



Ministry of Economic Affairs,
Agriculture and Innovation

SBIR

The power of public
procurement:
innovative
solutions to societal
challenges

This is a publication of:

NL Agency
NL Innovation
Juliana van Stolberglaan 3
2595 CA The Hague
PO Box 931444 | 2509 AC The Hague
The Netherlands
T +31 (0)88 602 55 97
sbirinfo@agentschapnl.nl

Ministry of Economic Affairs Agriculture and Innovation
Bezuidenhoutseweg 30
2594 AV The Hague
PO Box 20101 | 2500 EZ The Hague
The Netherlands

PIANOO, Public Procurement Expertise Centre
www.pianoo.nl

© NL Agency | January 2011
Publication-nr. 3SBIR1002

More information
SBIR programme
www.agentschapnl.nl/sbir



SBIR

How the Dutch Government provides incentives for innovation in the private sector through public procurement

SBIR is a procurement programme in which the Dutch Government uses the power of procurement for finding innovative solutions to societal issues. SBIR challenges companies to put their entrepreneurship and innovative strength into action to develop solutions within a short time span. SBIR enables the government to be a first client for new innovations.

What is SBIR

SBIR is a tried and tested method that originated in the United States. The government uses this instrument to provide incentives for companies to develop and market innovative solutions to societal issues. SBIR is a good instrument to solve specific societal problems or accelerate a desired transition. SBIR is used if there are no ready-to-use products or services available to address a challenge. This approach is used when innovation is necessary in order to make products or services available and market them to the end customers.

SBIR stands for Small Business Innovation Research. The name suggests that small businesses are the only target group. This is not the case. Any company, independent of its size, stands a chance in an SBIR tendering procedure. In the Netherlands SBIR has turned out to be particularly beneficial to early-stage companies and small and medium-sized enterprises (SMEs), due to its simple, fast procedure, accessible registration and low administrative costs.

SBIR in the Netherlands

End 2010 twenty-eight SBIR competitions had been launched by the ministries of Economic Affairs, Agriculture and Innovation; Defence; Infrastructure and Environment; Education, Culture and Science; and Health, Welfare and Sport. These ministries are very pleased with SBIR. In implementing SBIR procurement processes, they can rely on support from NL Agency, which has acquired the expertise in the past years to run the complete process efficiently and fast. SBIR is made to measure and can be adapted to specific needs of the government.

The power of procurement

Governments can play an important role as purchasers of innovations. The total procurement budget of the Dutch Government is about 11 billion euros a year. This makes the government a major player as a purchaser. Actively asking for innovative solutions is a good strategy. Governments and other authorities can bring about and enforce desired breakthroughs. PIANOo: the Dutch Public Procurement Expertise Centre, promotes SBIR and innovation-driven procurement by the government.

Benefits to government

- SBIR gives the government and other authorities the opportunity to promote market developments in which companies are challenged to opt for societal engagement and sustainability.
- SBIR helps ministries and other authorities to realise their policy goals relatively quickly, because companies develop several commercial products and services and are motivated to market their solutions.
- SBIR tenders result in exceptional solutions to societal issues.
- SBIR gives governments the opportunity to be a first client for new innovative products and services.

SBIR budget from 2005 to 2010 in millions of euros

Year	2005	2006	2007	2008	2009	2010
Budget	1.1	3.5	3.1	7.4	18.2	26.3



Benefits to business

- SBIR mobilises companies' entrepreneurship and innovative power to solve societal issues.
- The SBIR contract guides companies along the way, creating new markets in the long term. Procurement works well in operational management. The SBIR project is a results-oriented assignment and has high priority within a company.
- Being awarded an R&D contract from the government helps companies achieve a stronger position with respect to collaborating partners, clients, banks, backers and the government (as a procuring party).
- SBIR accelerates the time to market and helps to fund the high-risk phases of an innovation.
- SBIR offers the opportunity to work together with other companies and research institutes.
- Companies which develop products and services with SBIR may expect good chances of launching their innovation on the market.

