

The Dream Commitment



In 2015 the Norwegian innovation agency Innovation Norway arranged a national brainstorming on the future of Norwegian industry, economy and society called Drømmeløftet (The Dream Commitment). More than 3500 people participated in more than 80 different events. Many of the events were arranged by Innovation Norway's offices around Norway and abroad, but some were also planned by other companies and organizations.

One of the objectives of the agency is to provide innovation policy advice to its owners (The Norwegian Ministry of Industry and Fisheries and the counties), other ministries and society at large. Innovation Norway has made use of the Dream Commitment material in a series of reports on the needed transformation of the Norwegian economy. This document contains excerpts of some of the relevant documents. The originals can be found over at drømmeløftet.no (<http://bit.ly/1dutb8Y>).

The Innovation Speech 2016, by Anita Krohn Traaseth, CEO, Innovation Norway



(Held in Oslo, May 31 2016)

In many ways the year 2015 represented a turning-point. It was the year when the world delivered a number of demands – challenges, tasks to be resolved. Consider for a moment the fact that 1.5 billion people still have no electricity. Then imagine the opportunities for the Norwegian energy business as a result of that.

To “Ensure access to affordable, reliable, sustainable and modern energy for all” is but one of the 17 UN sustainable Development goals agreed upon in 2015.

As Norwegians, we may not be accustomed to thinking about society’s challenges as business opportunities. This is however, one of the major shifts we are experiencing at the moment.

The European Union also uses global needs and challenges as the starting point for research and innovation, with its giant frame programme Horizon 2020. One of the issues Horizon 2020 addresses is Smart Societies and Smart Cities, including fully digitized public services and new solutions for transport and logistics. Again, an area where Norway has a lot to offer.

Finally, the Paris Agreement resulting from the COP 21 meeting in December sets forth a strong reduction in greenhouse gas emissions. The main goal is to limit global warming to well below 2.5 degrees Celsius – the aim is to limit the increase to 1.5 degrees.

Norway decided to even go one step further, by reducing greenhouse gas emissions by 40 per cent.

All in all these agreements and goals represent huge market opportunities for Norway. We have world-class technology for reduction of emissions, both locally and on a global scale.

So, the world has produced its demands, its goals and intentions. And the work has begun.

But how evident is it to the rest of the world what Norway can deliver.

It may not be all that clear. There is no doubt that Norway needs the world market. We need Asia, with its 49 countries and its 4.4 billion population. But is it as evident why they need us?

No. Clearly not.

In addition, we have so much more to offer – which is still unknown to the rest of the world.

This is the backdrop for our massive, shared process “The Dream Commitment,” in which Innovation Norway invited input from a wide range of participants nation-wide and across the globe.

Our government expects Innovation Norway to provide input and advice to be used as a basis for policy-making.

Any such process starts with listening. We like to listen, and our listening apparatus is large. It includes start-ups, well established businesses, clusters, research and development institutions, private and public entities, businesses large and small, symphony orchestras and football teams, labour organizations and chambers of commerce. Our presence in 35 countries and every county of Norway enables us to do this; we have the network.

3500 people have participated in more than 80 events.

Our intention was to learn about the ambitions – the dreams – that drive Norwegian start-ups as well as the established business community. We wanted to know what they were able to accomplish on their own and to what degree they needed support from the state – what commitment they needed from organizations such as Innovation Norway. Hence the name: The Dream Commitment.

And we do not take lightly on the name: Research confirms that companies that have high ambitions – or dreams – achieve better results in the long run.

This mobilization was an eye-opener to me. Never before have I experienced so much enthusiasm, so much insight, so much creativity.

On behalf of Innovation Norway I would like to express our deepest appreciation to each and every one of those who took the time to participate and contribute. Your input is extremely valuable to us.

The main message from the participants was very clear:

Norway is ready for the transition. We are motivated for the transition; we are well under way in the transition.

The Dream Commitment has provided us with input that enables us to identify six specific areas of opportunity, crossing the conventional boundaries of sectors and industries.

What we see are areas of opportunity where Norwegian know-how, Norwegian technology and Norwegian raw materials match the global challenges and demands. As such they represent business opportunities, which we put forward to the Government through our report.

Norway's knowledge of and technology for the Ocean Space is widely known and highly regarded. In fact, our position in that area is quite unique.

Much the same is true of clean energy. Based on our position as a leader in hydroelectric power and in offshore wind power generation, we will be able to build new business clusters and value chains – for instance within solar power and wind power.

Health and welfare is the one area within which Norway has a strong emphasis on research.

But there is an untapped potential: To commercialize, to build businesses.

Within this field we may well build a new (manufacturing) industry in Norway, providing jobs as well as grabbing a position in a market that is by nature global. We currently hold that kind of position within research in health and welfare.

The world has a shortage of resources. As a result the bioeconomy is one of the fastest growing markets. Norway has a fortunate position because of our access to valuable raw materials.

Our challenge now is to combine and to lift Norwegian agriculture, forestry and ocean farming into a new era.

There are other areas of opportunities that we need more information about. We need more research on smart societies – digitization of public services, fintech, better utilization of energy, green cities, waste treatment, circular economy and so on.

The same goes for our need for increased knowledge and commercialization of creative industries and tourism.

A combination of these areas of opportunity and Norway's reputation in numerous areas will help build our credibility in the world market.

A targeted effort in these six areas will make Norwegian solutions the preferred choice – even in tough international competition.

The world-wide survey Nation Brand Index gives Norway a high score in these areas. What better starting point could we wish for?

On the other hand, if there is one thing we've learned from our recent unique position as a country, it is that our economy is exposed and vulnerable when one industry alone – oil and gas/hydrocarbons – constitute more than 50 per cent of our revenues from export.

Developing these six areas of opportunity will reduce our vulnerability. We will build a much more diversified economy, which will strongly influence the composition of our export industries and incomes. There is no reason why we should remain committed to relying completely on one industry. Most of us do not like the idea of putting all our eggs in one basket.

But neither does any one of us know which areas will grow the most or be the winners in the long run.

That is beside the point.

The point is to choose direction and concentrate our efforts. That improves our probability of success dramatically.

From The Dream Commitment we have reached not one, but a number of conclusions.

Based on the input from discussions with a wide range of external partners and our own knowledge, Innovation Norway has developed ten recommendations for policy development.

INNOVATION NORWAY'S TEN RECOMMENDATIONS

1. Norway must set a clearer direction and invest where we have a competitive advantage. Private and public stakeholders have so far identified six key opportunity areas for growth and value creation. These are: the ocean space, health and welfare, bioeconomy, clean energy, creative industries and tourism, smart societies.

