

The Produktion2030 Strategic Innovation Programme Spring 2015

A call for proposals within the Produktion2030 Strategic Innovation Programme

1 Summary

The Produktion2030 Strategic Innovation Programme is part of VINNOVA's, the Swedish Energy Agency's, and the Swedish Research Council Formas' joint efforts concerning strategic innovation areas.

The purpose of the strategic innovation programme is to create preconditions for international competitiveness and sustainable solutions to global social challenges.

Through this call for proposals, Produktion2030 and VINNOVA invite project groups consisting of companies, universities, and research institutes to apply for grants. These groups should be able to, and interested in, jointly developing new solutions that contribute to the aim and objectives of the Produktion2030 strategic innovation programme. Applicants are welcome to submit their applications by 2 PM on 10 March 2015.

This call for proposals includes all of the programme's six areas of strength. This call for proposals has a budget of SEK 20 million. Individual projects should apply for at least SEK 3 million. More information about Produktion2030 is available at www.produktion2030.se. Information about projects within strategic innovation is available at www.vinnova.se/sio.

The latest information about the call for proposals, the invitation to participate, and a link to the application form can be found at www.vinnova.se under "For applicants", "Calls for proposals".

2 Description of the Produktion2030 strategic innovation programme

2.1 Background and Goals

The Produktion2030 Strategic Innovation Programme is part of VINNOVA's, the Swedish Energy Agency's and the Swedish Research Council Formas' joint efforts concerning strategic innovation areas.

The purpose of the strategic innovation programme is to create preconditions for international competitiveness and for sustainable solutions to global societal challenges.

Strategic innovation programmes support this by generating new knowledge, creating new networks, and strengthening existing research and innovation efforts in the field.

Produktion2030 is focuses on six areas of strength where Swedish industry, academia and research institutes excel internationally, but in which on-going development and innovation is necessary to strengthen competitiveness.

Produktion2030's Areas of Strength
1. Sustainable and resource-efficient production
2. Flexible manufacturing processes
3. Virtual production development and simulation
4. Human-centred production systems
5. Product- and production-based services
6. Integrated product and production development

A more detailed description of the programme's areas of strength and the challenges involved can be found in the strategic research and innovation agenda *Made in Sweden 2030*. It can be downloaded at www.produktion2030.se.

This is the second in a series of calls for proposals to be issued during the period 2014-2018. The overall aims for all Produktion2030 projects are: high levels of private sector involvement, cooperation between industry, academia, and institutes, as well as a focus on technical maturity of results corresponding to Technology Readiness Levels 4-7¹.

¹ For a definition of TRLs, see

http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-g-trl_en.pdf

2.2 Aim and objective for the strategic innovation programme

The aim of Produktion2030 is to initiate projects and activities until 2018 or longer. Its objective is to make Sweden a world leader in long-term sustainable production.

3 Who may apply

The call for proposals is aimed at consortia of companies, research institutes, universities, and other legal entities active in Sweden. These are to have ability to, and an interest in, collaborating to develop new solutions and to contribute to the objectives of the Produktion2030 strategic innovation programme.

A requirement for funding through this call for proposals is that the consortium consists of at least two research entities and at least three companies. Research entities are universities and research institutes. Any Swedish actor in a consortium may act as a coordinator for the project.

4 Description of the call for proposals

4.1 Aim of the call for proposals

The aim of this call for proposals is to create research and innovation projects that can contribute to competitive and sustainable production, as well as strengthen cooperation between businesses, academia, and research institutes.

4.2 Content and implementation

This call for proposals addresses all six areas of strength. Its total budget is SEK 20 million. Each project should apply for at least SEK 3 million and be adapted to suit the project's objectives and activities.

The following description of challenges within each area of strength identifies the focus of this call for proposals. Each project application should clearly state which of the six areas of strength the project is based in. Each project should achieve at least one of the expected impact goals.

5 Challenges and expected results and impact goals for this call for proposals

The projects must result in new methods, methodological development, pilot systems, test beds, or demonstrators. The results must be tested and/or implemented in an industrial environment either during or shortly following the project.

