

European Construction Sector Observatory

Policy fact sheet



In a nutshell

Implementing body	Danish Technological Institute, Danish Agency for Science, Technology and Innovation
Key features & objectives	Innovation network for sustainable construction, supporting innovation and knowledge sharing across the entire construction industry value chain
Implementation date	2010 – ongoing
Targeted beneficiaries	Construction companies and public/private knowledge institutions
Targeted sub- sectors	All sub-sectors
Budget (EUR)	Approx. 10 million per year in public funding ¹
Good practice	****
Transferability	****

In the early 2000s, Danish construction companies faced growing competition at home and abroad. Globalisation, in particular, put increasing pressure on capacities and pricing². In the lead up to that period, innovation and development in the Danish construction industry had stagnated, limiting the sector's ability to compete on quality with other countries offering high value-added construction solutions³. The impact of the financial crisis of 2008 then served to exacerbate that challenge.

InnoBYG (Innovations for Construction) was launched in June 2010 in response to the challenges faced by the Danish construction sector. Its principal mission is to unite the sector to develop collaborative solutions to construction industry challenges and to improve the sector's ability to compete in a changing market.

InnoBYG aims to set the sustainable and energy efficient construction agenda, to promote, coordinate and streamline construction sector innovation, and to help construction companies and the industry innovate, compete and grow⁴.

InnoBYG has sought to reorientate the Danish construction industry by focusing innovation on the market of the future. Support for the development of quality-driven, sustainable and energy efficient construction solutions is the core of the network's vision and activities. The network is also increasingly promoting the importance of digitalisation and Build 4.0 for a healthy future in the construction industry.

InnoBYG is one of 22 Danish innovation networks. It receives public funding on the condition that it provides match funding from private sources – to support projects financially or by investing its own resources (personnel, time)⁵.

InnoBYG is a successful initiative that has brought together businesses, people, knowledge, skills and experience that represent the entire construction industry value chain. The network has grown faster than many other innovation networks and is increasingly gaining traction in the sector. It has also consistently exceeded the objectives set for it by the Ministry of Science and Education⁶.

As the network has grown in size, scale and scope, so too has its ability to influence policy-making and the construction agenda, promoting sustainability and innovation as important drivers for the sector. To date, it has supported 59 innovation projects (47 completed and 12 ongoing) involving over 230 businesses. SME innovation through 'sprout projects' has been strong, accounting for nearly half of all projects. However, less success has been achieved thus far in international projects.

National policy changes indicate that InnoBYG will be merged with other networks in 2021 to create a large single cluster focused on construction and infrastructure, which is identified as one of Denmark's ten 'national strengths'⁷.

General description

InnoBYG was set up in 2010 to provide a sustainable innovation network for the construction industry in Denmark.

Its vision is to create, gather and apply new knowledge on energy efficiency and sustainability in construction.

InnoBYG brings together professional competencies from across the industry, including construction sector customers, to develop collaborative solutions to address the industry's economic, technical and societal challenges⁸.

The network is coordinated by the Danish Institute of Technology⁹ and is co-financed by the Danish Agency for Science, Technology and Innovation, which is part of the Ministry for Education and Science. Direction and leadership are provided by the InnoBYG Steering Group, which is responsible for the network's overall strategy and ongoing development activities. The Steering Group represents the entire value chain in construction and is self-supplementary, enabling new members to join as needed¹⁰.

The network also works in partnership with Denmark's leading knowledge institutions. Examples include leading research institutions such as the Danish Technological Institute, the Technical University of Denmark and Aalborg University. This partnership is designed to bring together the broad knowledge, experience and competencies in energy efficient and sustainable construction required to support a wide range of network activities¹¹.

The network aims to benefit all parties involved in the construction sector value chain and any party with an interest in sustainability and innovation (e.g. trade associations, clients, architects, engineers, universities, architecture schools, applied science universities, institutes with test facilities, etc.), with a special emphasis on SMEs. All interested parties have access to free membership.

To advance its vision and objectives for a sustainable and innovative construction sector, InnoBYG implements a number of activities with a focus on knowledge sharing, networking and industry development. Network activities are broadly divided between those that promote innovation within the InnoBYG ecosystem, and those that disseminate knowledge in the field.

InnoBYG's main innovation support services provide members with innovation advice, assistance and co-financing support. The network acts as a project support facility that brings knowledge institutions and companies together to develop sustainable solutions to specific construction industry challenges¹².