Innovation Norway recommends that these six opportunity areas provide an overall direction for a new Norwegian unique position.

2. Norway should be the world leader in the development and implementation of sustainable solutions.

Innovation Norway recommends that state and municipalities develop requirements and regulations in order to achieve a faster development of new markets for sustainable solutions.

3. In order to be chosen, one must be known. Therefore we must further develop Norway's national brand for attracting capital, knowledge, talent and tourists.

Innovation Norway recommends developing a clear national brand to encourage the world to choose Norway and Norwegian solutions.

4. Norway needs a national export strategy developed in partnership with the industry.

Innovation Norway recommends that the government invests at least the same level as our neighbours in the next five years in extra measures to boost exports, replace lost export revenue and create new jobs.

5. Norway should the next few years prioritize to commercialize research results so that we can build new businesses, industrialize new industries and create jobs in Norway.

Innovation Norway recommends that the government in the coming years puts effort into turning specific areas of opportunity, such as health, more towards commercialization and innovation.

6. The public sector must demand new solutions and challenge the business community to develop future products and services.

Innovation Norway recommends that public and private work in partnership to develop innovative, world class solutions.

7. The Government has prepared 98 white papers that directly or indirectly affect the ability to innovate in society. There is a great need to see these in context.

Innovation Norway recommends that the government develops a more coordinated innovation policy across the ministries.

8. We need to get more entrepreneurial companies to grow big with base in Norway.

Innovation Norway recommends more governmental assistance to ensure long-term and competent capital that can help companies through the growth phase.

9. Norwegian business and industry must quickly adopt new digital solutions to remain competitive.

Innovation Norway recommends that clusters should be a driving force for restructuring in order to increase the digitization rate in the entire industry.

10. The public sector must be improved and digitized to reduce the growth in operating expenses.

Innovation Norway recommends that measures from the white paper Digital Agenda for Norway are implemented and prioritized.

Six areas of opportunities for a new direction

From the Innovation Norway Dream Commitment Report 2016¹

A small country such as Norway cannot contribute a 100 % in all areas. Innovation Norway therefore believes that we should make extra effort in those areas where we already are successful, and have a competitive advantage. Where global and national challenges meets Norwegian knowledge, competence and/or Norwegian natural resources – is where we would normally find the greatest market opportunities.

Based on the inputs from the Dream Commitment, and through dialogue with relevant parts in the industry, business- and society, six main areas of possibilities for Norwegian industry and business was identified. The areas represent markets of growth, and which goes across traditional business classifications. The solutions of the future will be found in the intercept between disciplines and sectors.

The areas of opportunities are:

- Ocean Space
- Clean Energy
- Bioeconomy
- Health- and welfare
- Smart societies
- Creative businesses and tourism

In some of these areas – such as energy, ocean and bioeconomy – we already have strong traditions for businesses, competence environments and innovative businesses in the global markets. Some of them would need to readjust to new general terms, especially the companies that have made good money by serving the petroleum industry. However, much of the expertise which they possess is valuable for development in other areas.

The areas of opportunities such as smart societies, health and welfare, and creative businesses are not as developed as the above mentioned yet. In these areas we need more research and establishing new areas of knowledge and clusters. It will be important to combine competence from different sectors and knowledge environments in new ways and redirect the businesses towards new opportunities caused by the major changes in the society.

All areas of opportunities represent large, global developing markets. Some of these markets are more structured than others, such as parts of the health

¹ *Innspill til en ny retning for Norge*, <http://www.drømmeløftet.no/wp-content/uploads/2016/06/drommeloftsrapporten2016.pdf>

sectors and smart societies, whereas the public sector is the largest buyer. At the same time, these two areas represent rapidly growing markets, where IKT and new technology opens up for new areas.

The areas of opportunities are overlapped. Since they are defined based on societal challenges and market opportunities, they are found across existing sectors, technologies, branches of science and policy areas. This leads to an increasing need for cooperation across business areas, through the value chains, and between companies and other knowledge institutions. The fact that the areas of opportunities include different sectors and social areas shows the need for increased cooperation between the public support system and across ministries.

We see quite a few challenges that are common for many of these areas:

- There is a need for better coordination between areas of politics. Especially when it comes to the interaction between research and business development. There are also a need for adaption for, and strengthening, interdisciplinary and cross-sectorial cooperation.
- In order to bring out the potential in business development, we need to see a closer cooperation between private sector and the development of3 official services. There is often a need for development of the markets at home, so that the companies can test their solutions and build relevant competence. The public sector can play an important role, as both partner in the innovation process, and a demanding customer.
- New, potential technologies drive much of the innovation and the development of all the areas. The public sector can contribute to more use of such technologies in all relevant areas of the society, and at the same time stimulate to more, relevant Norwegian research and innovation.
- The market orientation is often too weak, and the innovation process too technology driven. The value chains must be seen more in connection and it is important to develop solutions, more so than goods and services. Competitive innovations often develop from a good understanding of market needs, and international market needs in particular.
- It is a need for attracting international competent capital (with an industrial network).

Ocean Space

Ocean Space is comprised by new installations, technologies, and services, in order to utilize the resources of the ocean; The utilization of the resources on the sea bed, production and catch of bio raw material in the water mass, transportation and other activities in the surface, production of clean energy, and more.

A guess is that the global value creation in the Ocean Space in the years 2010-2030 will be doubled, from 1500 to 3000 billion USD. Some Norwegian research environments believe that we in Norway will see a much higher growth rate, maybe six times more.

What can be read from the numbers are:

- The relative importance of oil and gas is expected to be reduced, while the monetary value of this activity is expected to grow.
- Offshore wind is the area where we expect to see the largest growth, relatively speaking, and this area also represent a large growth in actual value. Offshore wind is in 2030 expected to create as much value as half of the oil and gas industry did back in 2010.
- Aquaculture and fisheries will expand its relative share minimally, while together with higher value creation (refinement), these will make 10 percent of all value creation in the Ocean Space in 2030.
- Ship building, shipping and equipment vendor industry will see their relative share being reduced, while the actual value is expected to grow.
- Port activities and coastal tourism will grow both in its relative and actual meaning, but it is not included in our definition of the Ocean Space, since the value creation in principal is tied to delivery of services and activities, and for the lesser part generates the demand for maritime technology and competence.