Each project must be able to demonstrate an increase in TRL of at least one level, so as to achieve a TRL of between 5 and 7.

5.1 Area of strength 1: Sustainable and resource-efficient production

5.1.1 Background

Sustainable and resource-efficient production strategies of manufacturing companies may take the form of corporate social responsibility, environmental improvements and profitable growth. Many companies today work on sustainability issues, but very few have succeeded in making sustainability a clear and integrated part of their strategies and day-to-day work. A sustainable materials supply is needed, for example, through a circular economy, a recently emerged concept that is currently used within the EU.

5.1.2 Focused challenges

The challenges for the area of strength are to develop methods, tools, and techniques for evaluation, implementation, and decision-making support for holistic sustainability within production. There is also a need to enable links between sustainable production strategies and the surrounding community with its sustainability requirements.

5.1.3 Expected impact goals (at least one must be achieved by the project)

- Increased efficiency and measurability within the company's management system and production strategies, in which the three dimensions of sustainability are integrated (i.e. social, economic, environmental sustainability).
- Demonstration(s) of method(s) for a circular economy that move parts of a company's production practices at least one step higher in the "waste hierarchy"*.
- Demonstrated reduction of the use of non-renewable raw materials within a chosen production chain.

**) The "waste hierarchy" (from its lowest to its highest level) is defined as follows: disposal, energy recovery, recycling, re-use, minimisation, and prevention.*

5.2 Area of Strength 2: Flexible manufacturing processes

5.2.1 Background

Future production systems will be steered towards a dynamic state, rather than towards an ideal state, by being both adaptive and robust. Such systems will be characterized by adaptability at all levels. This will create opportunities for automation of short series and the ability to quickly create new supply chains. The manufacturing process' data, information and knowledge structures will facilitate flexibility.

In today's operative production control, the Manufacturing Execution System (MES) level is a low priority when it comes to investments, while, as a rule, the Enterprise Resource Planning (ERP) level is both well implemented and prioritized. This creates gaps in the information chains, both vertically within companies and horizontally along the value chain.

In the future, production data is expected to be accumulated for each product and process, together with other relevant information and knowledge. This enables validation of production data in relation to design data. Each unit produced will be able to carry with it all the data needed in order to trace its origin. This simplifies traceability in the case of production errors and facilitates remanufacturing and recycling.

5.2.2 Focused challenges

- Improved and more standardized solutions for the fast and effective management of product and production data within a specific company, as well as between product owners and sub-suppliers.
- Simplification and automation of preparatory work to generate efficient production solutions that utilize and reuse product and production data.
- Development of new methods for using products as information carriers.
- Development of methods and models for reusing data and knowledge derived from the manufacturing process during the development of new products.
- New interfaces and standards for communication between production equipment.

5.2.3 Expected impact goals (at least one must be achieved by the project)

- Radically increased product quality in cases of major and rapid variations in production volume/demand.
- Radically reduced lead-time for production changeover between different products.
- Radically reduced amount of scrapped material during the running-in and ramp-up period.

5.3 Area of strength 3: Virtual production development and simulation

5.3.1 Background

The use of digital models and simulation during development of complex products and production systems can include virtual factories for optimization and planning or visualization for product development, geometry assurance, material testing and production layout and work performed by people. Virtual technology is also used for skills development and training. The area can be divided into data acquisition, data enhancement, and visualization and work strategies. This call for proposals focuses primarily on data enhancement and visualization.

5.3.2 Focused challenges

Industrial decision support systems require access to relevant and high-quality information, e.g. relevant product and process data, throughout the product life cycle. A key challenge is to create easily-access data structures, new analysis methods, optimization strategies and visualizations that provide the important final link to the decision-maker. Major challenges also lie in quickly identifying and extracting potentially valuable data from big data that must then be structured, enhanced and modelled for analysis and decision-making purposes. Inadequate data may need to be supplemented in a smart way and data can be used to auto-generate simulation models.