SBIR key features:

- Mobilises entrepreneurship and innovative powers of companies for finding inventive solutions to societal issues;
- Promotes the creation of innovative products and services;
- Gives companies a results-oriented assignment;
- Only funds the research and development phase of the best and most feasible projects;
- Accelerates the time to market;
- An ideal fit for SMEs and early-stage companies;
- Focuses on market opportunities in all phases of the process;
- Holds an important position in the European innovation landscape;
- Very suitable for governments which would like to use their procurement influence to promote innovation;
- Offers a simple, smart concept;
- Structured in logical phases;
- Fast turnaround time.

SBIR

How does it work?

1. The challenge

A ministry or other public authority identifies a specific challenge, a societal issue for which innovative solutions are needed, or a situation in which a transition is desired, and makes a budget available for that purpose.

2. Competition

NL Agency and the ministry or public authority initiate an SBIR procurement and launch an open competition. All competitions are expressed as a desired outcome, rather than a required specification. Companies send in applications within the tender period. NL Agency processes the applications and notifies companies.

3. Assessment phase 1

An independent evaluation committee formed for a specific SBIR reviews the proposals on the following criteria:

- Impact on the societal issue
- Entrepreneurship
- Innovation
- Economic prospects
- Ecological and societal aspects
- Quality of the proposal and the project.

The evaluation committee ranks all the projects and advises the contracting authority (generally the relevant minister).

4. Phase 1: feasibility study

The contracting party decides which of the highest-ranking companies will receive a contract for a feasibility study (phase 1). These companies demonstrate the feasibility of their innovation (maximum of 6 months, maximum of 50,000 euros per project).

5. Assessment phase 2.

In phase 2, all companies with feasible phase 1 projects compete with each other in a new round. The assessment criteria are identical to phase 1; economical prospects for phase 3 also play a significant role in the assessment. In phase 2, the evaluation committee advises the contracting authority (generally the relevant minister).

6. Phase 2: development

The contracting authority decides which projects will be commissioned a phase 2 contract. These companies start a research and development process (maximum of 2 years, maximum of 450,000 euros per project). The end result is a tested prototype, demonstration, limited pilot run or pilot project of the product, process or service.

7. Phase 3: marketing the innovation

In phase 3, the companies start preparing their products for market launch. This phase is not supported by government funding. Phase 3 offers the government an excellent opportunity to take up a strong position as a large innovation-driven buyer and to act as a first client for new SBIR products, benefiting from the new possibilities.

SBIR and EU procurement rules

SBIR is subject to the EU pre-commercial procurement legal framework for research and development projects. For R&D projects the public procurement directives do not apply (see Art. 16f of 2004/18/EC, Art 24e of 2004/17/EC). The European Commission views SBIR as a valuable supplement to the array of financial aid instruments. SBIR concurs with the European view on pre-commercial procurement of innovations.



A talk with Pepijn van der Vliet from Alert Solutions

Looking inside dikes with GeoBeads™

Dikes are crucial to keep the low-lying regions of the Netherlands from flooding. For the SBIR on dike inspection systems, Alert Solutions developed a method for continuous real-time monitoring of dike stability. “GeoBeads™ makes it possible for dike managers to look inside a dike,” says Pepijn van der Vliet from Alert Solutions.

“In order to really understand the condition of a dike, you have to know what is going on inside,” Van der Vliet explains. Water tension has to be measured, as well as the temperature for determining water flow, and the movement of soil layers to track down and pinpoint deformations. Van der Vliet: “Continuous monitoring of various soil layers in the dike and observation of their various parameters gives a real-time assessment of the stability of a dike.”

A string of beads providing geological insight

SBIR aimed to find new inspection technologies to map out the condition of dikes. Alert Solutions proposed their product concept, GeoBeads™. GeoBeads™ are strings of ‘beads’: a series of sensor modules monitoring the dike. “During the feasibility phase, we examined which parameters you need to track in order to produce a useful large-scale monitoring system. GeoBeads™ was subsequently adjusted and improved,” Van der Vliet explains. The GeoBeads™ prototype for dike monitoring was developed in the second phase of SBIR. “We started in early 2008, and the prototype was successfully

installed and tested in September. Its added value has been proven. Five district water boards already actively use the system,” says Van der Vliet.