The home market will become important on many areas in the future, both as drives for technology development (battery systems, new constructions for net cages, ferries and local shipping etc.), but also for reputation building and as a training area and display window for Norwegian, sustainable solutions.

When The Federation of Norwegian Industries Maritime is asked to point out one specific action that will trigger new and sustainable solutions in the Ocean Space, the answer is technology and infrastructure for liquefied natural gas (LNG) along the Norwegian coast line. If seen in a 5-10 years perspective, lack of infrastructure for new and environmentally friendly fuel is the largest

obstacles for the shift within maritime transport, both for ferries, local shipping, fisheries and aquaculture. Norway has invested in knowledge and have had a globally leading position within LNG, but will lose it without a well-functioning home market.

We need to strive for developing new, risk-bearing initiatives which use new technology, new business models and new systems. We must prioritize the new technologies, and focus on the new businesses which represent high value creating, through the whole value creation process, from the technology platform to the establishment of activities that bring out the potential in value creation as high as possible in the value chain.

A key to success internationally is to enter projects as early on as possible; in the design- and analytical phase. Norwegian Ocean Space companies receive high appreciation in the way they approach this, especially within oil and gas, maritime and aquaculture. Focusing on using this advantage even better will be more important, as experience shows that Norwegian design can break ground for Norwegian sub-suppliers and more sustainable solutions. At the same time, it is important to make sure that Norwegian general terms is at the same level as competing nations.

It is also a major challenge in triggering restructuring and crossover between the blue sectors, in particular from the petro-maritime industries to the other. Two important barriers in this context are costs and market knowledge.

Possible measures:

- The continuation of the NOx Fund, often extended to an international NOx fund, to strengthen market for Norwegian environmental solutions, technology and services, including LNG
- Greater focus on the development of traditional and new marine supply chains and solutions, technology and services that increase the value creation in Norway.
- Encourage offshore wind development in Norwegian waters and develop a domestic market for Norwegian equipment suppliers

Innovation Norway will consider:

- Increasing the risk relief to trigger major project through measures such as strengthening risk loan scheme, including increased use of contingent loans.
- Develop fast track services along with other funding agencies to simplify development and commercialization of sustainable solutions. Here we will build on experiences from the pilot project “pilotE” which was launched on 27 May this year.

- Putting greater focus on promoting Norwegian design and analysis companies globally, thus strengthening Norwegian sub-contractors opportunities to deliver.
- Increase efforts and mobilization opposite transverse business-oriented initiatives that embraces across multiple industries, and / or include all, or the majority, of the value chain within an industry.
- Strengthening our international offices through increased competence and capacity for networking, and procurement of services from leading communities in the respective market.

Clean Energy

Clean energy encompasses the entire energy system of renewable energy: planning, Production, network solutions, monitoring, storage, distribution, conversion, energy efficiency, and use of clean energy in energy-intensive industries.

Norwegian electricity production is 98 percent renewable. Net export of electricity in 2015 was 15 TWh. It is expected that there will be substantial profit in Nordic power balance towards 2030, which will set the direction for the future energy policy in Norway. Prices will remain low, even when electricity certificates are phased out.

The global energy market is undergoing major changes. This will entail significant challenges for most international power system, and also open market opportunities for Norwegian supply industry.

It will be important to further develop the Norwegian supply connected to the entire energy chain. The funding agencies play an important role in contributing to risk mitigation throughout the innovation chain for new technology.

The industry consists of both large and small players, and there is a need for predictability in long development cycles. A tighter integration between the Research Council of Norway, Innovation Norway and Enova will contribute to this. The supply industry market is global, and services that mitigate risk in the commercialization phase are essential - through Innovation Norway, The Norwegian Export Credit Guarantee Agency (GIEK) and Export Credit Norway.

The Norwegian power is renewable and affordable, and can be used for decarbonizing Carbon-intensive sectors suchlike as transportation and industry in Norway. The need for new technology, in order to meet future transportation needs on land and at sea, opens opportunities for Norwegian industry. Expertise and technology from the offshore petroleum sector - as subsea cabling and

transformers - can be further developed. New concepts, such as linking of floating offshore wind the petroleum activity, has great international impact.

We can increase the added value of our power surplus by building Norwegian energy intensive industries. Foreign capital, expertise and technology are crucial for Norway to retain and develop suchlike industry.

Invest in Norway has urged the international energy-intensive industries to establish themselves in Norway. Given affordable and renewable energy, Norway can be marketed as "The Greenest Industrial Site in the World. »In addition, the Norwegian industry a high degree of automation, adaptive process technology as well as access to highly trained and experienced specialists. Combined we see that these inputs give Norwegian energy intensive industries competitive advantages in a global market, that will add increasingly demanding low carbon footprint for products and goods.

When international companies consider where to establish their business, several aspects are taken into consideration. It includes various subsidies, improved infrastructure, longevity and predictability in relation to energy contracts, reduced costs for plots or buildings, tax, etc. In order to develop industry in Norway, the authorities must actively facilitate it.

Few industries are working as systematically with its environmental objectives as the Norwegian process industry, which is reflected in the recently published roadmap for low emission industries. The industry's goal is to reduce the greenhouse gas emissions down to zero. Competence, innovation and technology will be central to such an initiative, but the framework for ensuring international competitiveness will also be of great importance. To ensure Norwegian energy-intensive industry competitive advantage it will be important to develop competitive preferably beyond reasonable force. The roadmap for the process industry aims to reduce emissions from the industry, and this is one example of competitive advantage for the future.

Possible measures:

- Further development of the Norwegian supply connected to the entire energy system for clean energy.
- Increase value creation from the surplus of Norwegian power production – through the maintaining and development of green energy intensive industries.
- Increased investment in technology and systems to meet future transportation need both on land and at sea. These include electrification (charging, system integration, software and electricity expertise) and new energy carriers like hydrogen (storage, transportation, distribution and use).
- Establishment of good systems to further develop Norwegian supply through

Innovation partnerships with public actors related to large capital investments.

Innovation Norway is considering:

- Evaluate and develop the organization's policy instruments for environmental technology and environmental investments.
- Carry out benchmarking of Norwegian incentives and financial instruments in comparison to other countries it is natural to compare it with, to evaluate Norwegian attractiveness for international manufacturing and technology development.
- Develop collaborative relationships with Enova, aimed at optimal use of the Organizations' expertise and offerings
- Establish a fast track through the Norwegian funding agencies for development and testing of new concepts - based on the upcoming market needs and experiences from e.g. pilotE.
- Work to attract more foreign industrial establishments to Norway, looking at Comparative power agreements and other measures that can strengthen Norway's position as an attractive location for energy intensive industries.

