# Guidance: Thematic and technology areas

The Government's Long-term plan for research and higher education (only available in Norwegian) highlights a number of thematic areas and technology areas as particularly important for Norway. In the R&D statistics, these are grouped into 13 thematic areas (of which 10 have follow-up questions) and 4 technology areas (of which 2 with follow-up questions).

The definitions of the thematic and technology areas, as well as the underlying research areas, are available in the questionnaires. These appear only if you indicate that the unit has R&D activity within the thematic or technology areas. We have therefore gathered the definitions in a separate guidance document so that they can be viewed in one place.

# Thematic areas

The definitions and coverage of the thematic areas are designed to overlap as little as possible. The thematic areas are divided into research areas, which are listed below together with an overview of what is included. The thematic areas cut across disciplines and fields of R&D and may include all fields of science.

You will be asked to select the thematic areas in which the unit had R&D activity in 2025. A separate page will then be generated for each of the thematic areas you select, where you will be asked to report the extent of the unit's R&D activity within each selected thematic area as a share of the unit's total R&D activity.

If the unit did not have R&D activity within any of the thematic areas in 2025, please tick "The unit had no R&D activity within any of the thematic areas above".

For each thematic area that includes questions on research areas, you will be asked to distribute the unit's R&D activity across the listed categories within each thematic area. *The total for each thematic area must sum to 100 per cent*.

The thematic areas covered are:

## Energy

R&D within renewable energy, energy efficiency and change, oil and gas operations, as well as nuclear power.

**Renewable energy (production, maintenance, environmental consequences and operation):**

- Hydropower
- Wind power
- Bioenergy
- Solar energy
- Other renewable energy such as geothermal, waves etc.

**Energy efficiency and change:**

- Construction and industry
- Transport (includes energy carriers such as batteries and hydrogen as fuel, charging and transport systems (land/maritime))

- Oil and gas operations
- Other industries (low-emission technology within other industries)
- Energy systems (grid, cables, transmissions, grid systems and digitization etc.)
- Economy, market, society (framework conditions, energy policy, consumer). Innovation processes and business development)

**Oil and gas operations:**

- Search and increased extraction: Technology, geological models and knowledge about the development of the petroleum resources on the Norwegian continental shelf. Development and operation of reservoirs to achieve the highest possible oil recovery.
- Drilling, completion and well intervention.
- Production, processing and transport: Transport of well stream from the wellhead to the platform, land or underwater system, including process technology, marine operations and platform technology.
- Major accidents and working environment: Preventing major accidents or improving the working environment in petroleum operations on the Norwegian continental shelf or at land plants in Norway.
- Other oil and gas-relevant R&D.

**Nuclear power**

## Climate

R&D within $CO_2$ handling, climate and climate adaptations, climate technology and other emission reductions (except related to renewable energy and energy efficiency).

**Climate and climate adaptations:**

- The climate system (except climate technology/emission reductions). Processes in the atmosphere, ocean, ice on land, etc. which contribute to climate variations and changes. Understanding of climate change and Climate scenarios for global, regional and local scale
- Climate effects: Changes in nature and/or society caused by climate change and climate actions.
- Climate adaptations: Society's adaptations to the effects of climate change.
- Climate technology and other emission reductions:
    - Climate technology. Technology for the reduction of greenhouse gas emissions and other climate drivers that are not linked to energy use and -production.
    - Framework conditions and policy instruments for emission reductions.

**$CO_2$ handling:**

- $CO_2$ capture
- $CO_2$ transport
- $CO_2$ storage
- Use of $CO_2$

## Environment

R&D within environmental technology, i.e. technology that is directly or indirectly aimed at improving the environment (including $CO_2$ management, climate technology, renewable energy, energy efficiency as defined under "Climate" and "Energy"), as well as land-based environment and society, i.e. biodiversity, ecosystems, pollution, waste, circular economy, land use, cultural heritage, cultural environments.

**Land-based environment and society (includes air, fresh water and coastal stone):**

- Biodiversity, ecosystems and the impact of ecosystems on people's mental and physical health.
- Pollution including environmental toxins, as well as noise and radioactive pollution.
- Land use and land changes including land conflicts on land and in the coastal zone.
- Cultural monuments, cultural environments and cultural landscapes.
- Circular economy

**Environmental technology**

## Agriculture

R&D within the production, processing and market for agricultural products including forestry and the use of wood.