5.3.3 Expected impact goals (at least one must be achieved by the project)

- Major reduction in resources for compiling information for decision-making
- Better use of available data for better and faster decision-making
- Improved precision in decision-making through clear integration of the data flow, from source to visualizations presented to decision-makers.

5.4 Area of Strength 4: Human-centred production system

5.4.1 Background

Future production systems will be highly complex, requiring competent individuals to work together in new kinds of teams characterized by a strong capacity for change. Close human collaboration, automation, technical systems, robots, and information systems are also becoming increasingly important. This also increases requirements on work distribution, decision-making, safety, mobility, and complex communication.

Production work is thus increasingly becoming knowledge-work, characterized by collaboration, broad expertise, communication, innovation, and effective problem-solving.

5.4.2 Focused challenges

This call for proposals focuses on the following challenges:

- To achieve efficient communication and knowledge sharing in local, regional, and global networks of companies. Companies should be able to more effectively utilize the expertise of individual employees by strengthening, compensating and distributing knowledge support based on human needs.
- To create effective and safe collaboration between people and automation, where the human is controlling the situation and can anticipate courses of events that are dangerous or that can cause long-term damage.
- To identify new and effective methods for interaction and the real-time control of production. Here, new ways of communicating through technology using multimodal communication (images, text, film, etc.) are required. Different forms of communication also influence teamwork, individual work, remote work, mobile work, etc.

5.4.3 Expected impact goals (at least one must be achieved by the project)

- Radical increase in the security of the information flow and knowledge transfer between people in local, regional or global networks of companies.
- Increased security/safety and efficiency in the physical collaboration between people and different types of automation in production contexts.
- Radical reduction in change-over times by increasing the personalization of information technology, e.g. instructions, system monitoring, and decision-making support.
- Shorter and better defined lead times through better methods and tools for real-time control and efficient collaboration between production equipment/automation and people.

5.5 Area of strength: Product- and production-based services

5.5.1 Background

The manufacturing industry invests heavily in added value through development of services. In addition to physical products creating value for customers, value is also created through use of the product and services integrated with it. From this perspective, production systems may also be seen as enablers for creating a greater range of services and new business models.

5.5.2 Challenges

The quality of the manufacturer's product and service offerings needs to be improved. Product and service offerings need to be integrated better. How can the product service content be significantly increased and how can the production system support the development, use, and circular business models (e.g. maintenance, remanufacturing and recycling)?

Another challenge is the lack of effective methods for simulating the effects of different production and logistics solutions in circular business models and of how adjustments to product design affect production systems, maintenance etc. The products may need to carry the information needed to make information flows and production processes efficient. The amount of information in integrated solutions can then entail the management of a very large quantity of data on the product's performance, how it is used and its reliability. This information can also be used to improve service and performance for the customer.

5.5.3 Expected impact goals (at least one must be achieved by the project)

- The delivery to the customer should include greatly increased service content through new business models in which the product is a carrier of services and where product and production system are adapted to suit new, circular business models.
- Physical products should carry a large quantity of data with them for guiding manufacturing processes, for remanufacturing/recycling and for improving the quality of the delivery of services to customers and the use of physical products.

5.6 Area of Strength 6: Integrated product and production development

5.6.1 Background

Increasing integration and digitalization of product and production development shortens development times and improves competitiveness. The area includes technical challenges in using various simulation tools and the mapping of material properties, but also in information management, work methods and increasing sustainability requirements. Parts of products, e.g. hardware, software, services, digital products, support systems etc. as well as production systems are expected to be integrated and developed in parallel, all adapted to suit the selected business model. Development is carried out virtually so that all relevant life cycle aspects, such as environmental impact, manufacturability, customer value, aesthetics, performance, operations management, and more, can be optimized.

5.6.2 Challenges

Important challenges include being able to predict relevant life cycle aspects – environmental impact, producibility, material properties and ultimate performance – in early development phases.

