Call for Ideas for the Decarbonized Cities and 6G Bridge Programs and the Quantum Computing Campaign

1. Idea/Background for the Call for Ideas

In line with its strategy, Business Finland has launched mission-driven activities with two missions: 'Digital Native Finland' and 'Zero Carbon Future'. The goal of the mission-based approach is to provide Finnish companies with more opportunities to take advantage of future market opportunities. Missions are also intended to facilitate societal and systemic changes and to respond to global challenges. In the future, missions will play a strong role in Business Finland's programs.

In fall 2022, Business Finland has planned to launch two new programs related to the aforementioned missions, with the working titles:

- **Decarbonized Cities**. The Decarbonized Cities program aims to increase, strengthen and promote the Finnish offering and competence in cross-sectoral solutions to current and future urban carbon neutrality challenges, especially in the energy/construction sector and in the transport/mobility sector. The focus is on growing global markets. Finnish cities can act as pioneers in carbon-neutral urban solutions by demonstrating and piloting globally competitive and export-ready solutions.
- **6G Bridge**. The 6G Bridge program aims to deepen and broaden Finland's leading position as a developer of a mobile network technology portfolio, and to pilot and apply technologies to solve societal challenges and increase the export capabilities of Finnish companies.

And a campaign titled:

- **Quantum Computing.** The Quantum Computing campaign accelerates the growth and internationalization of the Finnish quantum ecosystem, in particular by supporting the development and deployment of the necessary software stack, as well as company experiments and demonstrations to solve significant problems through quantum computing.

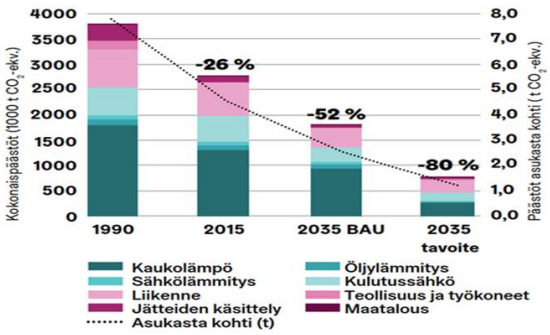
To map out ideas and Finnish expertise, Business Finland is launching a call for ideas. Exceptionally, funding will also be granted to research projects. The amount of funding awarded in response to the call for ideas will depend on the quality of the application and their competitiveness in relation to other applications. As a result of the call for ideas, we expect that the amount of funding for projects eligible for Business Finland funding will be EUR 25–30 million per program (EUR 8 million per campaign), of which the share of research projects is estimated to be in the order of EUR 20 million(EUR 5 million per campaign).

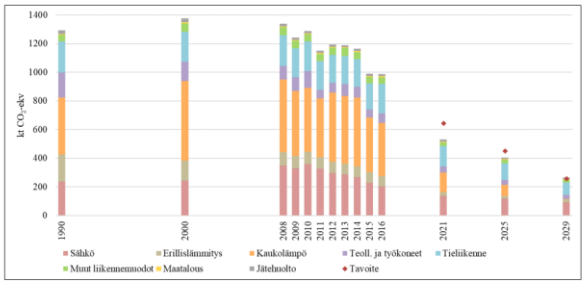
Business Finland has not made any decisions on whether to continue to organize calls after this one or on whether the research funding instrument will continue to be available.

2. Starting Point and Themes for Decarbonized Cities

Several cities in Finland and around the world have set strict carbon neutrality targets. In April, the European Commission selected 100 European cities with a mission to be carbon-neutral by 2030[1]. Helsinki, Espoo, Lahti, Turku, Tampere and Lappeenranta were selected to the list of Finland's pioneering cities. The Business Finland program will run alongside this EU mission, complementing the Commission's activities and funding opportunities.

The most significant low-carbon challenges in cities are related to **energy production and use, as well as transport solutions.** Below is an example of the development of CO_2 emissions in Helsinki and Turku to date, as well as future reduction targets.





Kuva 5. CO2-raportin menetelmällä lasketut päästöt Turussa 1990, 2000 ja 2008-2016, skenaariot ja tavoitetasot vuosille 2021, 2025 ja 2029.