InnoBYG supports three types of projects:

- Long-term development projects address broad areas of sustainability in construction (i.e. climate adaptation or the use and management of waste and resources). These types of projects are typically led by an InnoBYG knowledge partner and any network member can get involved. They usually run for a period of two years¹³;
- 'Sprout projects' support InnoBYG's SME members in collaborative innovation projects, the results of which may be of interest to a wider group of companies. Support for single company product development is not provided. 'Sprout projects' largely focus on Build 4.0 as: digitalisation and topics such new technologies; improved materials construction; circular resources and efficiency; indoor environment and climate; energy efficiency; and climate adaptation.

Projects are selected periodically through competitive procedures. To be eligible, they must involve a minimum of two InnoBYG member companies and at least one InnoBYG knowledge partner.

Successful projects are co-financed and receive advisory services from the network's knowledge partners. Co-financing ranges from EUR 6,700 to EUR 67,000 (DKK 50,000 to DKK 500,000). Participating companies are required to match the co-financing received, either financially or in working hours¹⁴;

International projects, for which InnoBYG seeks external funding through a special Innovation Express pool targeted at innovation networks. These projects help members to internationalise their businesses, for example, to export their solutions or to acquire knowledge. To support these projects, InnoBYG collaborates with other innovation networks in countries of interest to organise matchmaking activities with relevant organisations¹⁵.

InnoBYG members can request innovation project advice and assistance from a dedicated group of project managers with access to specialised professionals from a broad range of knowledge institutions¹⁶. Types of assistance offered to members are explained in Table 1.

Table 1: Project assistance provided by InnoBYG

Туре	Description
Basic assistance	 Services provided free of charge to network members include: Assessment of project ideas; Guidance on how to proceed, including advice on IPR management, collaboration agreements and project financing options; Support to find partners within the network.
Extended assistance	Services provided for an additional fee (calculated on a project to project basis): • Management and coordination of the application process, including assistance with the preparation of project applications.

Source: InnoBYG¹⁷

Support for knowledge generation is another core InnoBYG service. InnoBYG organises and hosts regional networks that bring together companies and other stakeholders interested in varied innovation and sustainability topics and disciplines. Current regional networks are focused on Build 4.0, the United Nations' 17 goals for construction and sustainable concrete, and the construction of tall wood buildings at the regional and Nordic level.

InnoBYG's knowledge generation and dissemination activities include¹⁸:

- Organisation of events and workshops to explore relevant digital transformation and sustainability issues, such as remote monitoring in construction, 5D construction, and sustainable concrete¹⁹:
- Organisation of "The Sustainable Element" awards for sustainability in construction, in partnership with [and hosted at] the Green Building Forum. There are two award categories: a personal award for promoting sustainability in construction; and a product award for a product that promotes green construction and is exhibited at the forum²⁰;
- Production of informative and analytical publications on the latest topics developments related to sustainable construction. Two examples are shown in Figure 1, 'Guide on voluntary sustainability (left) 'Dilemmas standards' and considerations in sustainable construction' (right). Other examples include white papers and catalogues of ideas and materials²¹, case studies²², brochures²³ and InnoBYG magazines²⁴.

Figure 1: Examples of publications



Source: InnoBYG²⁵

Achieved or expected results

Annual evaluations of all 22 innovation networks in Denmark reveal that each network has managed to steadily increase its membership, member participation in network activities, and the number of applications for funding from EU, national government and regions²⁶. Key findings from the most recent evaluation (2017) conclude that²⁷:

- More than 800 firms have created new innovations stemming from their participation in one of the networks, of which 70% (562) had less than 50 employees;
- In total, 3,000 firms have acquired new ideas that could lead to innovations, of which 77% (2,297) had less than 50 employees.

Multi-network results provide some context against which to compare and contrast the results achieved by InnoBYG over the past decade.

Overall, the results achieved by InnoBYG, to date, are very positive. Knowledge generation activities via collaborative projects are a key success.

InnoBYG has consistently exceeded the main objective set by the Ministry of Education and Science: to attract sufficient private funds to match public co-financing invested in projects²⁸.

Although quantitative indicators were not established for the network's other objectives, activity figures suggest that InnoBYG is achieving its other objectives, albeit not equally in every case.

Network growth

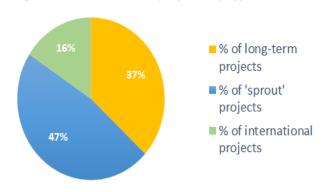
InnoBYG's membership has grown at a faster pace than many other innovation networks in Denmark. It currently has 491 members, which is considerably higher than the innovation network membership average of 126²⁹.

InnoBYG members include companies of all sizes, knowledge centres and academia³⁰. Many members are also involved in **other networks**, a fact that provides added value within and across networks. 45 InnoBYG members are also members of the Build 4.0 network. 175 are members of the network for the United Nations' Sustainable Development Goals (SDGs) in the construction sector. 155 are members of a regional Danish wood construction network and 100 are members of the Nordic Network for Tall Wood Buildings³¹. 30 are members of the Sustainable Concrete network initiative³².