Bioeconomy

The area includes sustainable and profitable exploitation, production and processing biomass from land and sea, for food and feed, materials and chemicals, and bio-energy (heat and fuel).

The bioeconomy represents industries that contribute greatly to the overall economy. The EU has estimated that bioeconomy has an annual turnover of 2,000 billion euros and employs about 9 percent of the total work labor supply. In Norway, the bioeconomy represents a turnover of about 303 billion NOK and employs approx. 140,000 persons.

The bioeconomy also represents some of the fastest growing markets where the three main global challenges; resource scarcity, climate change, population growth and urbanization, which drives the demand for renewable bio-based products.

Here it can be mentioned that the demand for seafood means that supply from aquaculture must increase by 37 million tons from 2004 to 2030. Norway, can multiply its share of this food production.

The future is bright for the natural composites material-industry, with an annual growth rate of 8.2 percent in the period from 2015 to 2020. According to analyses made by the forest industry, a rising demand for wood products is

expected, for building activities globally and in Europe, due to greater awareness about sustainability.

Norway has the expertise, industry and capital; however, the challenge is to unite forces to a wide effort on bioeconomy. There is a need to increase business knowledge of opportunities in bioeconomy, including knowledge about market opportunities, access, quality and composition of bio resources, and technologies and processes that enable efficient production, processing and processing possible, at all stages of the value chains.

To succeed, the bioeconomy requires an overall approach where innovation and development is important within the traditional bio based value chains and the creation of new ones. Knowledge about market opportunities, and the ability to translate them into strategies and products which the market demands, is crucial.

Except for the salmon industry, we see many fragmented value chains. It is information failures linked to market opportunities, making it challenging to secure quality and optimize utilization of bio resources for food, feed, materials, chemicals or energy.

Increased cooperation between enterprises, industries and research communities are important to trigger potential. There are several networks and clusters within the bio-based industries, but it is needed more new arenas of cooperation and a more cross sectoral and interdisciplinary cooperation to promote innovation and development.

Private venture capital assumes a favorable exit in the form of industrial sales or stock-exchange listing, except for long-term familial capital. For many bio-based projects the challenge is that perceived risk, for example related to future commodity basis or market, are disproportionate to the expected operating margins. The corresponding for larger companies will be challenges with the current value of long term projects, that might primarily have a sustainability reason (for reputational reasons), often are disadvantaged compared with shorter-term projects within the known value chains.

The consequence of short-term thinking is that many important bio based industry sectors in Norway have been underinvested for a long time, especially when it comes to new and innovative opportunities. We see this especially in the forest industry, but also in parts of the processing industry and the marine sector.

Public procurement can be an effective contributor to stimulate innovation and market development. This also applies to the development of new bio based products. For example, it can be done by increasing the use of wood in construction, bio plastics, and functional food or by purchasing greener consumables such as biofuels / gas.

Consumer power can help to stimulate innovation in this area (compare phasing out of the use of palm oil in food production). For consumers to make

the environmentally conscious choices, both information and knowledge about the benefits of bio –based products communicated in a trustworthy manner.

Possible measures:

- Use of public incentives such as taxes, the inclusion of emissions cost in the final price and risk financing (grants, loans and guarantees) will improve the profitability of bioeconomy thus increasing willingness to invest, and the pace on the implementation of bio-based products.
- To strengthen the work conditions, management plans and licensing regulations to facilitate pre-production, and full utilization of both traditional and new biological raw materials.
- Knowledge about trends and opportunities (market, commodity, technology, etc.) to promote innovation, and lay the foundation for market-oriented strategy and product development in enterprises.
- To stimulate innovation through business-focused collaboration clusters and innovation networks with international ramifications.
- Development of the market for bio-based products through awareness about the benefits and the importance of these products in both the public and private markets.

Innovation Norway is considering:

- Risk reducing market orientation development of business models, products and processes through greater expertise and scale (verification, piloting and demonstration).
- Increasing access to capital in the industrial structure through, among other measures to attract nationally and internationally competent capital - and greater efforts to exploit opportunities related to EU grants, loan and guarantee schemes.
- Increase expertise on new opportunities and markets and support market-oriented strategy and product development.
- Promoting interacting innovation, across disciplines and sectors.
- Profiling Norwegian companies and expertise through international partnerships, joint events, promotion materials etc.

Health and Welfare

Health and welfare, as an area of opportunity, includes companies that develop, produce, distribute, supply and export goods and services for health purposes. We may share the industry into the sub-segments pharmaceuticals, diagnostics, match, health ICT and specialized sub suppliers.

The Norwegian health sector is relatively small and young, with an emphasis on many entrepreneurial companies within match and health ICT. These

companies are known to be very ambitious and international. The private health sector had a total value of 48 billion in 2014 (one doubling in ten years), and grew by an additional 5 billion in 2015, at a time when several other industries experienced significant downswing.

Seven out of ten businesses report having introduced new products on the market in the past three years. 30 percent of their revenue comes from these very products. The combined export earnings were more than 20 billion last year. A few large companies account for three-quarters of export earnings, but we have nevertheless an important undercurrent of many small businesses that export. In the health sector we find that many are born global: entrepreneurial companies operating internationally from day one.

Successful innovation in healthcare has triple purpose of gain. For the individual patient it means better treatment, medicine and nutrition, which provides a much better and longer life. Society wins on a better resource-efficient health care: There are fewer to treat and more people can work. The business community wins when they manage to make and sell the world's best solutions to key health needs.

Health as an industry differs from many other industries, as the public constitutes the lion's share of the market. An aging population and new, large patient groups provide growth in public health tasks. The comprehensive needs make a potentially powerful driver for innovation in health industry. When important export revenue from the petroleum sector is reduced or absent, the public sector will have to rethink completely how we finance and organize the comprehensive Norwegian welfare state.

Although we can see the contours of a larger market for private health services, the history, values and culture of the Norwegian society dictates that the majority of health and care will remain in the public sector. The public market becomes less important forward like today. Coping with chronic illness, medications, rehabilitation, care, independence in home and medical devices, are just some of the many areas where we need to develop solutions for improved quality of life, and more effective treatments.

Healthcare must be far more productive, and businesses need to build good business models linked to public customers. Good partnership, where public and private together help create new solutions, therefore constitute a significant innovation potential health.

Few other industry sectors have a major growing market nationally and internationally. Large patient populations, pressure on welfare budgets and major demographic changes are all important drivers for health innovation in all Western countries. But as high-cost countries, we cannot compete on price.

