

Energy-Smart Nidaros Cathedral Competition Manual

Official project website: <http://climate-kic.org/nidaros>

Energy-Smart Nidaros Cathedral

Can you help bring smart and climate-friendly energy solutions to Norway's historic and cultural landmark Nidaros Cathedral?

The City of Trondheim, Nidaros Cathedral Restoration Workshop and EIT Climate-KIC now invite innovators to take part in an Open Innovation competition.

The City of Trondheim is known as the technological capital of Norway. More than a thousand years old, it is home to a large number of cultural monuments and protected buildings. Together these factors make for a unique playground for innovation. Can historic landmarks be transformed into smart and climate-friendly powerhouses?

Buildings are responsible for 40 per cent of energy consumption and 36 per cent of CO₂ emissions in the EU. The EU has therefore set the target for all new buildings to be nearly zero-energy buildings within 2020. How do we apply the necessary knowledge and innovation to existing building stock? Old buildings and new technologies should have room for each other.

Trondheim aims to be a frontrunner for development of climate-friendly technologies and become a smart and sustainable city. The *Knowledge Axis*, stretching from Sluppen in the south to Brattøra/Nyhavna in the north, is the focal urban area for development and display of smart sustainable solutions. Norway's first new-built Powerhouse will soon be realized at Brattørkaia on the northern edge of the Knowledge Axis by the Trondheim Fjord. The building produces more clean and environmentally-friendly energy than it consumes. This world-class pilot project can be an inspiration to a national symbol like Nidaros Cathedral, which in many ways can be considered the heart of the Knowledge Axis. The cathedral played a vital role for knowledge since the medieval age.

The site: Nidaros Cathedral and its surrounding

The Nidaros Cathedral is the world's northernmost medieval cathedral and Norway's national sanctuary. Because of its immense size and construction, the building consumes a lot of energy. In 2017, the Nidaros Cathedral consumed 1.5 GWh of energy, 21 per cent of which was electricity and 79 per cent from district heating. Can a large cultural heritage monument contribute to showcase good examples of smart climate solutions?

Changes to constructions and appearance (interior and exterior) of Nidraos Cathedral and its immediate surroundings are strictly regulated. However, it is also known that there have been changes over time to make the cathedral more suitable for modern use. With all the existing limitations, this is reckoned as a very challenging but exciting task. There is need to establish dialogues through multidisciplinary partnership across areas such as cultural heritage conservation, architecture and design, and energy technology for smart buildings and districts.

As the Director of Cultural Heritage Management in Nidaros Cathedral Restoration Workshop pointed out, *"We are well aware of all the limitations, but would like to find out more about the possibilities."*

Competition questions

The contestants shall contribute with solutions that address the following purposes:

- *Deep energy retrofit and smart energy management of a large historic monument, taking into account the cultural-historic features and user experience.* Nidaros Cathedral and its surroundings is an important arena for cultural and religious events and one of the most famous tourist attractions in Norway. Is it possible to make it more energy-efficient without reducing its activity frequency and user comfort?
- *Transforming a historic urban district into a smart energy system with decentralized production of renewable energy.* Can Nidaros Cathedral and its surroundings become a "prosumer" of renewable energy?

It is acceptable that some or all of the components of the proposed solution require further development to be made fully applicable in the context of this competition.

It is likely that some aspects of a proposed idea or solution have been developed elsewhere for other purposes. Contestants are moreover welcome to come up with partial solutions with functions that support one of the main purposes of this urban challenge.

Competition format

Stage one:

Proposals can be submitted **until 31 May (23:00 CET)**. Pre-selection will take place in early June. Five finalists will be selected and announced in June.

- Open for submissions 24 March 2018
- Deadline for submission of solutions 31 May 2018
- Pre-selection early June 2018
- Announcement of five innovators for stage two 20 June 2018

Stage two:

The selected finalists will be invited to a boot camp, site visit and final pitch in Trondheim on 27-28 August 2018, during the innovation festival Trondheim Playground. The winning proposals will receive professional advice and assistance by EIT Climate-KIC in cooperation with the Norwegian organizing partners on how best to bring their ideas closer to reality.