Embracing new technology

Constantly monitoring the inside of dikes has proven its worth. Van der Vliet has also noted market interest in this new inspection technology. As a result, it is important to give these innovations a standard niche in the normal operating processes of district water boards. For example, this form of dike monitoring could be implemented as a standard part of testing dams and monitoring fortification works. “At this point, the innovation is constantly being developed further in consultation with the district water boards.” The water market is large and important, and new technologies are adopted with all due caution. “It will take time before the technology is widely embraced,” says Van der Vliet.

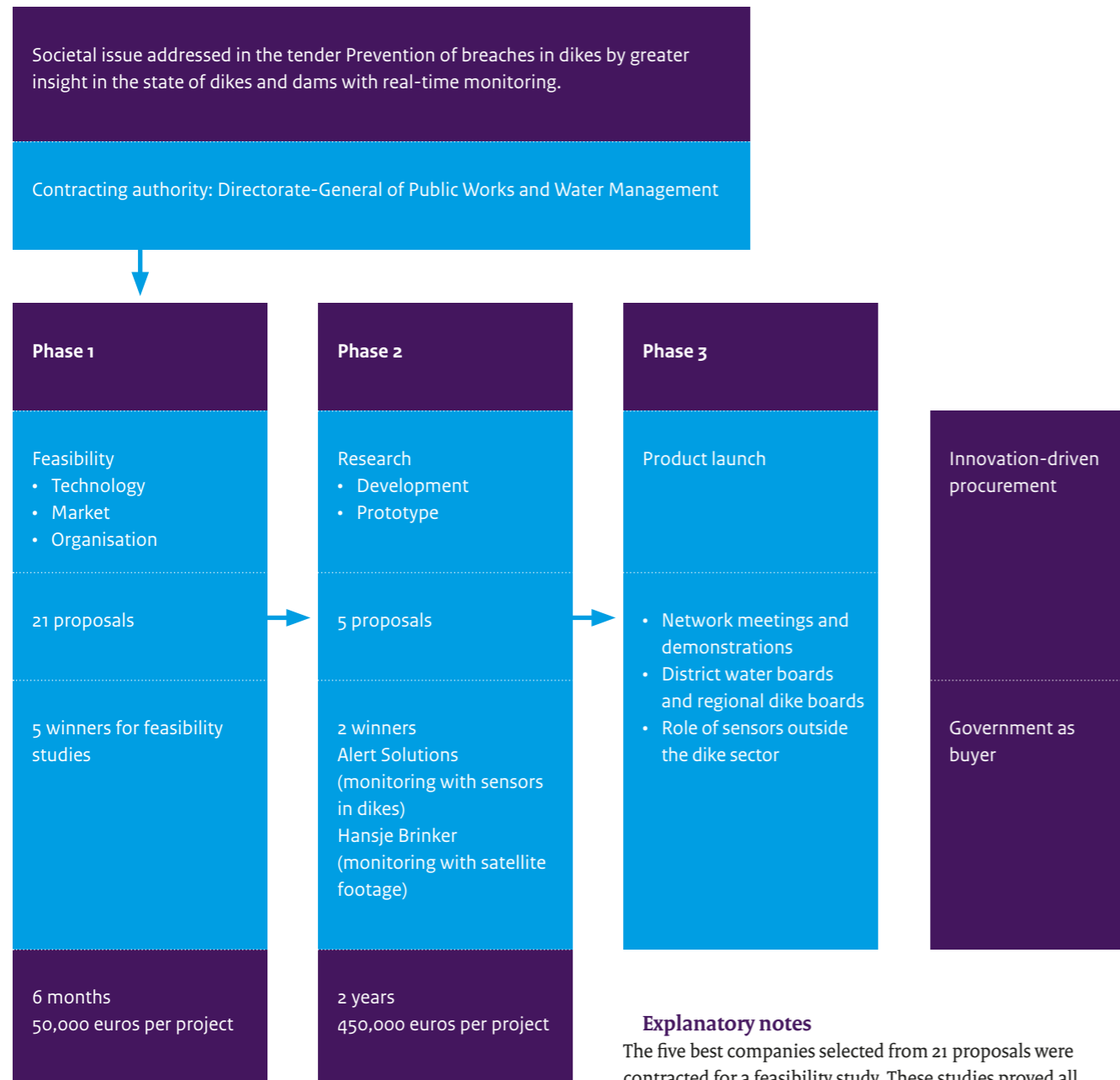
Broader scope

Van der Vliet considers SBIR a good way to develop innovative products. An urgent market demand is the starting point for an SBIR. Moreover, SBIR funded the development of the GeoBeads™ product, facilitating the creation of a new method for continuous dike monitoring. The company can now expand on this unique product basis. The potential market goes far beyond dike monitoring; there are also opportunities for GeoBeads™ in the building sector, for example to monitor risks in and near excavation sites.

