



**FUGE**

**Strategy for Industry  
Development**

**2007-2009**

## Strategy for Industry development FUGE 2007-2009

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### 1. Preface

Biotechnology is a key technology with commercial potential within several fields, among them medicine, diagnostics, agriculture, aquaculture, farming, environmental preservation, energy, health food and cosmetics. In the future biotechnology will affect our lives in different ways just as the information and communication technologies do today. Commercial exploitation of biotechnology entails an interplay which is stronger than ever before between basic research, applied research, commercial innovation, established biotechnology companies and companies that employ biotechnology.

According to a recent survey initiated by FUGE, a majority of the leaders in Norwegian industry believe that biotechnology will play as important a role as an industry in the future as the oil and gas industry does today. This is the first survey investigating the general attitudes toward biotechnology among Norwegian industrial leaders.

Biotechnology is an important area for the Research Council, and its importance is clearly stated in the white paper on research which was backed unanimously by the Storting. Norway has great business and socio-economic potential when it comes to biotechnology, not least because Norwegian biotechnology research communities continue to produce research results with exciting commercial potential for the international market. Consequently, a strong biotech industry will be decisive for an active employment of biotechnology and the evaluation of the social benefits and consequences of biotechnology. With proper focus and prioritisation from research communities, the biotech industry and the authorities, Norway has the opportunity of becoming a strong contender on what is possibly the most exciting knowledge arena in the near future.

EuropaBio operates with “three colours of biotech”, where red indicates the medical field, green signifies agriculture and white represents applications for the processing industry. In line with Norwegian traditions, marine biotechnology has been promoted as a fourth colour category within biotechnology, as the colour blue.

### 2. The Norwegian biotech industry

During autumn of 2005, Innovation Norway completed a larger project surveying the Norwegian biotech industry. The information was collected from 90 % of about 100 Norwegian companies where biotechnology is an important research and development component. The project mapped the companies' product focus and the interaction between the companies as well as between the companies and academic institutions and R&D institutions. Data was obtained mostly by way of an "online interface" which was named NORBIOBASE ([www.norbiobase.no](http://www.norbiobase.no)) which the companies themselves used and which was established particularly for this project. This database will be updated on a regular basis as an information resource for the industry, coordinated jointly by the Research Council, Biotekforum, MedCoast Scandinavia and Innovation Norway.

Norwegian companies that have biotechnology as an important part of the business have been classified according to their specific areas of technology or product categories.

Biomedicine is the dominant subgroup counting 48 companies, constituting almost 50 % of the total. The field can, in addition, be broken down into 29 therapeutic, 15 diagnostic and 4 pharmaceutical companies. Biomedicine employs 3 200 people, and had an annual turnover of 7.2 billion NOK in 2004, with Amersham Health alone grossing 4.1 billion NOK.

The blue-green sector is heterogeneous and difficult to classify, as several of the companies are active in different product segments. An illustrative example is Biotech Pharmacon ASA, a company with activities directed towards human nutrition, animal nutrition as well as purified enzymes.

The sector has a turnover of 4 billion NOK and employs 1 350 people. About  $\frac{3}{4}$  of the turnover is directly related to aquaculture; feed and the bulk components include more than 2.5 billion NOK, while fish health and breeding encompass about 0.4 billion NOK.

So far, there are few Norwegian companies in the white colour group, and most of the services offered are related to either production or the environmental sector.

### 3. FUGE in the value chain from basic research to commercial enterprise

The FUGE initiative has during a short period of time managed to build and coordinate 11 national technology platforms throughout Norway's various academic communities for biotechnology research.

#### The national platforms are:

- Biobanks for Health, the Bioinformatics Platform
- The Norwegian Centre for Integrative Genetics (CIGENE)
- The Norwegian Arabidopsis Research Centre (NARC)
- The Norwegian Centre for Microarray Technology (NMC)
- The Norwegian Structural Biology Centre (NORSTRUCT)
- The Norwegian Proteomics Centre (PROBE)
- The Norwegian Molecular Imaging Centre (MIC)
- The Norwegian Transgenic Centre (NTC)
- The Norwegian Centre for Microbial Technology (CAMST)
- The Regional Research Biobank in Central Norway.

The platforms form an essential foundation for R&D in a string of fields such as medicine, diagnostics, food production (both land based and marine), forestry, resource management (for instance water purification) and environmental refinement.

In the initial phase, FUGE's focus has been basic research and the establishment of platforms for research-based analysis and experimentation for the identification of genes and proteins and the role they play in various processes. In connection with business development, it is important for FUGE to establish:

- Which part of the value chain for business development would be of the greatest significance for future initiatives from FUGE?
- Who should be FUGE's collaborators for the chosen links in the value chain?

