

Statkraft's invitation to R&D applications

This call applies to KSP projects with the Norwegian Research Council application deadline February 17th as well as to IPN projects with deadlines in Q2 2021.

Since it is a short time since the KPN deadline in September 2020, this call is more focused on selected topics compared with our last call.

The invitation consists of the following documents:

- Invitation to participate (this document)
- Application template (excel-sheet)
- Template for project description (power point file)

Deadlines for the proposals is given in the table at the end of this invitation.

1. Background:

A well-structured and dimensioned R&D effort is a good investment for Statkraft. The R&D portfolio, which currently consists of 66 projects, is managed through the Corporate R&D program. The prioritization follows Statkraft's business strategy, with emphasis on areas where the company will grow. Statkraft uses a distributed R&D model where the business areas define and execute their projects and implement the results. The projects are preferably sought to be carried out in collaboration with the industry, research and educational institutions across geography and technology.

By R&D we mean systematic activity to achieve increased knowledge and competence in order to develop new products, processes and business models. Statkraft uses R&D to ensure a relevant knowledge-base, to build network, support the company's activities, provide input to the political agenda as well as to access public funds. Implicit in this, lies support to existing business areas and development of new business opportunities. Furthermore, Statkraft is a knowledge-based company and major industrial player, and we seek to take active part in R&D initiatives.

Statkrafts R&D strategy 2019 – 2025: Support growth

The focus of the R&D strategy is threefold:

- Support existing activities and the role as a premise provider in hydropower in the Nordic region
- Support growth in wind and solar to contribute to competitiveness in planned and future investments
- Enable new business initiatives by providing the necessary knowledge in decarbonization and electrification

Focus areas in the R&D strategy:

- **Hydropower:** Efficient operation and maintenance, improve energy management, increased flexibility, knowledge-based framework conditions

- **Wind and solar:** Reduce energy costs (LCOE), improve project decision, evaluate and enable new business models
- **Market operations and customer:** Improve trading, customer business and district heating. Strengthen knowledge about future energy markets and climate change
- **New business initiatives:** Contribute to increased electrification and decarbonization by increasing the use of renewable energy in energy sectors that today mainly use fossil energy, as well as increasing energy consumption through fuel cells and renewable fuel, energy storage and energy transport

2. Topics and priorities for call KSP/IPN 2021:

Topics of interest

The R&D strategy is focused on supporting Statkraft's growth and the R&D applications shall reflect this. We are mainly interested in receiving proposals within the below listed topics.

Hydro

ICT security for process control (OT)

Study security mechanisms for process control environment including legacy systems. Assess challenges with IT Security mechanisms (antivirus, patching, scanning, etc.) in process control systems. Assess secure solutions to be used towards process control when it comes to secure file transfer, remote access, etc.

Dam safety

Increase knowledge and understanding of dams to better predict the likelihood of failure, and further develop tools and methods to secure optimal dam safety for hydropower dams.

Impacts from changing operational patterns on hydropower assets

Identification of key parameters and correlations to identify impact on remaining lifetime, failure risk and maintenance costs as results of increasing flexibility and system services.

New Business

New Business develops new opportunities outside the current core of Statkraft, within defined search fields. Presently these includes Biofuel, EV-charging, Green Hydrogen, Green Ammonia, Datacentre and Distributed Energy. For the present call we are interested in:

Energy as a Service

- Sector coupling exploring synergies and business models when combining electricity and heating/cooling, transport (EV and Hydrogen) and energy storage.
- Energy management and digital solution for optimising demand-side flexibility including artificial intelligence.
- Techno-economic analysis, prosumer - consumer behaviour from different sectors including customer demands and expectations.

- Business opportunities, go-to-market strategy, related to customers in a digitalized society

EV-charging

- Smart charging, including future charging technologies and infrastructure.
- Future pricing and business models for EV Charging as a function of market, competitors and consumer behaviour.
- Brand managing and marketing

Green Ammonia

New eAmmonia production processes and applications.

- Build and develop broad knowledge and competence within production processes and use of Green Ammonia as a future fuel including techno-economic analysis
- Fuel cell technologies and applications

Priorities in project selection

Statkraft will emphasize achieving a portfolio that in total can respond to the factors mentioned below:

Relevance of project

- Relevance concerning topics described in the invitation text
- Topics outside the described areas, but within Statkraft's R&D strategy focus, might also be considered

Other factors

- Statkraft's strategy focuses mainly on growth outside the Nordic region. Hence, **international R&D activity and networks** are of increased interest. Collaboration with international universities, research institutes and relevant industrial partners will therefore be essential. In collaborative projects, it will be desirable to have 1-2 internationally recognized partners
- We want to promote innovation towards a renewable and climate-friendly energy system. Therefore, R&D within **new technologies, solutions and business models** is important not only for Norway but all locations where Statkraft is operating
- For Statkraft **social science research** is becoming more relevant, for instance to understand challenges and opportunities related to development of renewable energy in Norway and internationally
- **Interdisciplinary** projects will be emphasized to a greater extent. In addition to projects within the various subject areas, we would like to receive project applications that focus on hybrid solutions and/or have a system perspective

Financing, budget and actors

- Public/external funding is of great value in order to enable the desired portfolio of R&D projects
- In terms of budget, Statkraft's project share must be realistic in relation to our participation and R&D resources
- The actors participating in the project should be sufficiently comprehensive for the project's content and expected results

Intellectual property Rights (IPR) and collaboration agreements

Statkraft shall have access rights to all results that emerge from projects where we contribute with finances and in-kind. Background information is not included.

If the work is fully paid for by Statkraft, the company shall have ownership rights to the results that emerge. Background information is not included.

Projects shall not be started without a signed collaboration agreement in place.

3. Process

The KSP and IPN selection process is shown in the table below:

Process	Deadline (date)
Invitation issued from Statkraft	23 rd October
Deadline of first proposal	27 th November
First feedback from Statkraft	31 st December
Final Feedback from Statkraft	15 th February
Deadline KSP Norwegian Research Council (NFR)	17 th February

Applications to be sent via mailbox: RnD@statkraft.com

Please find below the contact information for the prioritised topics:

- Hydropower:
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- New business:
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EV-charging:
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