



# European Construction Sector Observatory

## Policy measure fact sheet

## Sweden

Bygginnovationen 2011-2016  
(Construction Innovation 2011-2016)

Thematic Objective 1

March 2016

<b>Implementing body:</b>	<b>VINNOVA (Sweden's innovation agency), supported by an industry consortium of 22 firms and the Swedish Universities of the Built Environment.</b>
<b>Key features &amp; objectives:</b>	The call provides grants to bridge the gap between research and industry, to support efficiency and productivity of Swedish construction companies and to enhance stakeholder collaboration.
<b>Implementation:</b>	2011–2014; 2014–2016; 2016–2019
<b>Targeted beneficiaries:</b>	Construction companies/SMEs.
<b>Targeted sub-sectors:</b>	Universities and other research institutes.
<b>Budget (EUR):</b>	EUR 1.48 Million (SEK 14 Million) per annum.

### In a nutshell

A combination of high demand for, and low supply of, dwellings has led to increasing house prices in Sweden. According to the Country Fact Sheet for Sweden, house prices are estimated to be overvalued by up to 30%, following an increase of 33.1% between 2008 and 2014.<sup>1</sup> The Swedish housing market also has a number of structural inefficiencies, which relate to issues with competition, regulation and infrastructure investments.<sup>2</sup> In addition to a housing shortage<sup>3</sup>, especially in the larger cities, the construction sector faces productivity issues and a gap in the innovation chain between research and industry.<sup>4</sup> Low productivity and gaps in the innovation chain are barriers to sustainable housing policy-making and the competitiveness of the construction industry in Sweden. To alleviate the housing supply challenges across the country, and to accelerate the uptake of R&D and innovation solutions in the construction sector, new initiatives have been launched to improve innovation capacity, commercialisation and collaboration among stakeholders to deliver solutions for a sustainable built environment.<sup>5</sup>

One such initiative, Bygginnovationen 2011-2016 ("Construction Innovation 2011-2016"), provides grants for SMEs, universities and institutes to help them to commercialise research, knowledge and solutions in the fields of IT, process developments and sustainability in the construction sector. The call is based on a network approach that brings together research and industry actors to promote R&D, commercialisation and collaboration and to generate productivity and efficiency improvements, as well as improved environmental performance in the construction sector.

Overall, the Bygginnovationen call offers rapid and targeted financing for smaller companies, enabling them to access business advice and research. On a broader level, it helps to bridge the gap in the innovation chain, by coupling research and industry. There is however a potential for improving outreach and communication activities and to clarify and simplify the application process for applicants. The business advisory committee's role in offering support and coaching for project development could also be further expanded.

### General description

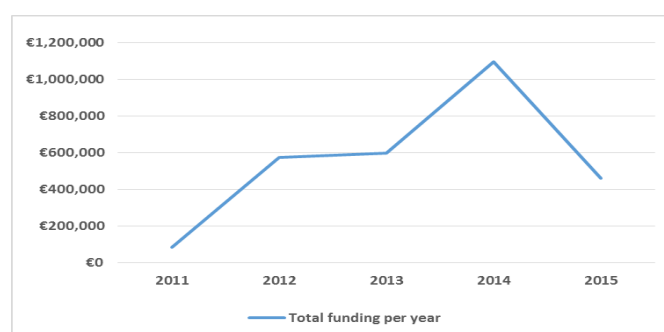
The Bygginnovationen 2011-2016 call is being implemented by VINNOVA (the Swedish Innovation Agency) in collaboration with a consortium<sup>6</sup> of 22 construction companies (mainly large private firms) and the Swedish Universities of the Built Environment.<sup>7</sup> The call is based on the innovation programme 'Bygginnovationen',<sup>8</sup> the objective of which is to develop a strong and sustainable innovation environment in the Swedish construction sector. The Bygginnovationen agenda is also linked to the European Construction Technology Platform and is in line with the priorities of Horizon 2020.<sup>9</sup>

The Bygginnovation 2011–2016 call aims to bridge the gap between academia and industry and the commercialisation of research results by supporting the adoption of innovative ICT and green growth solutions and process efficiency improvements. The targeted beneficiaries are primarily SMEs engaging in R&D and

commercialisation activities. Funding is also available for firms outside of the programme's industry consortium.