The FUGE initiative also represents a unique opportunity for commercial innovation within biotechnology. Examples of innovation through FUGE are products and services for use on the FUGE platforms, and products and services created through work performed on the platforms. Through FUGE, biotech companies acquire easy access to unique international as well as national R&D results. The FUGE platforms also constitute a domestic market for new products and services. In addition, FUGE collaborates with other similar Nordic initiatives, thereby gaining access to international markets.

In order to generate research results with commercial potential, FUGE supports **product and service-based research and development in collaboration with other RCN programmes**, such as FORNY (Commercialising R&D) and BIA (User-driven Research-based Innovation, which partly finances R&D projects within areas that are not covered by the thematic programmes).

Since 2003 FUGE has had a stronger commitment to commercialising research results from both academic communities and existing companies. It is vital that Norway build a substantial

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base of biotechnology companies, out of which some grow to become considerable actors on the international market.

The areas of the value chain in which FUGE can make considerable contributions to the biotechnology industry development lie within **the commercial verification/accommodation of research results and the development of new products/services in small and medium-sized companies. Furthermore, access to the FUGE platforms by domestic and international industry will be prioritised. This entails that the products/services offered by the FUGE platforms must be relevant to existing biotech companies. In addition, the FUGE platforms are required to pass on information about services from leading international actors within their fields which the platforms themselves do not offer.**

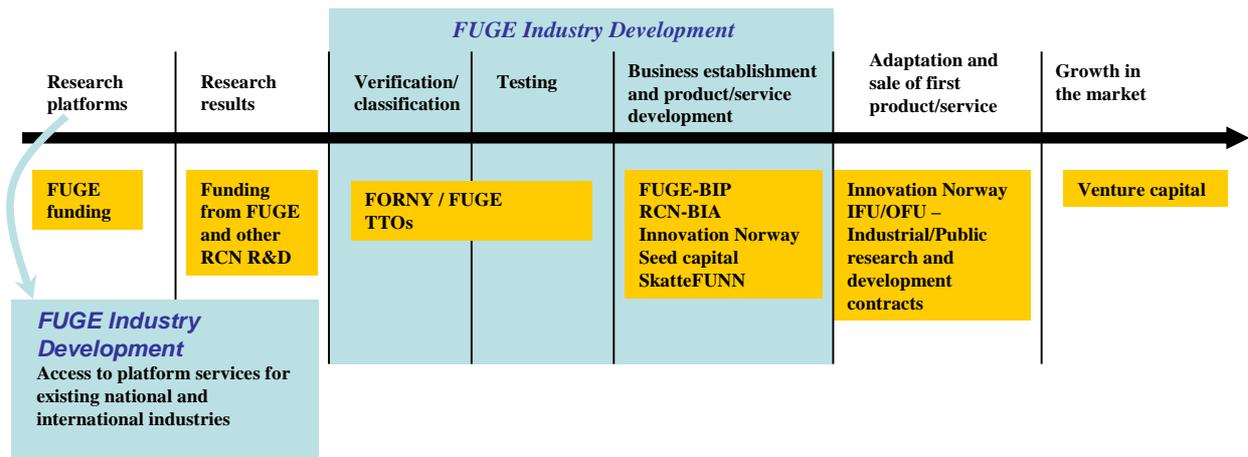


Figure 1. The links in the value chain where FUGE can make considerable contributions to industry development (marked with blue).

### 3.1 FUGE in a commercial verification and tryout phase

FUGE should be presented as a natural choice for partnership for the continuation of ideas with commercial potential which spring out from Centres of Excellence (CoE) and Centres for Research-based Innovation (CRI) and other applied research at the R&D institutions. In order to verify and try out/adapt research results for commercial use, it is imperative that the following points are carried out:

- Defining the product or service for communication externally
- Mapping market needs
- Clarify competitive aspects in the market, including the IP situation and patents in particular
- Clarifying time aspects, milestones and cost of research and development until the product/service starts generating profits
- Mapping possibilities for financing through equity funding
- Mapping possibilities for partnerships, among other things through use of the FUGE platforms and international collaborations
- Identifying one or more people who together with the researchers can carry out commercialisation through the distribution of the roles of “specialised entrepreneur” to researchers and “business entrepreneur” to external people, preferably people with backgrounds in biotechnology at PhD level possessing a keen sense for business and personal qualities such as determination and communication skills.

These are tasks for which the researchers lack competence; nor do they have the time to perform these tasks on their own. The “Technology Transfer Office” (TTO) connected to the various universities have an important job to do in this respect.