- Primary production of food: Soil, plants and livestock. Plant health and animal health as well as animal welfare.
- Food/processing of food: Processing, packaging, logistics and storage
- Economy, market, society: Framework conditions and business and trade policy. Market and consumer.
- Forest production and use of wood
- Other agriculture-related R&D

## Fisheries

R&D within harvesting/catch, processing, and market for marine organisms.

- Technology and equipment
- Food and processing industry
- Economy, market, society
- Other fisheries-related R&D

## Aquaculture

R&D within the production, processing and market for aquaculture products, including farming in fresh water and on land.

- Production biology: Biology of organisms in all life stages
- Feed, feed resources, nutrition
- Health, disease: Prevention of disease, fish welfare and vaccine development
- Breeding and genetics
- Technology and equipment
- Slaughter, quality, processing
- Economy, market, society
- Other aquaculture-related R&D

## Marine R&D

R&D on marine ecosystems, monitoring, and effects of various influences. Includes opportunities in new bioresources.

- Marine ecosystems: Ecosystem structure, function, variation and change.
- Ecosystem impact: Pollution and other man-made impact factors on the marine environment, including the environmental effects of oil and gas operations, mineral extraction.
- Monitoring and estimation: monitoring of the marine environment and biodiversity, including population monitoring.
- Mathematical and numerical models: Development of mathematical and numerical models for marine R&D.
- Marine biotechnology/bioprospecting: Development and utilization of "new" biological resources.
- Other marine R&D.

## Maritime R&D

R&D within the design, construction and operation of vessels.

- Design, construction and operation of vessels for sea transport.
- Design, construction and operation of vessels for oil and gas operations.
- Design, construction and operation of vessels for other purposes (e.g. fishing, aquaculture and renewable energy such as offshore wind, wave power.

## Welfare

R&D within welfare: Working life and the labour market, inclusion and exclusion from working life, living conditions and demography, family and upbringing, welfare services, migration and immigration, and he sustainability and public support of the welfare state. The thematic area covers conditions in Norway and/or where Norwegian conditions are part of comparative studies.

- Working life and labour market: Research on working life, the labour market, restructuring, management, the work environment, labour relations, and training in working life. This also includes research on the importance of education for participation in working life.
- Income security and inclusion/exclusion from working life: Research on drop-out, exclusion from and inclusion in working life, as well as income protection resulting from temporary or permanent absence from work, including research on retirement behaviour among older workers.
- Living conditions and demographics: Research on differences in living conditions, social class, integration, social participation, inclusion and exclusion, housing and the importance of place of residence for welfare. This also includes research on the causes and consequences of changes in the population with regard to age composition, immigration and fertility. It also includes research that gives particular attention to biological and social differences between women and men, where gender is a central dimension.

- Family and upbringing: Research on family relations and organization, and children's living conditions and frameworks for upbringing. This does not include research on kindergartens, schools or the education system.
- Welfare services - public and private: Research on public and private welfare services. This does not include research on kindergartens, schools or the education system.
- Migration and immigration: Research on international migration, immigration and emigration, integration, immigration policy, relations between minorities and the majority population, asylum policy, refugees, and global challenges.
- Sustainability of the welfare society and support: Research on the fundamental conditions of the welfare state, including its sustainability, legitimacy, trust and social capital. This also includes public support for political processes and institutions.

## Educational research

R&D within teaching and learning, the content and assessment forms of the education, professional education and professional practice, management, management and organization of the education sector and the role of the education system in society and working life.

**Levels in the education system:**

- Early childhood education and care
- Primary school (grades 1-7)
- Lower secondary school (grade 8-10)
- Upper secondary school
- Vocational college education
- Higher education (bachelor's and master's level)
- Research education (PhD level)
- Adult education/learning in working life (postgraduate and continuing education)

**Research areas**

- Education policy and governance
- Economics, organisation and management
- Teaching, learning and development
- Interactions between education systems, home and working life

## Health and care

R&D within health and health-promoting conditions, prevention, causal mechanisms of disease, reduction and treatment of diseases and functional limitations and organization and streamlining of services in the health and care sector.

## Development research

R&D within poverty reduction, peace, democracy and human rights, and research initiatives that contribute to building up research capacity in developing countries.