SBIR

A well-organised process

Example SBIR Dike Monitoring Systems



Explanatory notes
 The five best companies selected from 21 proposals were contracted for a feasibility study. These studies proved all innovations to be feasible and all 5 companies received a request to submit a proposal for phase 2. The two winners, both start-ups, were contracted to develop their innovation. These two companies demonstrated the necessary entrepreneurship. Their projects were appropriate responses to the challenge and complied with the eligibility criteria: they were innovative and economically feasible.



SBIR programme Digi-dike

Dike inspection using satellites

In the past, dikes were subjected to visual inspection every once in a while, and occasionally still are. Hansje Brinker, operating systems supplier, demonstrates a more efficient and reliable method of inspection. This enterprise proved that satellites can be used to inspect dikes and developed with SBIR a monitoring service for dike managers: Digi-dike.

Dike inspectors used to rely on a good pair of eyes and a solid dose of common sense. In today's society, technology, electricity and ICT are now also available to facilitate dike inspection in a more effective, sustainable and reliable way. This SBIR invited enterprises to develop innovative dike inspection systems. Five companies carried out a feasibility study, after which Hansje Brinker was selected as one of the two enterprises who were invited to develop their idea. (Hans Brinker is the hero in an American Children's book about a Dutch boy who kept the sea at bay all night long; according to the story, he plugged a leak in the dike by putting his finger in the hole.)

Dike inspection from outer space
 Hansje Brinker uses satellite radar technology recently developed to conduct a systematic stability analysis of dams. Satellite views can be used to examine the whole of the Netherlands quickly and frequently, resulting in a solution that is both sustainable and cost-effective. A satellite produces radar footage and sends the data to a database which can be consulted online. Dike managers are now able to pre-inspect their dikes through Hansje Brinker's database in just an hour, looking down from the satellite's vantage point in outer space, and then identify suspect locations for further analysis. Hansje Brinker developed a passive monitoring system supplemented by an active warning system, which raises a red flag if dike instability or deformation is detected. If the threshold value of a dike is surpassed, Hansje Brinker can send a warning signal to the dike manager. Water levels, malformed dikes, everything is automatically detected. Deformations can be digitally inspected in detail by zooming in, providing valuable information prior to repair or research at the site. For the highest dike in the Netherlands, the *Hondsbossche en Pettemer Zeewering*, the company has even produced a 3-D visualisation. Hansje Brinker's innovative technology is a great asset for dike managers, who work hard at keeping the Netherlands dry for all its inhabitants, both now and in the future.

Innovative solutions to societal issues

Innovative solutions to many societal issues can be provided with the help of SBIR. Examples include challenges in the fields of health, safety, traditional and bio-based economies, environmental protection, transport, defence, etc. The scope of the question may differ. Solutions take the form of innovative products and services.

Examples of societal challenges in SBIR tenders include:

- Safe maritime operations in severe weather conditions;
- Prevention of breaches in dikes by greater insight in the state of dikes and dams with real-time monitoring;
- Reduction in emissions of ammonia, odour and particulate matter by using combined air-scrubbing systems in factory farming;
- Use of energy-efficient systems and systems based on renewable energy in trucks, cars and delivery vans;
- Development of new proteins for human consumption based on proteins from plants, algae, seaweed, fungus, insects or cultured meat;
- Development and preservation of the quality of the landscape together with the development of a sustainable and commercially viable leisure sector;
- Adequate physical protection and reduction of physical strain for police officers, firefighters, soldiers, ambulance personnel and prison staff.
- Prolongation of health and facilitation of options for elderly people to continue to live at home for longer by developing and marketing products and services in cooperation with several sectors besides the health care sector.