FUGE works together with FORNY on this project, but will also stay in direct contact with the TTOs for discussions on how knowledge about business development is best supplied in the initial phase of establishment. In the execution of some tasks, such as obtaining market information and negotiating partnership deals, FUGE has the possibility of forming closer connections with the external offices of Innovation Norway while simultaneously marketing the services of IN to users.

### 3.2 FUGE’s role in commercial establishment and development of first product/service

FUGE contributes to commercial establishment through the means of User-led Innovation Projects (BIP), which also encourage collaborations with domestic as well as foreign universities, and also with state institutions. Such R&D projects will contribute to a risk reduction for investors, and thereby increase the opportunities for companies to receive necessary capital considerably. BIPs also provide access to the FUGE platform facilities, among which are laboratories, key personnel and highly necessary equipment. This may, particularly in the initial phase, be crucial for a swift start-up of analyses and experiments.

### 3.3 FUGE industry development directed towards established industry

FUGE financing through BIPs is also available to established biotech companies. In addition, the FUGE platforms should offer industry services at a discount price. This means an increase in use of the platforms and closer connection and collaboration between academia and industry. The needs of the industry should be reflected in the prioritisation of support to the FUGE platforms.

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Companies receiving FUGE funding are eligible for using FUGE as reference when promoting research results and products/services. This also entails that FUGE promotional material must be available for use in the companies' own presentation material.

FUGE should initiate the establishment of biotech companies that are willing to share their experiences, knowledge and connections. The initiative should be brought to life in collaboration with Innovation Norway and the Norwegian Bioindustry Association. A network of national and international biotech companies interacting with each other will contribute to the tying together of products/services and the continuation of customer and distributor relations. As a consequence, there will be increased possibilities for catering to greater needs in the market.

### **4. FUGE industry development within drug development**

Medical research directed toward drugs and diagnostics was originally one of the driving forces behind the establishment of the FUGE initiative. Through various FUGE projects, platforms have been established for various types of analysis which provide support in the early phases of the development of new drugs. Furthermore, academia has through research found a variety of so-called “drug targets” which can function as the foundation for regulation of chemical substances, known as “drug candidates”. There are only a few companies in Norway working with clinical studies related to developing drug targets into drug candidates. These companies in the drug value chain, known as “early drug discovery” companies, address a demanding market with a strong market potential and a strong will to pay. At the same time, they are natural recipients of research results (particularly drug targets) from academic communities, and they are users of a number of products and services which help them move downwards on the spectrum of the value chain. This creates demands as well as possibilities for academic communities (among them the FUGE platforms) and companies for supplies to the drug value chain. In addition, companies in the drug value chain constitute an interesting career path for researchers while they also help support commercial spin-offs directed towards other business segments such as aquaculture, agriculture and the foodstuff industry.

FUGE should therefore contribute to the process of forming a Norwegian tradition and enhancing commercial appreciation for supporting early drug discovery companies. Such companies represent a pinpoint in biotechnology and are crucial for building a sizeable Norwegian biotech industry. They represent the largest driving force as well as the demand for new biotechnology. A goal for FUGE should be increased collaboration and the building of larger units so as to achieve optimal use of existing relations and competence, thereby making sure that individual (smaller) companies do not have to make their own separate ways down the drug value chain.

## **5. Activities in 2007 related to industry development which FUGE should initiate**

In collaboration with other actors the following activities will be relevant in 2007:

1. **FUGE platforms for industry.** FUGE should urge the platforms to make the services they offer more visible to the industry. This should also include passing on information from other institutions about services that the platforms themselves do not offer. In connection with the establishment of FUGE II (2007-2011) the platforms' abilities to provide for the needs of the industry will be assessed.
2. **FUGE promotion of industry.** FUGE should offer all companies receiving FUGE funding the possibility of promotion by way of using FUGE as reference and FUGE promotion material. In addition, FUGE should help make the companies visible through the FUGE web site and media profile. This entails that FUGE funding consist of more than grants only and that FUGE also aim to make work from the industry more visible.
3. **FUGE collaborations with FORNY and the TTOs.** FUGE should approach FORNY and the TTOs to establish a dialogue about FUGE contributions to the work with verification and establishment of new companies.
4. **FUGE company network.** FUGE should, in collaboration with Innovation Norway and the Norwegian Bioindustry Association, initiate the establishment of a network for companies, researchers, state actors and funds in order to secure optimal use of existing relations and competence. This in turn will help new establishments downward on the value chain. As part of the network, there should also be a "core collection" of business entrepreneurs who can help with the establishment of new companies. Furthermore, the network should contribute to collecting market information as well establishing partnerships and customer relations on the international arena.
5. **FUGE industry information.** FUGE is planning a meeting between academia and the industry, which will provide an excellent opportunity for informing the industry about the FUGE platforms and financing possibilities, as well as launching the concept of the business network.