The health industry consists largely of knowledge-intensive, young and ambitious companies. They are already internationally oriented, but are small and need a helping hand in order to create a solid position in the global

healthcare market for themselves. The companies itself points at the need for access to risk capital in early stages, as well as infrastructure for testing and verification, as bottlenecks for development. We must carry forward the growth companies, and dip us into niches where we have particular prerequisites for success internationally. It is crucial to work with clusters and knowledge communities.

The Nordic countries are small. We should increasingly view the Nordic region as our home market, and a venue to find good partners for system solutions and as a common springboard into global markets. We can combine our strengths and create new system solutions, for e.g. welfare technology and medtech.

We have Norwegian environments that are particularly strong in fields such as cancer, diabetes, dementia research and neuroscience. Both health care and end users are characterized by high technological expertise and the public sector, including health services; enjoy a high degree of trust of the population.

Long distances and extensive use of advanced technology has created national expertise e-health, mobile health and IT in healthcare. It is especially work related to "One inhabitant - One journal" that will create new opportunities ahead. Sensor-, materials- and nanotechnology are other Norwegian areas of expertise that could be increasingly important in the health context.

The oil and gas industry possesses technology expertise, methodology and international relationships that may be relevant and directly transferable to a Norwegian healthcare, in restructuring and growth in the Norwegian health sector. How can we contribute to the implementation of technology and competence that will help accelerate restructuring in the oil and gas industry, and growth and sustainability in the health sector?

We are now seeing a global paradigm shift within the field of medicine. Genetic engineering and biotechnology are merged, and with major health registers very potent opportunities opens up for new, individually personalized medicines. However, experience shows that it is very difficult to create proven business models in the field of bio banks and personalized medicine.

The health industry is global, and Norwegian solutions must be internationally competitive and scalable. Based on unique Norwegian advantages we can create a value chain and analysis services for precision medication, with services to patients and their physicians worldwide.

Possible measures:

- Strengthen the health profile of seed funds, trigger the interest of angel investors, and encourage greater private investment capital to the industry.

- Development of the Nordic region as a domestic market and a springboard to world markets
- Increased use of public-private innovation partnerships as a key grip to open up public markets.
- Ensuring disruptive successes from Norway access to more systematically benefits worldwide, in terms of business national team, training programs, and increased sharpening and effort in selected markets.

Innovation Norway is considering:

- Connect early stage innovation (ETIL), and more advanced technology development programs (IFU/OFU).
- Testing the Innovation partnership scheme as a means of creating functioning public markets for innovation.
- Contribute to Norway becoming an international test-bed for precision medicine.
- Strengthen clusters' role as a particularly important tool to establish new growth companies. We see, for instance, a potential to reshape the expertise and technology from the petroleum sector for use in health care.

Smart Societies

Smart Society is one of the areas where Innovation Norway believes that the Norwegian industry have the greatest opportunities to be part of the "global solution". The scope of smart society is wide and in the first phase, Innovation Norway has chosen to concentrate on smart cities, it is within the urban development innovation has started and progressed the furthest. Experience from towns will be an important basis for the development of local communities

There is no precise definition of smart societies, and we have developed a number of models, some very broad, others more subtle. Common features in all areas are transport and logistics, energy efficient buildings and housing, municipal technical infrastructure, and civil and administrative services. Couplings and interactions between these areas are central. We have chosen to start with the following definition of smart cities, enshrined in White Paper "Digital agenda for Norge." (Digital Agenda for Norway):

A smart city uses digital technology in order to make the cities better places to live and work. The smart city initiative strive to improve public services and the life quality of the inhabitants, optimize the use of common resources, increase the city's productivity, as well as reduce the climate- and environmental problems of the cities.

More than half the world's populations live in cities, and urbanization is increasing dramatically. The market for new smart solutions for urban development is considered to be significant.

According to the research company Frost & Sullivan the global smart city market currently represents a market opportunity of over 13,000 billion over the next five years, and it is expected that more than 26 global cities will be smart cities in 2025.

The advisory and research company Gartner has assessed the global smart city market based on the evolution of the number of Internet of Things devices within different area of applications. By far the largest market is in the areas of "smart commercial "and "smart home ", which in 2020 will represent about 80 percent of all units. Transport systems and infrastructure represents approximately 13 percent.

There is a need to develop smarter solutions for urban transport, energy and waste management, administrative and welfare services. Smart cities shall provide safe and functional living and working environments for citizens, and efficient and sustainable solutions for the different functions. New and innovative technology, combined with new ways of delivering services, creating opportunities to realize the need for smarter cities. Here there is also a number of interesting business opportunities, both related to the development of new, user-oriented technology and more comprehensive system deliveries.

Development of smart cities is on the agenda, globally, within EU and on a national level. A significant number of cities have defined themselves as "smart", but most are in the early stages when it comes to realization of their ambitions. Also Norwegian cities, knowledge- and innovation communities, take part in this work, and in several areas, Norway has very good technology communities and companies. Rapid growth in the global market for smart solutions provides good conditions for increasing exports of Norwegian technology.

Several Norwegian cities have established projects aimed at finding smart solutions to their needs. These include Stavanger, which through the «Triangulum»-project participates in an EU funded project (Horizon 2020) to develop smart cities solutions, within mobility, energy and ICT. Stavanger agreed on 26.mai 2016 to prepare a smart city strategy that will be presented to City Council in December 2016.

In Oslo, the city council wants to facilitate a pedestrian friendly downtown Oslo, where availability and well-being of the city's users are in focus. It is also established cluster initiatives based on close cooperation between the municipalities and the business community, such as NCE Smart Energy in Hilden, and Smart City and Communities in Stavanger.

The most important segments in the smart society are considered to be:

- Energy-efficient buildings and smart homes (monitoring, control, regulation and intelligent features in a building that will provide energy reduction, increased comfort and a better user experience)
- Technical Infrastructure (systems for water, energy and sanitation based on ICT supported solutions for efficient use of resources , environmental solutions , and quality control and others)
- Transport and mobility (ICT supported solutions for well-integrated transport and logistics services)
- Community Services (Services that can provide citizens with effective and user- oriented services that can contribute actively participation in planning and decision processes and provide good coordinated care)

The initial goal for the area could be to put in place an overarching national vision, and common goals and strategies for the development of tomorrow's smart communities. Such a vision will contribute to simplify the prioritization of focus areas, and provide an opportunity to assess and compare the effects of different activities. Such a framework should naturally aim to involve both public and private actors.