A talk with Paul Schurink business developer with Bredenoord Aggregates

Generating cleaner, quieter mobile energy

SBIR gave Bredenoord Aggregates in Apeldoorn and NedStack in Arnhem the chance to develop a power aggregate to provide mobile electricity based on a new technology. Their 'Purity' uses hydrogen and is therefore quieter and more environmentally friendly than diesel-powered generators.

Family firm Bredenoord Aggregates in Apeldoorn supplies electricity in places where there is no mains voltage, such as along motorways, at events or in case of a power failure. The company has been working for years to improve diesel generators and find alternatives. As fossil fuels become scarcer, the market increasingly demands solutions with lower carbon emissions. That is why Bredenoord decided in 2007 to sit down with NedStack to come up with a more sustainable alternative to diesel-powered generators. With SBIR, Bredenoord built the Purity, a generator that runs on a hydrogen fuel cell and can be used anywhere.

Purity at music festivals

Whether the latest Purity can supply enough power for all purposes still remains to be seen. Where a normal diesel generator produces up to 1000 kW, the Purity only produces 15 kW at the most. "On the other hand, this is already three times more than the first prototype," says Paul Schurink. "During further development, we also ran tests replacing hydrogen with bioethanol. Hydrogen is often still too expensive, because the infrastructure has not yet been devel-

oped. Unfortunately, tests showed that it was technically impossible to turn bioethanol into hydrogen-rich gas suitable for fuel cells." The Purity runs well on hydrogen: in summer 2010, it successfully supplied renewable electricity to a floating stage at the popular Lowlands music festival.

Waiting for a breakthrough

Schurink cannot yet predict when hydrogen generators will break through. It depends on the demand and on dropping prices for components and available hydrogen. As a result of this SBIR, Schurink has noticed that the building sector shows great interest in the Purity. In the meantime, NedStack is working on reducing the price of components for the Purity. "SBIR has enabled us to make a big leap forward," says Schurink. The Purity has been admired throughout the Netherlands during demonstrations and has successfully been used in field tests carried out by clients. The fuel cell generator recently became part of a pilot project: from November 2010 on, the Purity has been supplying green energy for an ecological land bridge for animals to cross the A28 motorway at Hulshorst.

Schurink is confident that new energy technologies such as the Purity will conquer the world. "Once hydrogen breaks through in the market and becomes available on a larger scale, we possess the know-how to give clients a superb standard of service – just as we do now with diesel, biogas and synthetic diesel."

The rise of SBIR in Europe

In the United States, SBIR has facilitated successful public-private partnerships for decades. Inspired by the American SBIR successes, the Netherlands started its first SBIR competition in 2004.

Introduction in the Netherlands

A precondition for the Dutch SBIR is that there must be societal challenges that justify an SBIR procurement. In the United States, only American companies are permitted to participate in the SBIR programme; as a result of European laws and regulations that apply in the Netherlands any company in the EU can apply.

An important success factor of SBIR in the United States is that the contracting company retains ownership of intellectual property rights. This motivates a company to invest in innovation and to launch the result on the market.

European initiative: Pre-Commercial Procurement

Almost concurrent with the introduction of SBIR in the Netherlands, the European Commission became interested in tendering procedures for innovations. The Information Society and Media Directorate-General dealt with how governments could provide incentives for the development of products and services needed to address the major challenges we are facing. The emergence of these parallel concepts is how two almost identical methods to encourage innovations came about.

In December 2007, the European method was published: Pre-Commercial Procurement (PCP). 2010 saw the first PCP tenders in the Seventh Framework Programme for health and transport, among other sectors. These tenders involved societal issues pertaining to the whole of Europe. The European Commission is following SBIR developments in the Netherlands and exploring options for a European SBIR with EC support.