Themes Funded under the Decarbonized Cities Program

All ideas that significantly improve the carbon handprint/reduce urban carbon dioxide emissions are welcome. Larger cross-sectoral solutions that utilize digitalization and circular economy, for example, are particularly interesting. We would especially like to see applications related to the following areas:

Low-carbon urban planning and construction

- How can a built environment produce a positive carbon handprint? How can the carbon handprint be used to build a competitive advantage for exporting companies?
- Metaverse, digital twins and XR solutions, urban visualization and simulation tools, and data models to support low carbon solutions
- CO_2 capture and use in cities
- Waste-free construction (from a life-cycle perspective), new low-emission materials

Energy solutions:

- Virtual power plants and zero-emission, local energy production, energy storage, flexibility of energy systems, urban sector integration

[1] https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/climate-neutral-and-smart-cities_en

- Energy efficiency of buildings, energy-positive buildings and areas, smart metering and control systems

Transport

- New driving forces and modes of transport in passenger transport, distribution and logistics as part of urban infrastructure and energy system
- Emission reductions in transport and logistics made possible by traffic data and service solutions based on it

A change in attitudes and behavior

- Motivation of residents and consumers to participate in low-carbon activities
- New forms of housing and mobility, the effects of increased remote working and flexible space conversions contributing to low carbon emissions

Selection Criteria for Decarbonized Cities Applications:

- How does the solution to be developed or studied reduce the urban carbon dioxide emissions (reducing or improving the carbon handprint)?
- What kind of export/exploitation potential does the solution have?
- Credibility and feasibility of the applicant (s) and the draft plan
- Research projects: linking to EU Decarbonized Cities objectives and networks, the path to EU funding

3. Starting Point, Themes and Criteria for the 6G Bridge Program

Finland's position in the development of mobile network technologies has been strong globally. The next generation of technology, 6G, is under development and research is already underway. In the context of previous generations of mobile networks, it has been recognized that the achievement of a significant foothold requires research activities launched at a sufficiently early stage in order to develop and protect the necessary intellectual property rights and to make and protect new technological inventions. Government investment in research and development will generate significant export earnings in the future.

6G has been selected as a priority technology for Finland and the EU and is seen as the basis for the societies of the future. The aim is to ensure technology and system self-sufficiency in the future. The business potential of 6G is expected to be huge, several dozen times greater than that of 5G. As a forerunner, Finland would have considerable export opportunities.

The objective is to maintain 6G opinion leadership until the industry starts 6G standardization, which will happen no earlier than in 2024. To secure this goal, Business Finland wants to launch a program for the development of existing and future network technologies.

From a technological point of view, the 6G Bridge program focuses on two categories of mobile network technology:

- Development and demonstration of 5G Advanced technologies and their application in business and society.

- Presentation of the results of basic research on 6G to enterprises and a shift from basic research to industrial research. In addition, the aim is to explore various research and technological alternatives and to examine their suitability for different applications.

The call for ideas invites all ideas that significantly improve Finland's leadership in the development and application of 5G Advanced and 6G technologies to solve societal challenges and increase the competitiveness of companies.

At the same time as the call for ideas, the 6G Bridge program will launch the development of a national research and innovation agenda (SRIA). Research ideas open to all, the main facilitators of SRIA work, and working group documents can be found on VTT's MS Teams platform at National B5G & 6G SRIA, where the preliminary list of research ideas (pdf) available at the time of the publication of the call for ideas will be updated as the work progresses.

Please first request access to the platform by email from Jyrki.Huusko@vtt.fi (until July 15, 2022) and Jyrki.Huusko@vtt.fi / Kyosti.Rautiola@vtt.fi (as of August 1, 2022).

Selection Criteria for 6G Bridge Applications:

- How is the solution to be developed or researched related to 5G Advanced/6G technologies and their application?
- What is the export potential of the solution in the relevant time horizon?
- Credibility and feasibility of the applicant(s) and the draft plan.
- Research projects should be linked to the EU's Digital Decade objectives, where applicable, as well as to relevant international research, development and innovation networks.

4. Starting Point and Financial Aspects of the Quantum Computing Campaign

There is currently fierce international competition in the building of a quantum computer and there are still many competing basic technologies. Making quantum computing possible would open up opportunities for mankind to solve many major sustainability problems (fossil-free energy or materials, logistics optimization, new and faster to develop pharmaceuticals, etc.). The companies producing quantum-based solutions first are also likely to be able to capture markets from other players in many sectors. An ecosystem has already been created in Finland for the quantum computer built by VTT and IQM, which provides a unique and evolving hands-on experimental environment for quantum computing.