There are several good examples of how authorities are involved in the development of smart cities. The new Finnish transport plan, which is now out for consultation, proposes, for example more widespread sharing of data. By opening data and require that providers open data, gives developers a base for developing new services.

We see great potential in establishing a strategic cooperation with Nordic countries in the work to develop smart cities. Sweden, Denmark and Finland have in some areas made more progress in the development of smart cities. It is important that Norway can develop some areas where we can be leading, so that we also become attractive in terms of a Nordic cooperation. Such cooperation will provide greater opportunities for faster scaling globally, leveraging experience across countries. Co-financing of Nordic investments within several of the areas that are connected smart cities is an opportunity that should be investigated in order to contribute to closer cooperation between the Nordic countries.

Possible measures:

- The authorities take an overall coordinating role and establishes framework ensuring wealth creation in cities and communities
- The government establishes arrangements for financing, facilitating use of (open) public technological standards and platforms
- The government develops regulations and standards that promote a market for smart solutions.

Innovation Norway is considering:

- Building up its own expertise in the development of sustainable smart society and strengthen focus on relevant projects.
- Supporting long-term strategic cooperation initiatives, where businesses and cities / municipalities jointly develop innovative solutions for urban needs.
- Contribute to establish cooperation between Norwegian and Nordic companies and innovation environments, based on common interests and complementary advantages.
- Establish a common meeting places for skills and learning for both companies, knowledge institutions and funding agencies.
- Work towards several Norwegian companies is linked to the work of smart cities in EU Framework Program for Research and Innovation (Horizon 2020)

Creative Industry and Tourism

This area of opportunity refers to the possibilities created in the interaction between the creative industry and tourism. It includes sustainable economic development in key areas such as art, culture, nature and leisure activities. Additionally, it includes industries like architecture, computer games, design, film, literature and music. In order to realize the potential of the link between tourism and creative industry, new approaches are required.

Both the tourism industry and creative industry represents a great potential in itself. Globally the tourism industry is one of the fastest growing industries. 9 per cent of world GDP and 9.1 percent of all global jobs related to tourism. A growing proportion of the world population will be in the middle class over the next 15 years. In this group, purchasing power will be larger and thus give the opportunity to travel more.

The creative industry has evolved faster than the global economy as a whole in recent years, with growth of 8.8 percent annually from 2002-11, in trade of creative products and services. According to the UNESCO report The Globalization of Cultural Trade of 2016 is trade in cultural products, totaling \$ 212.8 billion in 2013, almost doubling total in 2004. There is no reason to believe that growth will slow down going forward.

Innovation Norway tourism survey shows that both Norwegian and foreign tourists increasingly are more interested in culture. Figures from 2014 show

that 42 percent of the foreign tourists can be characterized as cultural tourists. This is 14 percent more than in 2013. The so-called Cultural-tourists have higher average day consumption, and spend 26 percent more than other tourists vacationing in Norway.

In this work we focus however on the synergies created when the two industries meet. A greater degree of smart collaboration between the creative industry and the tourism industry is crucial for success in the future. Innovation Norway would therefore contribute to a shift from traditional models of tourism based on cultural heritage, to new models based on creative tourism with innovation and intellectual property content in focus.

The creative industry represents great opportunities for the tourism industry by contributing to greater diversity of content in tourism products, thus building strong and attractive destinations with distinct identity. The tourism industry in turn presents opportunities for the creative industry when it comes to increasing the amount of available audience, providing increased value and appeal to cultural and creative products and services, and to increase the credibility of countries, regions and cities. Recent years' efforts to build sustainable tourism destinations have created international attention, and this should give synergies in collaboration with creative industries, and should be further enhanced.

Norway has great natural advantages with spectacular scenery, fjords and mountains, and natural phenomena like the northern lights and midnight sun. A successful tourism initiative has given Norway an advantageous position in this area. But Norway has several other advantages, as well, and a good basis for promoting talented entrepreneurs and growth companies, both cultural enterprises and tourism enterprises, delivering world-class quality. Increased focus on commercialization and to convey Norway's many arts and cultural facilities, will also help to reinforce Norway as an attractive destination both nationally and internationally.

In order to continue working on the possibilities of increased cooperation between tourism and creative industries it is important to look at the preconditions for growth in each area. It must be focused on further innovation and sustainable growth in both industries. Both creative industry and the tourism industry are not very research-intensive, and it is important to make connection with research communities, to get a targeted effort.

Network-based corporate and cluster development in creative industry and tourism will underpin the industry's need for more innovation and increased profitability. It will help ensure that participants from different research

groups working together across academic and practical divisions and share knowledge with each other. While more companies will work on development through research, the research communities can benefit from the companies and their employees in the training. This is how innovation and knowledge arise.

There are many countries in the world that have already established investments in creative industry and tourism at national, regional and local level, under the tab creative tourism. An important part of the work will therefore be to establish strategic alliances with the best in the field to increase knowledge acquisition.

Possible measures:

- Building strong clusters and business networks that connect tourism and creative industry, research, innovation and market development.
- A competition to find the best product / service in creative tourism.

Innovation Norway is considering:

- To include creative industry as a central article in Norway's tourism strategy, because value creation depends on knowledge that creative industry is helping to create.
- Strengthen services for businesses in the creative industry and tourism to commercialize sustainable solutions (both expertise and capital).
- Stimulate restructuring and investments in reason-to-go experiences through risk reduction (loans and grants)
- Establish a shareable cultural calendar for Norway on VisitNorway.no.
- Contribute to the development of the Brand Norway.

