on the website of the call. The description should include a maximum of 10 standing A4 pages beyond page 1 (page 1 includes "Project title", "Project facts" and "Summary" in the template)
The text should be written in Swedish or English with 12-point black text. References to any information on web pages and similar are not taken into account by the evaluators when assessing. The proposal should cover all parts, including format and heading in tables.
- **CV-appendix** according to the template found on the website of the call. The appendix should include relevant CVs for the project manager and all key people in the project team. At least one CV from each project partner should be included.

In direct connection with submitting the proposal to Vinnova, the appendix Project Summary must also be sent to the program office for SIO Grafen via e-mail to info@siografen.se. The Project Summary must be freely publishable and must therefore not contain confidential or otherwise sensitive information.

¹⁰ Templates for the attachments, specific for this call by SIO Grafen, can be found on Vinnova's website: <https://www.vinnova.se/e/strategiska-innovationsprogrammet-for-grafen/samverkan-kring-kommersiella-2022-01461/>

Keep in mind that it takes time to make a proposal. You can start filling in details, save, and continue at a later stage. When your proposal is complete, mark it as ready. You can at any time fully unlock the proposal and make changes, right up to the last proposal date.

Mark the proposal ready well in advance of the call deadline.

When the call has closed and the proposal has been registered, a confirmation will be sent out by e-mail to you who are responsible for the user account, project manager and company signatory/head of department. It may take a few hours for you to receive the confirmation.

If you have not received a confirmation email within 24 hours of the call closing, please contact us.

When the proposal period has expired, the completion of the proposal can only be done at the request of Vinnova.

11 Who can read the proposal?

Proposals submitted to Vinnova become public documents. Vinnova does not disclose information about an individual's business or operating conditions, inventions, and research results if it can be assumed that any individual will suffer harm if the information is disclosed.

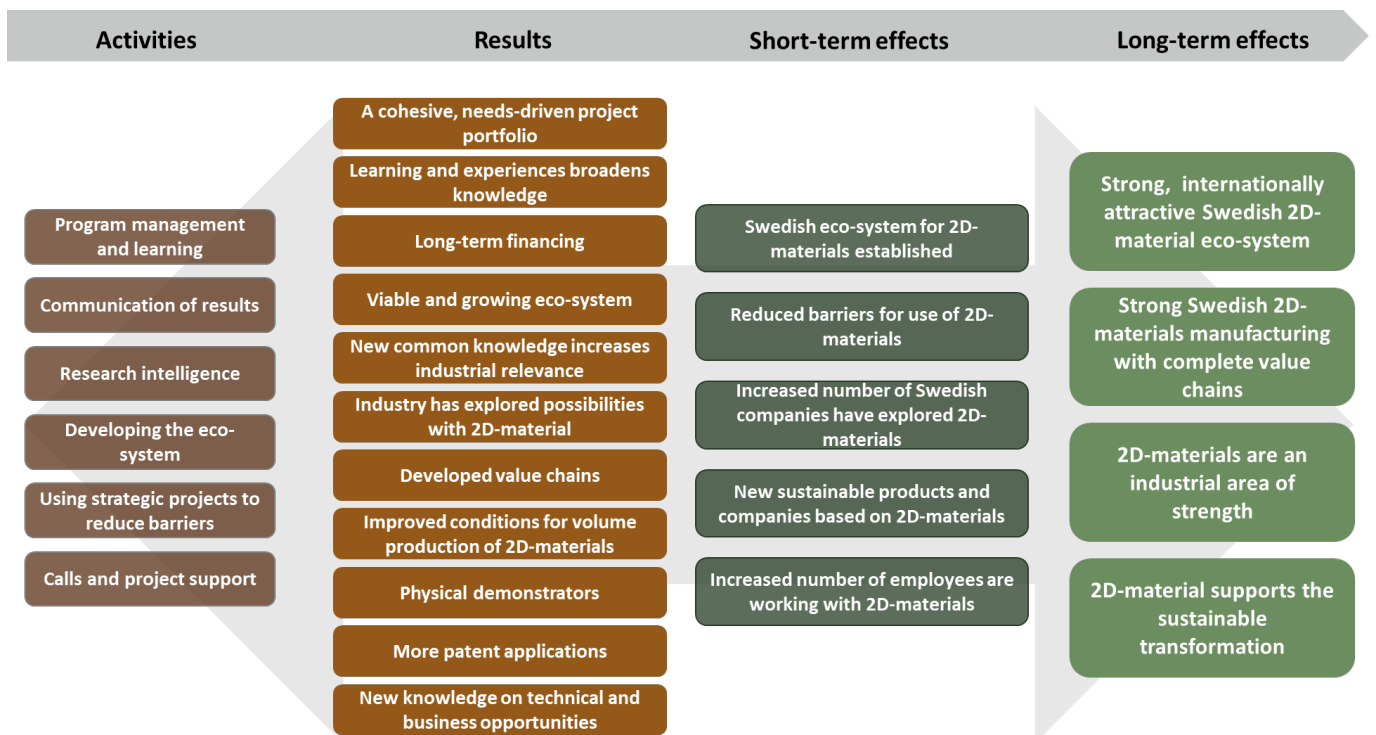
Documents sent to SIO Grafen's program office, for example the Project Summary, are not covered by Vinnova's confidentiality regulations

Appendix 1 – SIO Grafen’s vision and effect logic

The vision of SIO Grafen:

In SIO Grafen’s vision Sweden is one of the ten leading countries in the world in developing and using graphene and other 2D materials industrially

SIO Grafen’s effect logic:



Appendix 2 – Definition of graphene and other 2D materials

In this call graphene and other 2D materials are defined as:

- One-layer graphene
- Few-layer graphene (FLG), that is material dominated by 2–10 atomic layers of graphitic carbon in a two-dimensional structure (sp²-hybridized).
- Graphene oxide, GO, or reduced graphene oxide, rGO, (the content is dominated of 1–10 atomic layers).
- 2D-materials (the content is dominated by 1–10 atomic layers) based on other species of atoms such as MoS₂, WSe₂, BN and so on.
- Functionalized materials based on any of the four categories above.

Not included in the call is graphite (over 10 atomic layers of carbon), carbon nano tubes and structures alike, neither surface coatings with diamond-like carbon (DLC).

Please contact the program office of SIO Grafen via info@siografen.se if you have any questions about graphene or other 2D materials.