Network projects

InnoBYG has completed a total of **47 projects** that have involved **more than 230 businesses**³³. A further 12 projects are currently ongoing. Figure 2 conveys the distribution of projects by type³⁴. A key result is the high involvement of SMEs in collaborative projects, particularly via 'sprout projects', which make up almost half of all implemented projects.

Figure 2: Distribution of projects by type



Source: InnoBYG³⁵

Although the network has succeeded in promoting innovation within the construction sector, its direct influence on exports and internationalisation seems to have been more limited.

The number of international projects has been quite low in comparison with the number of 'sprout' and long-term projects. International projects provide internationalisation and knowledge exchange support via matchmaking and collaboration with other networks outside of Denmark. However, an average of less than one project per year have been implemented.

Other internationalisation activities have included international events and study trips; however, there have been significantly fewer activities than those dedicated to innovation.

InnoBYG's direct impact on the internationalisation of Denmark's sustainable construction industry is therefore currently unclear, in terms of activities and results. However, the network's support activities are at least indirectly contributing to the internationalisation by supporting innovation in the Danish sustainable construction sector.

Communication, dissemination and networking

Dissemination of knowledge has been a priority for the InnoBYG network since its inception. Particular emphasis has been placed on disseminating voluntary sustainability standards for the industry and on advancing wood construction in Denmark. These activities have made an important contribution to the growth of InnoBYG's membership, reputation and influence within the industry.

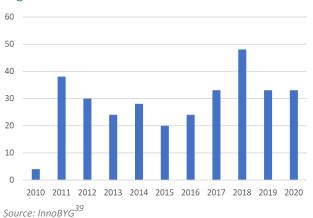
Thematic collaboration within regional networks has also helped to attract increasing levels of participation in the InnoBYG cluster initiative. Relatively higher numbers of members from some thematic clusters have joined InnoBYG, compared to others. For example, relatively high numbers of members from regional networks focused on wood construction (155) and on the United Nations'

SDGs in construction (175) have joined InnoBYG³⁶. In comparison, relatively fewer members of networks focused on, for example, sustainable concrete (30) have joined InnoBYG.

Figure 3 shows the number of events that the network has been involved in, either as a host or participant. These include a wide range of events that serve as a promotional platform for the network, as well as provide collaborative opportunities for the network and its members.

To date, InnoBYG has organised and hosted more than 70 events³⁷ and has participated in a further 315 events³⁸, an average of 32 events per year. In spite of fluctuations in participation numbers, InnoBYG has hosted or participated in at least 20 events per year – excluding 2010, when it was not fully operational for most of the year.

Figure 3: Evolution of participation and organisation of events



InnoBYG has also produced a range of informative and analytical publications, from white papers to brochures to guidelines on voluntary sustainability standards for construction⁴⁰.

Perspectives and lessons learned

InnoBYG's reach and influence has greatly benefited from its capacity to bring together organisations, professionals, knowledge, skills and experience from across the construction sector value chain.

The members of the InnoBYG Steering Group represent the sector's entire value chain. The same is true of the network's membership, which has expanded significantly over the last ten years. By establishing an inclusive network, InnoBYG is increasingly able to support the innovation needs and objectives of the broad construction sector in Denmark. The high relevance of the network to the sector is one of the main reasons why it is well regarded by stakeholders.

According to the InnoBYG Secretariat, the network's ability to unite the sector, under the direction of its Steering Group, is one of the network's key success factors. It has helped provide continuity and increase the growth of its membership, its recognition and reputation in the sector, and ultimately its ability to influence policies and initiatives⁴¹.

Similar benefits are highlighted by VIA University College⁴², a member of the InnoBYG Steering Group and one of the network's partners within the knowledge institutions. According to the VIA, one of the principal advantages of a large steering group that represents the whole value chain is the possibility for political impact.

As much as InnoBYG's growing membership and its full value chain representation are key to the network's success, according to the VIA they are also a challenge. Scale and scope matter because they help the network be more effective. However, the larger the membership becomes, the harder it becomes for members to reconcile their individual interests with the interests of the network and the sector. Achieving consensus is vital for success⁴³.

Free membership may not have best served the objectives of the network, as some members demonstrate a lower level of commitment than others.

In line with most of the Danish Innovation Networks, InnoBYG chose not to require members to pay a network membership fee. The InnoBYG Secretariat considers free membership to be both a strength and a weakness.

On the upside, it has enabled the network to welcome all parties that are interested in sustainable construction as a member. This may have helped to make the network more attractive to smaller companies.