Products, production systems and new types of manufacturing processes should be able to be developed, optimized, and validated faster and at a higher quality early in the development process. Late-stage customer requirements should be able to influence the implementation of new products in the production system faster and more effectively. Other challenges concern information exchange and communication in a global society and across both geographical and cultural boundaries and between production facilities and product development centres.

5.6.3 Expected impact goals (at least one must be achieved by the project)

- Reduced development time and increased quality due to increased parallelization and integration of product and production development work in early development stages.
- Reduction of the number of physical prototypes by 50% through increase of the number of products where the product and production system are developed and verified virtually.
- Radical improvement of industrial ability to utilize opportunities from additive manufacturing through new, models for virtual/digital product and production development.

6 Prerequisites for financing

6.1 Budget

	2015	2016	2017	Total
Budget for this call for proposals	SEK 10,000,000	SEK 10,000,000	-	SEK 20,000,000

The total budget of this call for proposals will be divided between projects within the six areas of strength. The budget for the current call for proposals is SEK 20 million, distributed according to the table above. Each project should require at least SEK 3 million and be adapted to suit the project's objectives and activities. The percentage of funding applied for per project should not exceed 50 per cent.

The programme's other instruments will be used to disseminate the results to more actors and to transfer new methods and knowledge to more businesses and organizations.

The members of the projects' consortia are expected to participate in relevant conferences and information meetings held as part of the programme within the proposed budget.

Each project shall establish a consortium agreement, signed by all parties, that regulates intellectual property matters. This agreement should be finalized no more than two months after the project begins.

6.2 State aid rules

Grants given by VINNOVA to businesses and other organizations that conduct commercial activities are restricted by the rules governing state aid.

Grants are given based on VINNOVA's Regulation on State Aid for Research and Development and Innovation (SFS 2008:762), or on an equivalent regulation that is in force when the decision to grant funding is made², or, alternatively, based on the Commission Regulation (EU) No. 1407/2013 on the application of Articles 107 and 108 of the Treaty of the Functioning of the European Union to de minimis aid, also known as lesser aid or aid of minor importance.

² The Swedish government has announced that a new financing regulation will be adopted in early 2015.

In the majority of cases, these rules mean that the company or organization will only receive a grant for a certain percentage of its eligible costs or for a limited amount³.

Each project partner is responsible for ensuring that the received funding does not exceed the support level allowed according to the rules for state aid.

6.3 Eligible costs

For *the project as a whole*, the specific details of the call for proposal determine what percentage of the total eligible costs VINNOVA's contribution can cover (in this case, 50 per cent).

Individual project partners' eligible costs (the costs each project partner incurs for implementing the project) can be partly or fully covered by grants from VINNOVA. That part covered by VINNOVA's contribution is termed a 'support level' and is expressed as a percentage. The maximum support level is determined per grant recipient, as different rules apply for different types of organizations and projects. The maximum allowable support level per grant recipient is **not** determined by the specific details of the project as a whole. The costs deemed eligible depend on the project's character and content and are indicated in VINNOVA's Regulation on State Aid for Research and Development and Innovation (SFS 2008:762). The document **Guide till VINNOVAs villkor om stödberättigande kostnader**⁴ (in Swedish only) explains which costs are considered eligible.

7 Timetable

The following dates apply for this call for proposals. Please note that these are tentative. For up-to-date information, see www.vinnova.se.

Application process, spring 2015

Opening date:	15 January 2015
Information meeting at VINNOVA:	20 January at VINNOVA, Stockholm
Closing date for applications:	10 March 2015, 2 PM
Date of decision:	3 June 2015
Earliest date for project commencement:	1 July 2015

8 Formal requirements

We wish to particularly emphasize the following requirements:

³ See VINNOVA's Regulation on State Aid for Research and Development and Innovation (SFS 2008:762) at <http://www.vinnova.se/sv/Ansoka-och-rapportera/Regler-och-villkor/Regler-for-statligt-stod/> (in Swedish).

