

# Helsinki Energy Challenge

Answers to the clarifying questions sent  
to the organizer by 7 August

**Helsinki**

After filling in team member data and saving it looked ok. When you log in next time everything is gone and replaced with "null". Why is that? I tried to contact you by your form for technical issues.

All technical issues with the application portal should indeed be reported via the correct form - link available on the application portal's ([applychallenge.hel.fi](https://applychallenge.hel.fi)) instruction page. So the Q&A form on the challenge website (<https://energychallenge.hel.fi/qa>) shouldn't be used for technical issues. The technical issues are responded immediately if reported via the correct form. In June, there was a technical problem that impacted some application forms and all the teams with the problem was contacted back then and all issues were sorted out back then. We believe your issue was also sorted out back then already.

May screen captures from the maps available from <https://kartta.hel.fi> be used in the attachments of the proposed solution?

The team can upload relevant supporting attachments if they are needed to verify the submitted answers. The team can decide which attachments to use, thus, also the screen captures of the mentioned maps can be used. On the application portal, it is instructed that in which format the files should be. Note – only the information submitted in sections 1 and 2 of the application form will be used as a basis for evaluation; the attachments will only be used if clarifying information is needed.

I have sent a question a few weeks ago about whether there is a weather station in Finland that captures IR radiation and I never received an answer? Furthermore, can you recommend a company involved in the heating installations that could work with us locally?

As instructed in the competition material, all questions and their answers are published on the Helsinki Energy Challenge website, following the given deadlines and timetable. (The answers for the questions sent by 22 June can be found here: <https://www.hel.fi/static/kanslia/energy-challenge/q-by-22-june-a-by-3-july.pdf>) We do not have information on whether this kind of data (IR radiation) is collected. We encourage the competitors to directly contact any potential partners or information providers if needed. Furthermore, if the team is still looking for new team members for the Helsinki Energy Challenge team, the Collaboration platform might be helpful (Go to: <https://hec.solved.fi>). The organizer of the Challenge will not recommend team members. It is also good to note that this is a design contest so in this challenge competition we are in the search for master plans on how to decarbonise the heating of Helsinki. In the competition entry, the challenge participants need to describe, among other things, the implementation feasibility, including the different actors and stakeholders involved in the implementation. We have not imposed any restrictions or preferences on these stakeholders and actors. The implementation of the winning plan and solutions included in it is a possible continuation, but a separate process from the Helsinki Energy Challenge. This means that it is not required that there is a local company within the Challenge team when joining the competition.

Miksi kilpailuun ei voi osallistua yksittäinen henkilö (vaan pitää olla tiimi, jossa on vähintään kaksi henkilöä)? // Why Helsinki Energy Challenge is only open for teams with minimum 2 team members?

We believe that great innovation often comes from multidisciplinary discussions and diverse teams. We therefore require teams to consist of at least two members and actively encourage large and more diverse teams. Team members can represent different organisations (start-ups, other companies, universities, research organizations, etc.) but may also be individual experts not representing any organization. The bootcamp for finalists also requires team working. We encourage to team-up with others also due to the size of our challenge.

Regarding the team name, the application form says: You should choose a team name that does not reveal the names of your team members. The team name must be descriptive: 'Tons of Coal' could be your team name if you planned to use more coal in the heating of Helsinki. Is it correct that the above recommendation is given for data protection reasons? If people are forming a team which are all belonging to one organization, e.g. the red cross, would it be o.k. to name the team "the red cross team" ?

The final competition entries of the finalist teams will be evaluated anonymously. Therefore, it is important that the team name does not reveal the name of the team members (or team members' organisation/s). The finalist teams commit to not reveal the content of their entry in a way that could risk their anonymity.

I have a solution to save energy in buildings. That's energy efficiency. Are you interested to know more?

We are looking for solutions that will help us to get rid of coal by 2029 and speed up our journey to become carbon neutral by 2035. It is good to get familiar with the evaluation criteria (presented in the competition program section 3.5.) as well as other details presented in the Competition program; the competition program will guide you on who and what kind of solutions can apply and how we evaluate the proposed solutions, etc. Its good to note also: if the Challenge team is proposing energy efficiency solution as part of the competition entry, it should be such that the City of Helsinki or its energy utility can either implement centrally or have control over implementation otherwise. This is to ensure large scale impact. Improving the energy efficiency of individual buildings is often based on the decisions of the owners and is therefore associated with an uncertainty independent of the City; therefore, this kind of solutions are excluded from the Helsinki Energy Challenge, unless the competition entry also includes an element for "central implementation" as described.

And where do I find the answer on my question I put to you yesterday?