The call has an annual budget of EUR 1.480.000 (SEK 14 million) and is co-financed by VINNOVA (50%) and industry (50%). In total, around €10 million (SEK 90 million) of public funding has been made available in the period between 2011 and 2015. Industry financing is mainly provided in the form of employee working hours and personnel costs. A project office at VINNOVA manages the call; it has EUR 75.000 per year to cover the call's administration costs related to the management and assessment of the submitted project ideas, as well as communication. The total administration costs until 2015 was €0.9 million (SEK 8.5 million). Professor Jan Bröchner is employed to follow and study the project results. The research is carried out in cooperation with the University partners and the findings feed into the Call's board meetings.<sup>10</sup>

**Figure 1: Summary of total funding provided by VINNOVA 2011 – 2015**



Source: VINNOVA project costs for Bygginnovationen 2011 - 2016<sup>11</sup>

The amounts paid to companies to cover part of their project costs was higher in 2014 because VINNOVA had a budget surplus and had received a greater number of strong applications. The amounts paid in 2015 only reflect those projects that have been awarded to date. The call offers three types of grants, which have been developed gradually with successively higher requirements.

**Table 1: Overview of grant types**

Grants	Max contribution	Focus
<b>Innovation vouchers</b> 2011-present	EUR 5.300 (SEK 50.000)	SME access to advice from academia/institutes on project proposal development and access to further support.
<b>Planning grants</b> 2011-present	EUR 21.200 (SEK 200.000)	Market and cost-benefit analysis, mapping of regulation / legislation and IPR.
<b>Development grants</b> 2011-2014	EUR 212.000 (SEK 2.000.000)	Commercialisation of close-to-market products processes and services.

In 2014, it was decided to exclude the Development grants (the largest of the three grant types) in subsequent calls. It was felt that existing funds and grants, including from VINNOVA, already offer sufficient financing options for larger companies, and that the call would be better placed to help SMEs.<sup>12</sup>

The prioritised areas (i.e. main orientations) of the call are *Process*, *ICT* and *Sustainability*. The supported companies are therefore operating mainly in the domains of ICT, material and production technology, energy and environment. From a construction perspective, the innovative features of the call are coupled with an emphasis on feasibility studies during the early stages and high-risk projects with a short time to market, or the potential for rapid commercialisation. While short-term objectives concern a project's capacity to deliver new solutions and prototypes, the medium-term objectives target the development of new products, services and processes, as well as productivity enhancement and sustainability. No specific requirements apply to the composition of the project team: Companies can apply on their own or in cooperation with companies and academia.

The call is steered by a business advisory committee,<sup>13</sup> led by 40 experienced industry specialists. The committee is responsible for evaluating the market potential of each proposal and may offer further advice on project development. The call is based on a rapid, efficient and non-bureaucratic application process: applications can be submitted up to 15 working days before board meetings. The applicant must submit a project presentation for evaluation by the committee. The presentation must comply with the call's relevance, quality and feasibility criteria.<sup>14</sup> While the relevance criteria concerns the projects financial conditions and focus on market needs, as well as links to the call's priorities, the quality criteria addresses, for example, the novelty and innovativeness of the project. The feasibility criteria covers the project team's leadership, experience and network, the financial position of the company, its project and activity plan and realistic goals. The committee advises VINNOVA on the proposal's eligibility to receive funding. If eligible, the applicant must submit a formal application to VINNOVA. It then undertakes a financial assessment of the project. To ensure commercial appropriability, the call preserve the secrecy of project ideas, e.g. by making personnel bound by confidentiality agreements.

Close consultation with industry and academia has led to the gradual fine-tuning of the call. VINNOVA will launch an updated version of the call in January 2016. The updated call is set to run from 2016 to 2019. VINNOVA's intention is to maintain the main principals, such as a continuously open call and a rapid evaluation process together with a focus on SMEs with innovative ideas during their early stages.

## Expected or achieved results

A total of 116 grants have been awarded out of 279 applications by September 2015 (success rate close to 40%). In total, 33 Innovation vouchers, 64 Planning grants and 16 Development grants have been awarded, based on 75,141 and 63 grant applications. 13 applications were rejected due to formal reasons and 3 were withdrawn by the applicant prior to receiving advice. It is not known if those projects deemed insufficient managed to receive funding from other sources.<sup>15</sup>

**Table 2: Priority areas 2011 – 2014 and financed projects**

Main orientation of grants	Number of grants
Process	26 Grants
ICT	19 Grants
Sustainability	57 Grants

SMEs play a prominent role in the call: of the 116 awarded grants, 105 engaged SMEs (>90%).<sup>16</sup> Though it is not a Call requirement, most of the projects are collaborative in nature: 77 grants involved 2 or more partners. 64 awarded grants involved universities. University funding was also provided in 8 out of 16 Development grants. On average, VINNOVA grants in 2014–2015 covered 44% of project costs, with the remaining 56% covered by the participating companies.