⁴ See <http://www.vinnova.se/sv/Ansoka-och-rapportera/Regler-och-villkor/>

- The project should not have commenced prior to submission of the application.
- All project partners must be legal entities.
- The project must not begin before 1 July 2015.
- The project period shall not exceed two years, and the percentage of funding applied for per project must not exceed 50 per cent of the total budget.
- The consortium must include at least two research actors and at least three companies. Research entities are universities and research institutes. Any Swedish actor in a consortium may act as a coordinator for the project.

If one or more of the above requirements is not met, the application will not be considered.

9 Assessment

9.1 Assessment Process

Applications will be assessed in competition with other submitted applications. Assessments will be based on the electronic applications submitted to VINNOVA via VINNOVA's eServices Portal (see Section 9).

The decision-making process follows the following schedule:

1. Application submitted via the eServices Portal.
2. The project summary is to be e-mailed to Produktion2030's programme management at: cecilia.warrol@Produktion2030.se
3. Applications that meet the formal requirements will be assessed by external, independent experts based on the stated assessment criteria. This will result in a recommendation concerning financing and a ranking of the applications.
4. Representatives for the Produktion2030 strategic innovation programme will have the opportunity to comment on the reviewers' recommendation.
5. If necessary, VINNOVA will conduct interviews with representatives of the applying project consortia.
6. VINNOVA decides which projects will receive financing based on the financed projects' own contributions to the balance in the strategic innovation programme's project portfolio.
7. Decisions will be sent to applicants and the strategic innovation programme's management will be informed of the results.

Applications must **clearly address** the issues listed under each assessment criterion below. To simplify the assessment, VINNOVA recommends that applications be written in accordance with the templates available for download on the call for proposal's website.

The description of the research and development project should make a plausible case that the project partners can implement the project and the activities that will ensure the distribution and/or commercialization of the project's results.

It should also clearly state the basis for the research and development project and how the project contributes to the strategic innovation programme's objectives.

9.2 Assessment Criteria

The research and development project will be assessed based on the following three criteria. The criteria are equally weighted.

1. Potential
2. Actors
3. Feasibility

	Criterion stated in the call for proposals	Description of criterion
1. Potential	Scientific and industrial excellence	Scientific excellence, potential for renewal and the ability to contribute to development within the call for proposal's focus areas. Additionally, the expected result of the project in relation to the state of the art.
	The project's direct effect, expressed as an increase in TRL	How well the application describes problems addressed by the project and how likely it is that the project will be able to demonstrate an increase in TRL of at least one step, so as to achieve a TRL of between 5 and 7.
	Plan for utilization and result dissemination	How well the application describes the plan for the application of the project's results, future commercialization, and dissemination of the solutions developed by the project.
	Use of project results in education	How well parts of the results can be utilized in basic education, advanced education and postgraduate studies.
	Use of the project's results in small and medium-sized companies	How well the project's results can be used in small and medium-sized companies, in company clusters, and in other business groupings.
2. Actors	Project management's expertise	The project management's composition and expertise
	Clearly-defined roles	How clearly defined the roles of the partners in the project are and how well it is demonstrated that the expertise's contributions are important for achieving the project's objectives.
	The active participation of industry and academia in the project	How credibly industry's, academia's and institutes' active participation in the project is described?
3. Feasibility	Realistic plans and decision signposts and choice of methods	The realism in timetables and activity plans, measurable objectives, and the appropriateness in the choice of methods
	Plan for collaboration	How well plans for cooperation between partners, project decision-making processes, and risk analyses are described.

10 Applications

10.1 How to apply

Applications are to be submitted electronically via the application service contained within VINNOVA's eServices Portal. The application consists of a form and a number of annexes and can be accessed at www.vinnova.se.

To be able to submit an application, you must create a VINNOVA user account. Existing VINNOVA accounts may be used. Those who submit applications must be authorized to do so on behalf of the applying organization.

Note that applications must be submitted no later than 2 PM on the last day of the application period. After this time the application submission system closes and it is no longer possible to submit applications to VINNOVA. No supplements to the application may then be submitted unless VINNOVA requests such.

Remember that it can take time to fill in, upload and submit an application, particularly if many applications are being submitted. For this reason, make sure to begin filling in your application well ahead of the deadline. Note that it is possible to save changes and additions up until the time the application is sent.