Strategy 2016-2020

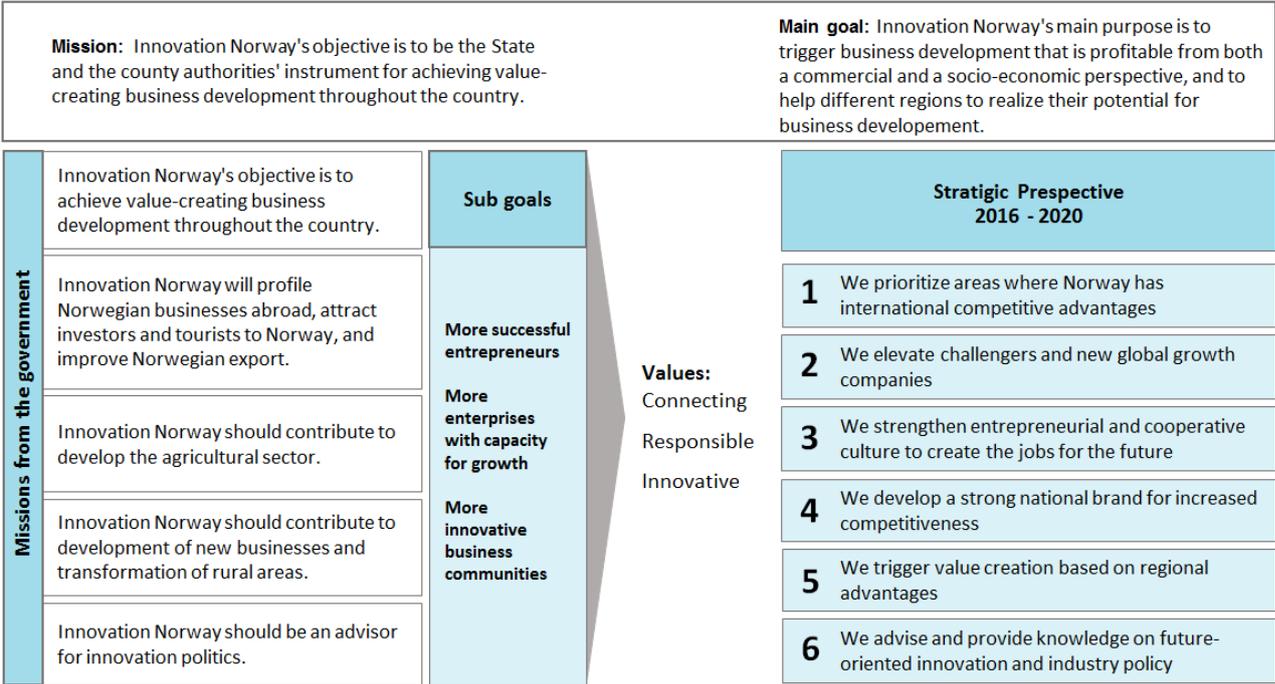
Innovation Norway towards 2020, strategy 2016-2020.

Innovation Norway will fulfil the role of being the instrument of the state and the county authorities for implementing value creating business development with a rapid rate of change Innovation Norway as a company is itself in transition and is now undergoing a comprehensive process of change to ensure its relevance for the reorganisation currently taking place In 2015 the executive board revised the company's strategy for the period 2016-2020.

The revised strategy aims to boost Innovation Norway's ability to achieve the three sub-goals that are defined by the owners as:

1. More successful entrepreneurs
2. More businesses with capacity for growth
3. More innovative business communities

The Dream Commitment's message about reorganisation, challenges and opportunities has also been the basis for the preparation of the revised strategy.



Innovation Norway's strategy map for 2016-2020

Innovation Norway's strategic message 2016-2020

Given the need for increased exports, which are described in this report, Innovation Norway says the company must invest more in areas where Norwegian business has relevant skills and an international competitive

advantage. This applies both to areas of opportunity, markets, technologies and areas of expertise, across industries and within various types of innovation.

Innovation Norway will do this by connecting new market needs, business models and disruptive technologies with areas and industries where Norwegian business can take a leading position.

Innovation Norway's contribution must be seen in context with other innovation policy processes and what the other government agencies and the Norwegian Ministry of Foreign Affairs' offices abroad do in this area. It is particularly important to achieve a good link between the research initiatives organised by the Research Council of Norway and innovation and export initiatives organised by Innovation Norway.

Innovation Norway has set up six overall strategic messages for the work towards 2020. These priorities are embedded in the purpose, social mission and ownership goals of the company, and also reflect what it has learned through the Dream Commitment.

Innovation Norway's six strategic messages:

1. We prioritise areas where Norway has international competitive advantages

Given the need for increased exports as described above, it is the intention of Innovation Norway that we must focus more on areas where Norwegian industry has relevant expertise and an international competitive advantage. This applies both to areas of opportunity, markets, technologies and areas of expertise, across industries and within various types of innovation.

We will do this by connecting new market needs, business models and disruptive technologies with areas and businesses where Norwegian industry can take a leading position.

In order to develop new businesses and value chains that are internationally competitive we are now crossing established trade and sector boundaries. Innovation Norway can contribute by linking relevant actors and processes together and by focusing more on areas where international opportunities linked to Norway's competitive advantages can be developed.

Innovation Norway's contribution must be seen in context with other innovation policy and what the other government agencies and the Norwegian Ministry of Foreign Affairs' offices abroad do in this area. It is particularly important to achieve a good link between the research initiatives

organised by the Research Council of Norway and innovation and export initiatives organised by Innovation Norway.

2. We elevate challengers and new global growth companies

New technologies such as *the Internet of Things*, *big data*, sensor technology, automated production and new materials are helping to transform our society. These technologies enable new products, solutions and business models that change the rules of the game and the division of labour in global value chains. These are business activities that have significant export and value creation potential if we succeed.

Start-up companies supply a great deal of dynamism to the economy by challenging the established order. This is particularly evident now, where pioneering technologies and ways of thinking are replacing previous big names and opening things up for entirely new growth companies. Therefore, we will continue to invest long-term in entrepreneurship.

In the established businesses, we also find important engines for innovation and change. We want to highlight those companies that plot a new course and renew themselves from within, those that create new growth by moving technology and expertise to innovative solutions and new markets. This is where the greatest growth potential is in the short term.

The domestic market is not big enough for entrepreneurs and companies who challenge the established order – in order to grow, many more must succeed internationally. This is needed if we are to solve the new challenges in export and the balance of trade.

Companies with a good grounding in international markets are also more innovative and more productive than other companies. Thus increasing the overall ability of commerce and industry to absorb new knowledge and new technology from abroad, including through interaction with customers and suppliers in Norway.

We must therefore intensify efforts to help Norwegian companies out into the world and foreign companies into Norway. Innovation Norway's offices abroad and the Norwegian Foreign Service will play a central role.

3. We strengthen entrepreneurial and cooperative culture to create the jobs of the future

Flat organisational structures, trust and cooperation are unique competitive advantages for Norway. Our best industrial clusters have created a culture where we "cooperate when we can and compete when we must." For a country with few industry engines and 99 percent of companies being small

and medium-sized, strong networks as well as regional and national clusters are crucial for competitiveness and innovation.

The start-up scene in Norway has taken off in recent years. We are meeting a new breed of entrepreneurs who innovate quickly and aim high. Such entrepreneurial culture, we need more of in the future, both among start-up companies and business in general.