The focus of the funding call is to produce the necessary knowledge and expertise for the development of the necessary quantum computing software, the creation of services that support their use, and the seamless integration of conventional computing and quantum computing. Since we are still working with a lower levels of quantum software stack, the development and optimization of the hardware and software interface is also one possible area of research. Research that promotes the solution of significant problems in Finnish companies through quantum computation and activates companies to participate in research work is also welcome.

Since the sector is still at a very early stage, we do not yet believe that there will be any co-innovation research involving company projects, but the proposed research projects must, nevertheless, activate and encourage companies to join in and experiment. The idea proposal must describe not only what is being researched, but also how to get companies to participate, how to validate the research results together with the companies, and/or how the project to be funded generates pilot and PoC projects around it. Potential companies to be activated and companies wishing to join the project steering group must be mentioned in the application.

Selection Criteria for Campaign Applications:

1. Project compatibility with a focus area of the call for ideas
2. Credibility and feasibility of the applicant (s) and the draft plan
3. Potential business benefits of the research results for Finnish companies in the long run
4. Engagement and interest/commitment of enterprises
5. Potential for further EU funding through international cooperation

5. Schedule and Process for the Call for Ideas

Application Template:

- Applicants must use the application form set out in Appendix 1. The maximum length of the applications is 3 pages.

Schedule and Selection Process:

- The call for ideas will be opened on June 20, 2022. Applications, i.e. **short descriptions of the project idea, are requested to be submitted by Thu, August 25, 2022** to the Business Finland record office
- The Business Finland evaluation panel scores and ranks the applications, gives applicants feedback on the application and informs the applicant about whether or not to submit an actual funding application
- Full funding applications are requested to be sent by October 13, 2022, via Business Finland's electronic application system

6. Financial Instruments of the Actual Application Phase for Funding:

Business Finland's normal financial instruments are used to finance the actual applications. Applicants that have qualified as candidates after the call-for-ideas round are sparred by Business Finland's contact persons, with whom the idea can be further refined before submitting the final funding application.

- **Research Projects**
  Exceptionally, research projects by individual research bodies or joint research projects between a few research bodies will also be granted funding under this call for ideas.

- The funding level will be 70%.
- International networking and a vision of how the concept can be continued and expanded with EU funding are required from the project.
- Parallel business projects or the funding of the research by companies are not required, but the funding of research by companies is an excellent indication of the interest and importance of the subject studied. Representatives of several companies are required to participate in the project steering groups. During the actual application phase, the level and quality of engagement of companies and other beneficiaries are key issues to be examined.
- Not only the participating enterprises but also representatives of cities and other parties that utilize the results are required to participate in the steering group for the projects to be included in the **Decarbonized Cities** program.
- The steering group of the projects to be included in the **6G Bridge** program must include representatives of several organizations that will utilize the results and experts appointed by Business Finland, based on the national strategic research and innovation agenda (SRIA).
- The **Quantum Computing** campaign requires that the research projects be carried out in close cooperation with companies, the means of cooperation and activation are described in the application and that representatives of more than one company utilizing the results participate in the steering groups.

- **Co-Creation**[2]:
  - The research organization(s) and the companies are working together on a new research idea. Maximum funding level 60% and project size up to EUR 100,000
  - https://www.businessfinland.fi/suomalaisille-asiakkaille/palvelut/rahoitus/yritysten-ja-tutkimusorganisaatioiden-yhteistyo/co-creation

- **Co-innovation Joint Project between Research Organizations and Companies**[3]:
  - The project involves one or more research organizations and at least three companies, at least two of which are applying for funding from Business Finland.
  - https://www.businessfinland.fi/suomalaisille-asiakkaille/palvelut/rahoitus/yritysten-ja-tutkimusorganisaatioiden-yhteistyo/co-innovation

- **Individual Company's RDI Projects and Pilot Loans**[4]**(40–50% Grant or 50% Soft Loan)**
  - https://www.businessfinland.fi/suomalaisille-asiakkaille/palvelut/rahoitus/tutkimus-ja-kehitysrahoitus

[2] Co-Creation applications can also be submitted outside of the call period. Funding for research projects can only be applied for within the framework of this call for ideas

[3] Co-Innovation applications can also be submitted outside the call period. Funding for research projects can only be applied for within the framework of this call for ideas

[4] Applications for RDI funding for an individual company can also be submitted outside the call period. Funding for research projects can only be applied for within the framework of this call for ideas

7. How to Participate in the Call for Ideas

Ideas/applications of a maximum of 3 pages drawn up in accordance with the template and titles provided in Appendix 1 must be sent by e-mail to kirjaamo@businessfinland.fi or by using a secure connection to https://asiointi.businessfinland.fi/suojaposti by August 25, 2022.