All questions and their answers are published on the Helsinki Energy Challenge website, following the given deadlines and timetable. Note, only those questions that are sent using the correct form will be answered and published (more information: <https://energychallenge.hel.fi/qa>)

Is Helsinki ready to act in the competition after the best knowledge we have on earth to minimize the amount of CO2?

Helsinki is committed to be carbon neutral by 2035. With this Challenge competition, we are aiming to find solutions on how to decarbonise our heating system; heating currently counts more than half of our emissions. We are committed to get the emissions down.

When will I be invited to Helsinki? It is necessary to ask all questions about the conditions in Helsinki and Finland in order to come up with the best possible optimal suggestions on how to remove the terrible coal! I also assume that I can use my mother tongue, Swedish.

Those teams that will be selected as finalist (3–15 teams) will be informed about the selection in the beginning of November; they will be invited to Helsinki in December (9–11 December), if the covid 19 -pandemic allows (if the situation does not allow, then the bootcamp will be organized virtually). In the application phase (ending September 30) the teams are not invited to Helsinki. The background material and reports published on the Challenge website should be sufficient information to prepare the application (also clarifying questions can be submitted using the Q&A form). The language of this competition is English and only applications that are in English will be accepted.

I am sending a link to my website today with content that is applicable to Helsinki as well. What do you think of my analysis of district heating in Sweden?

<http://fastighetsanalys.se/visaartikel.asp?refdatum=20150828185329&kategori=-1&sok=Fj%E4rrv%E4rme+%E4r+bra+men+varf%F6r+kan+man+inte&val=1&sprak=1>

In case you are interested to join the Helsinki Energy Challenge, please send your proposal through the application portal, <https://applychallenge.hel.fi/en/login>. Ideas that are sent through some other channels, are not accepted and not commented at this stage of the competition.

You have mentioned that you are going to reduce the amount of consuming biomass products, it would be appreciated if you clarify what exactly you treat as the "biomass". There is a text on the competition material:

"One way forward could be an increased use of biomass, a route that many other Nordic cities have already chosen or are adapting to. Helsinki refuses to go with the flow. Biomass is not a long-term sustainable solution and in order to steer away from even a temporary reliance on biomass, we are in search of other alternatives. The City of Helsinki is committed to make sure that other investments in biomass-fired production units will not be needed and instead, is looking for long-term sustainable solutions in its journey towards carbon-neutral future."

If we correctly got the point, "biomass" is used for describing wood/grass-based elements. We also reviewed the Q&A, but still feel some uncertainty about how to interpret the responses you previously provided. That is why we decided to ask you for a clarification regarding the "biomass".

We do not want to replace the coal-fired heat production with biomass-fired production, regardless the source or type of biomass. In the Challenge competition, biomass is understood to entail all organic materials considered to be "1st generation biomass", including e.g. harvesting and industry residues and peat. Generally, the aim is to find best solution(s) that can significantly reduce carbon emissions and affect the cessation of coal use by 2029 and speed up the City of Helsinki's journey to becoming carbon neutral by 2035, and all competition entries will be evaluated against the same criteria (available in the competition material) regardless of the proposed solution. The competition criteria includes, among other things, assessment of the natural resources needed as well as the impact on emissions.

How much more drive power is used in an air heating system for the fans in comparison with a water-borne low-flow system with the pressure-controlled pump from Grundfos on the pressure side? Is it 10, 20, 30 and so on times more?

Applicants should provide their own estimates and include necessary assumptions in the application where relevant.

How much power in W is used in Finland for waterborne systems per m<sup>3</sup>?

Applicants should provide their own estimates and include necessary assumptions in the application where relevant. The Finnish Energy association follows techno-economic indicators of district heating companies and the annually published statistic may provide some basis for making further assumptions. The statistics for 2018 are available in Finnish at: [https://energia.fi/files/4158/Kayttotaloudelliset\\_tunnusluvut\\_2018.pdf](https://energia.fi/files/4158/Kayttotaloudelliset_tunnusluvut_2018.pdf)

What is the method in Finland for calculating the absolutely necessary energy needs? So the need you get if you adjust the heating system correctly and optimally.

If such information is relevant for the proposed solution, the applicant should have their own estimate and present it along with the methodology and relevant assumptions as part of their application.

Is combustion air humidification used in any of the existing plants in Helsinki? In which of the plants it is used?

None of the existing plants have air humidification in use. Helen is constructing Vuosaari bioheating plant by using combustion air humidification and flue gas condensing technology to maximise efficiency.

What is the flue gas moisture content in the Salmisaari pellet HOB?

The moisture content depends on the hydrogen and moisture content of the fuel available. Typically the moisture content of the flue gas varies between 10 and 13 percent.

Is this challenge only aiming at 'heating', or is it possible to propose an overall system approach, simulating the entire system (energy, transport, and of course heating) and finding the route to an optimum solution for Helsinki?