## Tourism

R&D within tourism and the tourism industry.

# Technology areas

You will be asked to select the technology areas in which the unit had R&D activity in 2025. A separate page will then be generated for each of the technology areas you select. On these pages, you will be asked to report the extent of the unit's R&D activity within each selected technology area as a share of the unit's total R&D activity. The survey covers four technology areas, of which two have follow-up questions.

If the unit did not have R&D activity within any of the technology areas in 2025, please tick "The unit did not have R&D activity within any of the technology areas above".

For each technology area that includes questions on research areas, you will be asked to distribute the unit's R&D activity across the listed categories within each technology area. The total for each technology area must sum to 100 per cent.

## Information and communication technology (ICT)

R&D within information and communication technology (ICT), such as artificial intelligence, robotics and automation, digital security, smart components, hardware, communication technology, the Internet of Things, software and user interfaces, as well as digital transformation and implementation.

- Artificial intelligence, machine learning, machine reasoning: Research on artificial intelligence using various approaches and techniques, such as machine learning (for example deep learning), machine reasoning (including planning, search and optimisation).
- Robotics and automation: Research on robotics and automation, for example related to industrial robots and autonomous vehicles such as drones, self-driving cars and ships.
- Digital security: Technologies and knowledge aimed at reducing digital vulnerabilities, for example encryption, biometrics, privacy and security.
- Hardware, electronics, smart components and communication technology: Research on the Internet of Things, including future hardware and processing technologies, such as embedded systems, photonics, lab-on-a-chip technologies, sensor networks and communication infrastructure and networks.
- Software and user interfaces: New development methodologies, new programming languages, visualisation, user interface design and understanding, usability, new delivery models, ecosystems and business models.
- Digital transformation/digitalisation: Digital transformation and implementation of ICT at the interface between technology and people, organisations and/or society. This also includes legal, ethical and organisational challenges related to ICT.
- Other ICT

## Biotechnology

R&D within the application of natural sciences and technology to living organisms and to parts, products and models thereof, whereby living and non-living materials are modified in order to generate knowledge, goods and services. Biotechnology comprises several disciplines, including agriculture, industry and societal domains, as well as generic and societal aspects.

- Marine biotechnology: Technology and applications related to seafood and new food products based on marine resources, fish health and welfare. Application of new knowledge from the genomes of relevant aquaculture species and parasites. Cultivation and use of marine biomass and residual materials for various purposes. Marine bioprospecting, genetic resources and infrastructure for marine research.
- Agricultural biotechnology: Breeding and variety development, including biobanks, bioprospecting, diagnostics and treatment of animal and plant diseases. Biodiversity, genetic resources, and environmental biotechnology on land. Innovation in the production of food, feed and fertilisers. Utilisation of biomass, such as wood, fibres and slaughter waste.
- Industrial biotechnology: Development of tools for use in industrial biotechnology, such as enzymes, microorganisms and microbial systems, including systems biology and synthetic biology. Utilisation of biomass through integrated biorefineries, as well as biological treatment processes. Development of biotechnological process technologies, such as biocatalysis, fermentation and downstream processing, and infrastructure for demonstration and scaling up of biotechnological processes.
- Medical biotechnology: Development of diagnostics and treatment methods for humans. Applications within translational research, clinical research, prevention and innovation in the health sector. Infrastructure for health data and biobanks to support biotechnological research and development.
- Generic biotechnology: Development of the biotechnological toolbox with potential applications across all areas. This category should only be used when it is not possible to refer to any of the other sectors.
- Societal aspects of biotechnology: R&D related to how society contributes to and is affected by biotechnology. This includes ethical, legal and economic aspects of the use of biotechnology, as well as R&D related to responsible research and innovation, consumer issues, and artistic research related to biotechnology.
- Cross-cutting or interdisciplinary areas.

## Nanotechnology

R&D within new techniques for synthesis and processing for the design of functional and structural materials, components and systems with properties and functions and where dimensions and tolerances in the range of 0.1 to 100 nanometres play a decisive role. Ethical, legal, societal and health/environmental/safety aspects of nanotechnology are included.

## New materials, except nanotechnology

R&D within functional materials (materials with specific chemical, physical or biological properties). Materials, where the properties are purposefully changed through the use of nanotechnology, must be listed under nanotechnology.