10.2 Application details

The application consists of a number of electronic forms to be filled in by the applicant in VINNOVA's eServices Portal.

Attach the project description, project summary and a CV annex to your application. Annexes should be submitted as PDF files.

Project description in accordance with the template for project applications that can be downloaded from the call for proposal's website, www.vinnova.se/produktion2030 (website in Swedish, but form is in English). The description must be no longer than 10 A4 pages (in portrait orientation), single column, 12-point font and black text. References to information on websites or similar sources will not be evaluated in determining whether to fund the project.

Project summary (max. 1 page) in accordance with the template [that can be downloaded from the call for proposal's website](http://www.vinnova.se/produktion2030), www.vinnova.se/produktion2030 (website in Swedish, but form is in English). The project summary should be in such a form as to be able to be shared and published freely and, thus, *may not contain any confidential or in other way sensitive information*. When submitting the application to VINNOVA, *the annex*

Project Summary should also to be sent by e-mail to the Produktion2030 programme office at: programkontoret@produktion2030.se.

The CV annex should contain current CVs for the project manager and all key members of the project team. Indicate their names, ages, genders, titles/roles and the extent of their participation in the project. Each CV should be no longer than one A4 page, written in 12-point font.

All of the above annexes are compulsory. If the page limit is not observed or the templates are not used as described above, the application will not be considered.

ATTENTION

Because the applications will be evaluated by international reviewers, we prefer that project descriptions be written in English.

11 Terms and Conditions

VINNOVA's general terms and conditions for grants, as applicable on the date of decision, apply to this call for proposals. The terms and conditions contain rules for reporting, project agreements, follow-up, auditing, conditions for payment and more. They can be found under the heading 'Terms and Conditions' on the left-hand side of the call for proposal's web page.

Because the call for proposals is being issued within the framework of the Produktion2030 strategic innovation programme, special terms and conditions and instructions governing reporting, follow-up, communication and more in relation to the Produktion2030 strategic innovation programme will also apply. For special terms relevant to this call for proposals, see the call for proposal's website. Additional special terms and conditions may be added for specific projects.

The formal requirements for receiving funding are described in VINNOVA's General Terms and Conditions for Grants:

<http://www.vinnova.se/PageFiles/30198/General%20terms%20and%20conditions%20130130.pdf>. A consortium agreement that regulates (among other things) matters of intellectual property rights between the partners is to be drawn up no later than two months after the project begins.

12 Confidentiality

Applications related to this call for proposals are public documents. As a rule, in accordance with the principle of public access to official records, the public has the right to access these documents. This also applies to applications that are rejected or withdrawn. VINNOVA's decisions and the reasons for its decisions are also public information.

However, VINNOVA is required to keep confidential all information about an individual's business and operating circumstances, inventions and research results if it can be assumed that the individual will suffer financial loss if the information is made public. More detailed information about what confidentiality rules apply to applications can be found on the 'Sekretess vid ansökningar' page (in Swedish), which can be accessed from the call for proposal's web page. For more information, see 'Legal Information' at www.vinnova.se under 'About VINNOVA'.

13 Contact

Contact persons concerning the call for proposal's focus and content:

Cecilia Warrol, Teknikföretagen
cecilia.warrol@Produktion2030.se
Tel. +46 (0)8-782 08 28

Johan Stahre, Chalmers University of Technology
Johan.stahre@Produktion2030.se
Tel. +46 (0)31-772 12 88

Contact persons concerning the assessment process and legal and administrative questions:

Tero Stjernstoft, VINNOVA
Tero.Stjernstoft@VINNOVA.se
Tel. +46 (0)8-473 32 96

Administrative questions:
Bengt Larsson, VINNOVA
Bengt.Larsson@VINNOVA.se
Tel. +46 (0)8-473 31 14

VINNOVA's contact for questions about the online application service is

VINNOVA's IT Support
helpdesk@vinnova.se
Tel: +46(0)8-473 32 99