Initial expert assessments have found that awarded projects have delivered productivity improvements in companies in varying sectors – in construction, real-estate, manufacturing, ICT, architectural and consultancy services and energy supply.<sup>17</sup>

According to Bröchner and Lagerqvist, development grant recipients were typically offered advice on commercialisation planning, business models and relationship building with relevant research institutes.<sup>18</sup> As projects that receive Innovation vouchers or Planning grants are mostly at the idea-generation stage, it is difficult to present clear results for these types of projects: the aim is typically to make them suitable for larger funding grants from VINNOVA or others. The time for commercialisation is equally long for projects that benefit from Innovation vouchers or Planning grants. While two beneficiaries of the Innovation vouchers went on to receive a Planning grant, nine recipients of the Planning grant had successfully applied for a Development grant by the end of 2014. Some projects also applied for VINNOVA's "Innovationsprojekt i företag" grant, which is open for SMEs in all sectors. As applications for Innovation vouchers and Planning grants were in some cases followed by development grants, the total number of innovative ideas is lower than the number of awarded grants.

Examples of commercialised Development grants include:<sup>19</sup>

- Project 12015 developed simulators for operator training of shotcrete robots. Eleven simulators have so far been sold in

Sweden, Australia, Bulgaria, Switzerland and the United Kingdom.

- Project 12018 created an energy efficient cooling system utilising the low and stable temperatures of rocks. Patented in Sweden and the US, it has so far been installed in Sweden and Poland.
- Project 12024 concerned the development of a painting tool for road markings. While field tests have been carried out, it will be commercialised during 2015, focusing on the Nordic market.
- Project 12038 has delivered walls that click together with putty-free and screw less assembly (of metal). A production line has been setup, five patents have been granted and the product has received widespread attention in newspapers and magazines.
- Project 13038 has created a patented solar collector (EOS) based on modular and power-enhancing design: the product is commercialised in Sweden, Germany and the UK.

## Perspectives and lessons learned

Call evaluations are done by VINNOVA (annual evaluation reports) and by two different independent evaluators (mainly based on qualitative measurements). They indicate that Bygginnovationen is an important element in the construction sector innovation chain. It is enabling networking, co-creation and research/industry collaboration and is helping to bridge the innovation gap in the Swedish construction sector.<sup>20</sup> The continuous call for applications, combined with a rapid decision-making process facilitated by the business advisory committee's secure and competent assessment, is helping to create an active environment for innovation.<sup>21</sup>

From a **government perspective**, an expert report commissioned by VINNOVA suggests that there are areas for further improvement. For example, outreach and communication activities could be improved and extended beyond the current web-page platform, targeted newsletters and seminars. Better monitoring and measurement tools are also needed, including more traceability and documentation in relation to the organisation, the decision-making process, applications, reports and protocols.<sup>22</sup>

With the majority of funding being allocated to SMEs, VINNOVA is satisfied with the number of SME participants. However, industry associations emphasize that SMEs face considerable challenges when implementing research results, and that this may be restricting SME involvement in the Call. SMEs have limited resources and are more risk averse than larger companies. Larger companies are typically more capable and willing to implement and commercialise research results.

From an **industry perspective**, stakeholders view the role of the business advisory committee as mostly successful, but with room for improvement. The committee evaluates each proposal's

commercialisation potential, and has successfully provided rapid / targeted resources to companies and has ensured stakeholder interaction. The Committee's 40 experienced business representatives are considered to have helped to ensure the credibility of public-private cooperation. Given the committee's commercialisation expertise, it could be helpful to expand its role to include project support and coaching.<sup>23</sup> The Call's application process could also be improved. Though industry applauds the speed of the process, there is consensus that it should be simpler and easier for participants to understand and use.<sup>24</sup>

From an **academic perspective**, the call is helping partnership building between universities, research institutes and industries, and there has been broad university involvement. Regional universities that are geared towards businesses in their local regions have shown particular interest in the call. While there is little evidence of researcher/employee mobility taking place between partners in awarded projects, several projects have created part-time employment in university and industry partners.<sup>25</sup> It is however still too early to assess the extent to which such collaborations may lead to stable and/or long-term partnerships with industry.<sup>26</sup>

### Comparison with other analytical sources

This Policy Fact Sheet concurs with the Country Fact Sheet 2016 on Sweden<sup>27</sup>:

- Key economic drivers of the construction sector – access to housing;
- Innovation in the construction sector;
- Current status & national strategy to meet Construction 2020 objectives;
- Outlook.