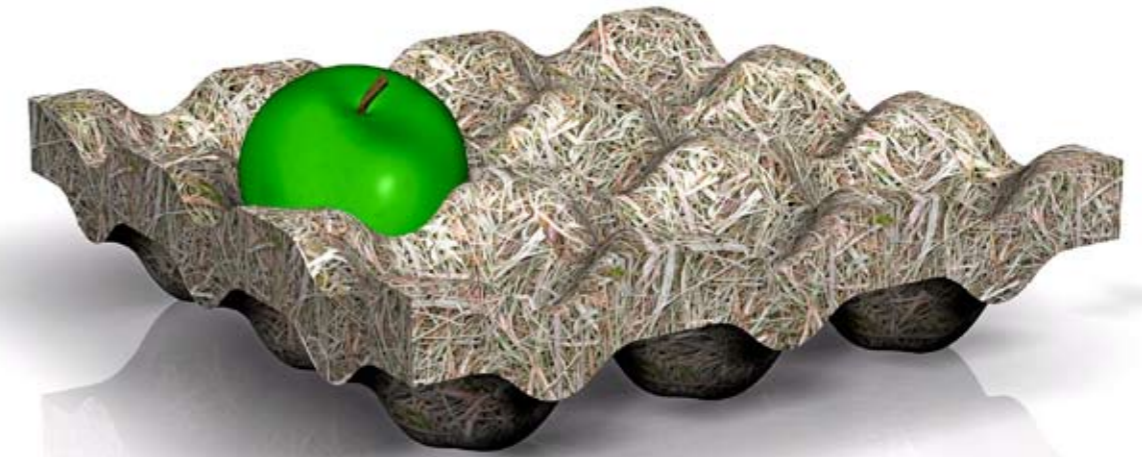
The English equivalent: SBRI

The European PCP approach made it possible for the United Kingdom to start its own programme in 2008: the Small Business Research Initiative (SBRI). It has many things in common with the Dutch SBIR. The UK now also has many examples of small and mid-sized enterprises developing groundbreaking innovations with the SBRI. Other countries are also looking for new ways of encouraging innovations.

Implementation in other European countries

In 2010, the INNO-Partnering Forum, a joint project of several European innovation agencies, reviewed SBIR and SBRI. Other countries can use the resulting format to set up their own SBIR programme. Countries such as Sweden, Austria, Spain, Ireland and France have taken an interest and may want to start their own SBIR-like programme. The EC has made funds available through the INNO-Partnering Forum to support a twinning programme, which would help countries without prior experience to learn from the Netherlands and the UK.

SBIR, PCP and SBRI occupy an important place in the European innovation landscape. Governments which would like to use their procurement power sustainably to promote innovation will find that SBIR, PCP or SBRI offer good methods to achieve that goal.



Engineering firm Ingenia and product developer GKID

Grass-based packaging

The inedible parts of plants could be used as packaging material, thus contributing to a biobased economy. This ingenious idea was submitted by engineering firm Ingenia and product developer GKID. With SBIR, they developed Haynest®, a new packaging material consisting of grassy fibres instead of polystyrene.

Haynest®, a textured material, has the same characteristics as expanded polystyrene or EPS, which is widely used in product packaging. Unlike polystyrene, however, it is completely organic in origin. It is made out of natural grasses and therefore completely biodegradable. Haynest® is a new material introduced in an existing market. It is the first biofibre-based packaging material that protects products the way polystyrene does. Haynest® reduces the use of fossil fuels and the accompanying CO₂ emissions.

Unrefined fibres

Haynest® is produced using raw, unrefined fibres, which are a by-product of other processes. Unlike many other biobased fibres, the fibres used in Haynest® are not grown especially for use in the packaging material. Roadside plants and other natural grass are already being mowed and harvested. Moreover, after customers use the Haynest® package, they can return it to the compost cycle

through the green compost bin collected by municipalities. As a result of this cradle-to-cradle lifecycle, producing Haynest® requires a relatively low amount of energy.

Reducing the use of fossil fuels

Haynest® will primarily be used to replace existing EPS packaging. It can be used as industrial packaging, but potential applications also include secondary packaging for organic foods, such as egg crates and fruit trays. Consequently, Haynest® also contributes to reducing the climate problem, making a positive contribution all along the line, from waste cycles to the distribution of environmentally hazardous waste. Moreover, it limits economic dependence on fossil fuels, which are becoming increasingly difficult to find.

Entrepreneurship

Haynest® is successfully produced by a cooperative effort involving three companies: engineering firm Ingenia, product developer GKID and Wolters Europe. They combined their knowledge and experience to process the organic raw materials and turn them into a viable product which can be put on the market. Various packaging end users have already enthusiastically embraced Haynest®. Several firms have agreed to evaluate the packaging, with the aim of starting to use Haynest® themselves.