We are looking for solutions on how to decarbonize the heating of Helsinki. However, the teams are free to propose overall system approach if they wish to do so. Important is to keep in mind the evaluation criteria presented in chapter 3.5. of the competition program as well as the other details that are presented in the competition program and base the proposal on that information.

I have a complementary question regarding the final prize. The Q&A states that "The implementation of the winning plan ... is a possible continuation but yet a separate process from this challenge competition." Does this mean that if our solution wins (i.e. an innovative heating network system), and Helsinki wishes to implement it, the funding for that project would be in addition to the €1M? Or are the €1M expected to cover the implementation, complementary studies, development...?

This is a design contest and the 1 million euro award is purely the prize for the winner of this challenge competition, so for the winning plan. It is not to cover the implementation. The implementation of the plan and the solutions included in it, as well as the possible co-development between the winner(s) and the City of Helsinki, is a possible continuation of the competition, but yet a separate process from this challenge competition. The continuation will be decided upon after the challenge competition process is completed, depending on the winning plan and the type of solution(s) it consists of.

Have you read this article? What do you say?

<http://fastighetsanalys.se/visaartikel.asp?refdatum=20090102195752&kategori=-1&sok=TN+10%3A&val=1&sprak=1>

In case you are interested to join the Helsinki Energy Challenge, please send your proposal through the application portal, <https://applychallenge.hel.fi/en/login>. Ideas that are sent through some other channels, are not accepted and not commented at this stage of the competition.

Have you read this article too?

<http://fastighetsanalys.se/visaartikel.asp?refdatum=20020607000000&kategori=30&sprak=1>

In case you are interested to join the Helsinki Energy Challenge, please send your proposal through the application portal, <https://applychallenge.hel.fi/en/login>. Ideas that are sent through some other channels, are not accepted and not commented at this stage of the competition.

To be sure that I have sent you this article I have to sent it once more! What do you say?  
Do you want to change your knowledge so it will be better than Swedens?

<http://fastighetsanalys.se/visaartikel.asp?refdatum=2004033000000&kategori=-1&sok=Statens+Institut+f%F6r+Byggnadsforskning&val=1&sprak=1>

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Will the Helsinki challenge consider green hydrogen, solving the electricity and markets challenge can enable infinite energy ?

Will the Helsinki challenge consider an ecosystem solution?

We are looking for solutions on how to decarbonize the heating of Helsinki and different types of solutions can be proposed as part of the competition entry. However, the challenge teams should get familiar with and use as a basis for their application the details that are presented in the competition program and other given background material. All submitted solutions will be evaluated using the same evaluation criteria. At this stage of the competition, we do not comment any ideas or solutions.

Which solutions are already in place for optimising of the production (and/or consumption) assets? Eg. combined heat and power plant optimisation using Procom etc. Which solutions are already in place for demand side flexibility on the heating side?

This information is not available at this stage of the competition. It is good to note that the new legislation bans the use of coal in energy production by May 2029. Considering the amount of coal that is currently used in Helsinki for generating heat, new heat production methods will be needed even if the production (and consumption) are optimised.

What is the maximum temperature of the heat sink of the (13MW) heat pump that can use sea water as heat source and that will be constructed into Vuosaari?

The maximum temperature is 82 °C.

The competition program requires us to clarify the development cost in the cost impact part of the solution. When we talk about proposed solutions for Helsinki, what development cost do you think is worthy of attention and indispensable?

This depends on the solution. The goal of the competition is to find solutions that can be implemented and used at a feasible cost to the city and end-users. Challenge participants are required to present the total costs of their solutions (e.g. development work, implementation/investment costs, usage/operating costs). Estimation of the total costs is enough in the Application. When it comes to the development costs, it depends on the solution and the teams themselves should know what development costs will be needed to taken into account when considering the total costs of the proposed solution.

I have heard of "your" drilling in Espoo. A very deep hole, 3000 to 5000 m? Can the energy there be used in Helsinki? How many MW can it deliver? What is the cost of investment for each MW or kW?

The geothermal heat project in Espoo will extract heat from the depth of 6.5 km and is estimated to produce heat at up to 40 MW capacity. The plant is expected to cover approximately 10% of the heating demand of Espoo district heating network. For the sake of this competition, heat generation from this geothermal plant is

not considered to be utilizable in the Helsinki district heating network. More information of the geothermal pilot is available at the project webpage at: <https://www.st1.com/geothermal-heat>.

Minulla on jo valmiit energiakaaviot. Kenelle ne lähetetään?// I have ready energy diagrams. Where can I send them?

If you are interested to join the Helsinki Energy Challenge and submit your team's application, please go to <https://applychallenge.hel.fi/en/login>. Only applications that are sent through the application portal will be accepted to Helsinki Energy Challenge.