When sending the application, the following should be taken into account:

- The applicant's name and the case ID must be indicated clearly in the subject field of the email:

  'APPLICANT ORGANIZATION: Decarbonized Cities program Call for Ideas **BFRK/2/35/2022**'

  or

  'APPLICANT ORGANIZATION: 6G Bridge program Call for Ideas **BFRK/3/35/2022**'

  or

  'APPLICANT ORGANIZATION: Quantum Computing campaign Call for Ideas **BFRK/4/35/2022**'
- The maximum size of the email message, including attachments, is 9 MB. The files can be compressed (Winzip). The files should be submitted primarily as .pdf and .tif documents. The files can also be submitted as .rtf files or .doc and .docx files (Word), .xls and .xlsx files (Excel) and .ppt and .pptx files (PowerPoint). When using email, the idea application is deemed to have been received by Business Finland once the message(s) and attachments are available in a readable format in the email account of the record office at Business Finland.

  Applications can also be submitted by mail or in a closed envelope to the reception desk at Business Finland:

  Business Finland/record office
  P.O. Box 69 (Porkkalankatu 1)
  00101 Helsinki

The projects selected as candidates will submit the actual funding applications through the Business Finland electronic application system. More detailed instructions will be provided to these applicants at a later stage.

More Information:

- Decarbonized Cities program: Ilmari Absetz, Sini Uuttu, Virpi Mikkonen (at office in 1–14 July), Karin Wikman. Questions will not be answered from 15–30 July
- 6G Bridge Program: Jöns Tuomaranta, Sixten Sandström, Timo Sorsa, Tiina Nurmi, Mika Klemettinen, Pekka Rantala.
- Quantum Computing campaign: Outi Keski-Äijö, stand-in: Aki Ylönen. Questions will not be answered from 4–29 July
- all email addresses in form: firstname.lastname@businessfinland.fi

Appendix 1: Compulsory structure of applications proposing ideas

APPENDIX 1: Compulsory structure of applications proposing ideas

COVER PAGE

Project name:	
Name of the primary applicant organization:	
Other participants (in the case of a joint project):	
Contact details of the contact person (name, phone, e-mail):	
Project budget (preliminary estimate of the total costs of all project participants):	
Funding applied for from Business Finland (preliminary estimate of BF funding contribution, information on whether a loan or grant is being applied for):	

Decarbonized Cities / IDEA APPLICATION TITLES, max 3 pages

1. What need does the idea meet/what problem does it solve?
2. What impact will the solution have on the city's carbon dioxide emissions/carbon handprint?
3. What is the estimated export potential and market for the solution? For research projects: what companies could potentially utilize the results?
4. How is the matter resolved, what is being researched/developed, by what means and within what timescale?
5. What competing solutions can be found? What alternatives do we have today?

6G bridge / IDEA APPLICATION TITLES, max 3 pages

1. What problem will the proposal solve? What is the estimated export potential and market for the solution? For research projects: what companies could potentially utilize the results?
2. How is the matter resolved, what is being researched/developed, by what means and within what timescale?
3. What are the benefits of the solution in relation to the estimated costs?
4. What competing solutions can be found? What alternatives do we have today?

Quantum Computing / IDEA APPLICATION TITLES, max 3 pages

1. Need: What need does the idea meet/what problem does it solve?
2. Benefits: What kind of results with international novelty value does the research create for Finnish companies? How does this problem-solving promote the business of Finnish companies in the long term?
3. Solution: How is the matter resolved, what is being researched/developed, by what means and within what timescale?

4. Competition: What competing solutions can be found? What alternatives do we have today?
5. Participation of enterprises: How will companies participate in the research, what role would companies play in it and what projects could be created by them, either during or after the project? What are the potential participating companies for the project and the steering group?