When we discuss what we will depend on in the future, we too often set established industry and entrepreneurs against each other. There is no reason for this. Start-ups and established businesses each have their roles to play in the restructuring of the economy. Many entrepreneurs come from established companies, not from research communities. Often the seeds of their business idea come from their old employer.

The most promising entrepreneurs seek not only venture capital but also expertise, resources and networks to grow and succeed internationally. This expertise is what our very best companies and clusters have lots of. They have competed internationally for many years. They have built up and they have scaled back. But they have little contact with promising entrepreneurs.

Entrepreneurship lays the foundation for future value creation and exports, while innovation in more mature companies is most effective when we need to create new jobs quickly. It's not an either or. The larger companies need challengers in order to innovate faster. Entrepreneurs need the bigger companies in order to scale and grow. Therefore we are strengthening clusters and dismantling the barriers between industry, private capital and start-up communities.

4. We develop a strong national brand for increased competitiveness

Norway is a very open economy and we rely on foreign players and resources to ensure future growth. Access to these resources is controlled, however, not by us but by the choices made by foreign players. There are many countries out in the world that are both bigger and better known than Norway and that also have competitive advantages that the players are interested in.

How will we ensure that the players we rely on, actually choose us? That they will choose Norway as a tourist destination, that they will choose to make all or some of their investments here, that talent will live, study and work here. And not least that we ensure exports of Norwegian goods and services amidst strong international competition in the global market arena.

We know that Norway as a nation creates many positive associations abroad, with beautiful scenery and a stable political governance. We stand for quality,

technology and sustainability - and the outside world trusts us. This is a good starting point for creating brand Norway. Norwegian businesses compete for visibility out in the world.

Most Norwegian businesses are small or medium sized, have few resources to build awareness and knowledge in target groups, and often lose out in international competition. By building positive, differentiating associations with a national brand, we give Norwegian actors the opportunity to exploit this in their brand strategy.

Therefore, it becomes increasingly important for businesses looking to expand internationally to have the home country's reputation "behind them" when they go out into the world.

Norway is facing a big change, and in order to succeed in the future, we cannot just become better at innovation, research, business development and business establishment. We must also exploit the strategic opportunities offered by our positioning and highlight Norway's competitive advantage as a modern knowledge society. We must tell the world what we are doing.

The goal is to unite industry and government in a common, long-term commitment abroad in order to increase our value creation. The idea is that we get greater growth and more out of the resources through a purposeful, systematic, joint effort than what can be achieved individually.

At the same time, we believe the project can be something more. By defining an attractive position for Norway, we can build an identity and pride at the individual level. It gives a self-confidence that we Norwegians may need in the tough competition of an increasingly globalised world. It is also one of reasons why Innovation Norway is now starting a project to strengthen Norway's reputation as a knowledge-based and innovative economy.

Programmes for profiling and reputation creation will help to make Norwegian businesses and technology better known abroad and help foreign companies invest and establish new business in Norway. Team Norway is a measure that will improve the coordination of the various Norwegian actors who work with business promotion abroad. Cooperation in Team Norway is a requirement for the success of this work and should be further strengthened.

5. We trigger value creation based on regional advantages

Much of Norwegian innovation power lies in the interaction between different regions, between urban and rural areas, and in meetings between small sub-contractors and large industry engines.

Many of our most important export industries, clusters and industrial companies are located outside the major towns. Norway has been, and will remain, a country that places considerable demands on natural resources. Both oil and gas production, tourism, energy intensive industries and food production on land and at sea have a strong presence in rural areas and along the coast. The development of automated transport, building of a 4G network and methods for small-scale manufacturing make geographic distance and proximity to urban centres less crucial for future profitability.

At the same time big cities are also important engines for creation and innovation. Here we find the biggest knowledge centres and the central points for our leading service providers and creative industries. Digitisation blurs the distinction between traditional manufacturing and services. Leading industrial companies increasingly focus on services related to the products they deliver, and service providers in the cities provide industry and other companies with expertise and knowledge-based services. It makes little sense to set city and country against each other. Historically Norwegian industry has grown out of the interaction between the two.

99 percent of Norwegian companies have less than 10 employees. Targeting public spending only towards a limited elite of large, research-driven companies and industries is not sufficient if we are to go from transition to a new unique position. We must also increase the rate of innovation and competitive force in small and medium sized businesses across the country that have the potential to grow.

Innovation Norway is present in all regions and has networks across the breadth of Norwegian commerce and industry, which is truly unique. The company has a special responsibility to ensure that research and innovation policy does not only target those companies that already carry out systematic work on innovation and research. Innovation Norway will be the trigger for this by ensuring the supply of new promising entrepreneurs, growth companies and clusters increases every year.

Agriculture in Norway uses technology heavily compared to most other countries. Combined with a long coastline and a tradition of harvesting from the sea this provides good potential to develop new industries. Innovation Norway sees an untapped potential for value creation based on bio-resources from water, land and forest.

This does not mean that all regions should concentrate on the same thing. Regional advantages and potential for added value are very different. Smart specialisation and supplier development based on strong local clusters and

knowledge centres increases the potential for profitable value creation in places where demographics are currently challenging growth and development.

Together with its partners in the regional partnership, Innovation Norway will contribute to innovation and value creation development based on regional advantages. Proximity, accessibility and good local knowledge make it possible to identify the “right” customers and trigger opportunities locally. Together with municipalities, county authorities, Siva and the Research Council of Norway we are creating more profitable jobs, and making business more robust and flexible throughout the country.

6. We give advice and provide on future oriented innovation- and industry policy

Our owners have given Innovation Norway a comprehensive mandate as an innovation policy adviser. Innovation Norway will have knowledge of the challenges and opportunities Norwegian business faces at any time, based on our extensive contact with Norwegian businesses in Norway and internationally. We use this insight to advise owners and principals on innovation and business policy and regional development. We carry out analyses on which instruments are relevant to the business community, and which give an adequate result for companies and society.

The restructuring in business is leading to increasing demand for a rethinking of innovation and business policy, as well as tools for encouraging innovation. It requires a solid knowledge base and forward-looking analysis.

Innovation Norway is putting increased emphasis on building learning arenas for innovation policy thinking and development, arenas that include companies, professional organisations, other significant actors, government departments, research centres and others with an interest in

innovation and innovation policy. The dream commitment is a key part of this arena construction. Innovation Norway's advice will be based on input from other actors with ownership and insight of - business development, finance, innovation and relevant social development.

Photos: Choreograph/Thinkstock and Agnete Brun