## Endnotes

<sup>1</sup> See the ECSO Country Fact Sheet for Sweden, [http://ec.europa.eu/growth/sectors/construction/observatory/index\\_en.htm](http://ec.europa.eu/growth/sectors/construction/observatory/index_en.htm)

<sup>2</sup> European Commission (2015) *Country Report Sweden 2015 – Including an In-Depth Review of the prevention and correction of macroeconomic imbalances*, Commission Staff Working Document, COM(2015) 85 Final, accessible on: [http://ec.europa.eu/europe2020/pdf/csr2015/cr2015\\_sweden\\_en.pdf](http://ec.europa.eu/europe2020/pdf/csr2015/cr2015_sweden_en.pdf).

<sup>3</sup> [http://www.sabo.se/om\\_sabo/english/Sidor/Swedish-housing-market.aspx](http://www.sabo.se/om_sabo/english/Sidor/Swedish-housing-market.aspx)

<sup>4</sup> <http://www.vinnova.se/sv/Var-verksamhet/Gransoverskridande-samverkan/Samverkansprogram/Bygginnovationen/Bygginnovationen---bakgrund-och-motiv/>

<sup>5</sup> [http://www.formas.se/PageFiles/5460/Formas\\_SB11\\_brochure.pdf](http://www.formas.se/PageFiles/5460/Formas_SB11_brochure.pdf) and [http://www.iqs.se/about\\_us](http://www.iqs.se/about_us). FORMAS is the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning and IQ Samhällsbyggnad is the Swedish Centre for Innovation and Quality in the Built Environment.

<sup>6</sup> For an overview of the industry consortium, see: <http://www.bygginnovationen.se/sa/node.asp?node=811>

<sup>7</sup> An alliance between Chalmers University of Technology, KTH Royal Institute of Technology, Luleå University of Technology and Lund University Faculty of Engineering

<sup>8</sup> <http://www.bygginnovationen.se/sa/node.asp?node=815>

<sup>9</sup> [http://www.sverigesbygguniversitet.se/dokument/2013/Bygginnovationen\\_III\\_Agenda.pdf](http://www.sverigesbygguniversitet.se/dokument/2013/Bygginnovationen_III_Agenda.pdf).

<sup>10</sup> VINNOVA (2015) Lägesrapport till VINNOVA

<sup>11</sup> VINNOVA (2015) *Projektkostnader för utlysning 2011-02947 - Bygginnovationen 2011-2016 - utlysning*

<sup>12</sup> <http://www.bygginnovationen.se/sa/node.asp?node=1394>

<sup>13</sup> For an overview of the advisory body's composition, see <http://www.bygginnovationen.se>

<sup>14</sup> For a presentation of the criteria, see [http://www.vinnova.se/EffektaXML/ImporteradeUtlysningar/2011-02947/Utlysning%20Nationellt%20innovationsprogram%20-%20Bygginnovationen\\_rev20140925.pdf%28599759%29.pdf](http://www.vinnova.se/EffektaXML/ImporteradeUtlysningar/2011-02947/Utlysning%20Nationellt%20innovationsprogram%20-%20Bygginnovationen_rev20140925.pdf%28599759%29.pdf)

<sup>15</sup> Bröchner, J. and Lagerqvist, O. (2015). From Ideas to Construction Innovations: Firms and Universities Collaborating. Working Paper, Department of Technology Management and Economics, Chalmers University of Technology. September.

<sup>16</sup> *ibid.*

<sup>17</sup> *Ibid.*

<sup>18</sup> *Ibid.*

<sup>19</sup> VINNOVA (2015) Lägesrapport till VINNOVA

<sup>20</sup> IQ Samhällsbyggnad (2013): Utvärdering Bygginnovationen, 2013-01-14

<sup>21</sup> Apleberger, L., Billqvist, K. and Swahn, H. (2014), *P.M. Utvärdering av det nationella innovationsprogrammet "Bygginnovationen"*, 2014.12.12

<sup>22</sup> *Ibid.*

<sup>23</sup> IQ Samhällsbyggnad (2013): Utvärdering Bygginnovationen, 2013-01-14

<sup>24</sup> *Ibid.*

<sup>25</sup> Bröchner, J. and Lagerqvist, O. (2015). From Ideas to Construction Innovations: Firms and Universities Collaborating.

Working Paper, Department of Technology Management and Economics, Chalmers University of Technology. September.

- <sup>26</sup> Apleberger, L., Billqvist, K. and Swahn, H. (2014), *P.M. Utvärdering av det nationella innovationsprogrammet "Bygginnovationen"*, 2014.12.12
- <sup>27</sup> European Construction Sector Observatory, Country Fact Sheet Sweden, March 2016, [http://ec.europa.eu/growth/sectors/construction/observatory/index\\_en.htm](http://ec.europa.eu/growth/sectors/construction/observatory/index_en.htm)