- Boot camp and site visit in Trondheim 27-28 August 2018
- Final pitch and announcement of final winner 28 August 2018

Economic compensation

The five finalists (up to three team members per accepted proposal) will be reimbursed for travelling and accommodation expenses in accordance with EIT Climate-KIC terms and conditions. All receipts must be presented for expenses to be reimbursed.

IPR

The intellectual property rights (IPR) for the proposals are owned by the contestants. The IPR can be transferred to any of the organizing partners or any other partner involved in the

implementation in return for economic compensation which is agreed between the contestant and the partner willing to take over the IPR.

For all the finalists invited to stage two, where the ideas will be presented to other contestants not working in the same organization, an agreement about the IPR may be drawn up and signed between the teams. The organizing partners will not take any responsibility for such agreements. The responsibility belongs entirely to the teams. A copy of the agreement must, however, be sent to the competition secretariat before the second stage begins.

Implementation

The goal of the competition is to develop solutions that support the demands of the organizing partners looking to improve energy-related performance of a historic landmark and its surroundings. These demands concern various aspects such as technique, production, economy, aesthetics, long-term sustainability, social engagement, possibilities for local employment, etc. of the project.

The organizing partners do not take responsibility for the potential implementation of the solutions. The responsibility of the organizing partners ends at the end of stage two when the winners are announced. However, the winning proposals will receive professional advice in form of one follow-up meeting each with the organizing partners on how best to bring their idea closer to reality.

Publishing

All - or at least some - of the proposals submitted to the competition will be published in a solution catalogue associated with the competition. This catalogue, as a whole or partly, will be used for promotional purposes, shared on the official competition website and on the websites of the organizing partners. It may moreover be shared with other external parties to inform others about the competition and/or its results.

By taking part at stage one of this competition, contestants accept that their proposals can be published. If this is not acceptable, notice must be submitted when the proposal is registered.

Competition documents

This Competition Manual contains the program of the competition. Facts and other relevant information about Nidaros Cathedral are available at the official competition website <http://climate-kic.org/nidaros>. The purpose of these documents is to give participants a greater and more tangible idea of the objective associated with this competition. Full or partial solutions submitted to the competition by no means need to be “ready to roll-out” according to the site description documents. This is neither required nor expected at this stage.

The first stage of the competition will run without close interaction between the contestants and the organizing partners. Questions to the competition can be raised through the following communication channels:

- *An open webinar* at 14:30-16:00 CET on 7 May 2018. All questions raised at the webinar will be collected and answered at the official competition website.
- *Send an e-mail to the competition secretariat* at chin-yu.lee@trondheim.kommune.no no later than 11 May 2018. Answers to the competition questions will be made public on the competition website in batches. The last batch no later than 16 May 2018.

Proposals

All proposals submitted at stage one must contain a detailed description of the solution including a short description of its climate impact. Please note that:

- Proposals must be written in English.
- Proposals shall contain a written description of the solution in maximum four A4-pages with text in 12 point Times New Roman or similar and submitted in PDF-format.
- Proposals shall be submitted digitally through the official competition website (<http://climate-kic.org/nidaros>) latest at 23:00 CET on 31 May 2018.

The scope and content of proposal presentations at stage two will be decided by the organizing partners and informed as part of the invitation to the finalists.

Evaluation

The evaluation of the proposals will be carried out by a group of representatives from the organizing partners. The jury may be joined by experts from other institutions in order to cover opinions on different aspects of the proposals.

The jury will select five finalists in June (see Competition Format). The finalists are then invited to stage two of the competition in Trondheim 27-28 August 2018. At the final pitch event, the finalists will present their proposals to a panel of jury appointed by the organizing partners. The jury members of stage one and stage two may vary due to availability and other concerns.

Criteria

The proposals will be judged according to the following criteria. ***Technical and economic feasibility are absolute demands for a winning proposal.***

Feasibility – *How likely is it that the solution can be implemented?*

- Technical feasibility
- Economic feasibility
- Replicability

Innovation and ingenuity – *Is this solution a novelty or a unique breakthrough?*

- Level of creativeness and innovativeness

Use and function – *How will this solution work and be perceived on a daily basis?*

- Functionality and attractiveness

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- Form and design (in accordance to cultural heritage conservation)

Climate impact - *How climate-friendly is this solution?*

- Increase of energy efficiency
- Reduction of greenhouse gas emissions