On the downside, InnoBYG recognises that free membership may be a double-edged sword. The absence of membership fees may have given some members the impression that their membership implies an absence of network obligations and expectations. This may explain the lower levels of involvement by some members⁴⁴.

Mechanisms are needed to ensure that activities proposed by the network resonate with members. InnoBYG is responding by changing how activities are proposed.

Initially, projects were defined thematically, with funds distributed to knowledge partners. However, in 2017, the Steering Group decided to subject knowledge partner activities that require over 50% of funding to an internal tendering process via 'sprout projects'.

Proposals must now be supported by at least two members from the innovation network, with a commitment that they will invest their time in the project. Projects are defined collaboratively and are based on real challenges faced by the companies⁴⁵. This has resulted in a high demand for projects⁴⁶.

The InnoBYG Secretariat has received very satisfactory feedback from the companies that have participated in these projects. They report benefits in terms of growth, cooperation opportunities and access to knowledge afforded by the initiative⁴⁷.

VIA University College's assessment is also positive. In large part, they attribute the current broad acceptance of InnoBYG across the construction industry to a growing recognition of the importance and value of digitalisation and Build 4.0^{48} .

Conclusion and recommendations

network InnoBYG innovation for sustainable construction in Denmark has achieved considerable success over the last decade. It has succeeded in uniting a very fragmented establishing sector by innovation network that is inclusive and which represents the entire construction industry value chain. Its membership has grown faster than most other innovation networks in Denmark and it is continuing to expand. The network's composition, vision and relevance to the construction industry have fuelled its growth, increasing its capacity to set or influence the sustainable construction agenda in Denmark.

Stakeholders recognise the importance of InnoBYG as a knowledge exchange forum that engages and connects professionals and organisations from across the construction sector value chain, including associated sectors and disciplines (e.g. sustainability, ICT, energy and climate)⁴⁹.

InnoBYG has successfully positioned itself as an important innovation hub for the construction industry. Its innovation support services help its members to work together to generate, apply and share new knowledge, seeding the creation of new construction solutions to address industry challenges.

Looking forward, three recommendations are suggested to help improve the impact of InnoBYG:

- The network would benefit from a more comprehensive evaluation framework for the assessment of network activities, results and impact. Clearer and more detailed quantitative objectives and indicators would make it easier to assess network performance and impact, identify issues and potential weaknesses, and take remedial action as needed;
- The network should consider (re-)evaluating the appropriateness of its membership model to

better understand the extent to which it may or may not be incentivising members to participate in network activities. Stakeholder engagement (e.g. surveys, interviews) may help inform this evaluation. If, for example, the current free membership model is not stimulating the active participation of some members, consideration should be given to alternative membership models.

Changes to membership rules and/or the introduction of fee-paying service packages are two examples. For those members that have a 'nothing at stake' mindset, a low and largely 'symbolic' membership fee might help to motivate them and increase their participation, without damaging membership growth. Alternatively, moderate membership fees could be charged, with exemptions for SMEs that demonstrate their active engagement in network activities (participation in projects, regional networks, etc);

• Mechanisms should be explored to ensure that all network activities resonate with members. The competitive 'sprout project' proposal model encourages a focus on real-life challenges that companies face. They incentivise innovation projects that are business case driven. As a result, demand for projects within the network has risen. Consideration should be given to extending this kind of approach to other activities that have experienced less demand. Examples include international projects or certain regional networks.

Overall, InnoBYG is rated as a '4-star good practice measure' on a scale of 1 (low) to 5 (high).

This score is based on the continued growth of the network over the last decade, in terms of members, activities, reach and impact. The network is growing faster than many other Danish innovation networks and it is valued by its members, evidenced by their feedback and

increasing involvement. The network is helping members share knowledge and innovate. SMEs are key beneficiaries of innovation support, with 'sprout projects' accounting for nearly half of all supported projects. To achieve a '5-star good practice' score, however, InnoBYG would need to introduce better performance monitoring and improve member participation throughout the network, particularly in international projects and all regional networks.

InnoBYG is rated as a '5-star transferable measure' on a scale of 1 (low) to 5 (high).

The InnoBYG concept and approach is very transferable, not least because industry cluster

initiatives are quite common across many countries and sectors. The concept is easy to adopt and adapt. There are also many and varied cluster initiatives across the EU that have a direct or indirect focus on the construction industry. The key to developing a successful cluster is to adopt a bottom-up approach to collaboration, challenges and solutions.

Looking forward, cluster-based work to advance innovation and sustainability in the Danish construction industry is expected to continue under the umbrella of a larger 'construction and infrastructure' cluster⁵⁰.

Endnotes

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