Will you in this competition ignore me like they have done in Sweden and EU?

All competition entries that are sent through the application portal, and comply with the information that is given in the Competition program, will be evaluated using the same evaluation criteria. None will be ignored.

I'd like to know if this challenge is for the Helsinki city only or for the entire Helsinki urban area.

This challenge competition is for Helsinki city. We are looking for solutions for the heating of Helsinki (so not the entire Helsinki urban area). However, we hope we will find solutions that also other cities can utilize and learn from.

Are you excluded from an association with 5,000 members for making unreasonable criticism?

Unfortunately we do not know which association you are referring to. Also, please submit only clarifying questions that are relevant for this challenge competition, Helsinki Energy Challenge.

(Q1.) Is the telemetry data that Helen OY collects from the substation, based upon the following three factors only?

Temperature sensors (On the DH supply and return pipe and one for outside temperature monitoring)

Flow sensors (to measure the amount of water, needs to be installed on the primary side of the district heating)

Differential pressure regulator (To monitor and vary the opening of the control valve, ensuring a uniform pressure of 150 kPa across the supply and the return pipe of the DH fluid)

(Q2.) Is the district heating substation in Helsinki installed at the building level? If yes, is the number of substations equal to the number of buildings over there?

(Q3) In the pdf provided about the Helsinki DH network, the pressure levels of DH fluid are mentioned to be 6 and 8 bar. Is 6 bar the pressure of returning DH fluid? or is the network maintained at a constant 6 or 8 bar pressure throughout.

(Q4) Is Helen still pursuing the construction plan of the seasonal storage Kruunuvuorenrata? The new high end residential district is planned to host residents



from 2030 onwards. Can the 300,000 m<sup>3</sup> storage be included into our proposal calculations from year 2030 onwards, as there is no planned commissioning date shared by Helen.

(Q5) How many buildings (or in %) in Helsinki have a cloud based intelligent heat distribution system installed in them? Referring to the service in this link:

<https://www.helen.fi/en/housing-companies/heating-for-housing-companies/energy-efficient-heating-in-a-housing-company/make-savings-with-the-smart-heat-distribution-centre>

Q1: This information is not available at this stage of the competition process. Applicants should include all relevant assumptions in their competition entry.

Q2: The most common setup in Helsinki is that each building is connected to district heating via its own substation. The substation typically comprises of two heat exchangers (space heating and hot water). From the substation, heat is then distributed to individual apartments. As such, the number of district heated buildings would be a reasonable proxy for the number of substations in Helsinki.

Q3: In the background material, 8 bar refers to the pressure level of network located in the Eastern part of Helsinki and 6 bar to the pressure level of the main network in the city centre area.

Q4: No definite investment decisions have been made regarding Kruunuvuorenranta seasonal storage. If the applicant chooses to integrate this project to its solution, all relevant assumptions should be included in the proposal.

Q5: For the sake of this competition, it can be assumed that the majority of buildings in Helsinki are not equipped with the cloud based intelligent heat distribution system.

Does the project concern exclusively Helsinki city, or shall we also consider areas around Helsinki? What is the exact geographic delimitation of the project?

The scope of the competition is the heating system within the city of Helsinki. There is no geographical delimitations of the solutions, but as specified in the description and objectives of the competition program, it is important that the implementation of the proposed solutions can be influenced or managed by the City of Helsinki.

We would like an opportunity to present our idea,  
Please indicate: (1) Content specifications (if any); (2) Amount of Time

All applications have to be sent through the application portal, available at <https://applychallenge.hel.fi/en/login>. Further instructions, including the allowed length of the answer per question field, is available on the application portal. Further advice on the Challenge process and other details is available on the Competition program (available for download: <https://energychallenge.hel.fi/about>).

Those team that are selected as finalist teams (3–15 teams) will be invited to co-creation phase and to join the 3-day boot camp in December, to learn more and to get support to be able to make the further elaborated versions of their proposals. The competition entries are plans and will be sent in a written format, also the final competition entries after the co-creation phase.

Does the heating plants energy supply figure include the warmwater for bath and shower of the flats and houses or do they produce it with own electric boilers in the houses separately?

District heated buildings use delivered heat for both space heating and preparation of domestic hot water (DHW). All figures in the background report showing district heat consumption and production include heat



consumption of both space heating and DHW end-usage categories. It is very uncommon that buildings attached to district heating network in Helsinki have own parallel heating installations.

Please clarify whether family members of employees of City of Helsinki or its subsidiaries can join a competition team as a team member.

Helsinki Energy Challenge is a public design contest open for all. For each application, we will assess whether there are any factors that could affect the eligibility of that team. By default, being a family member of the City or its subsidiary does not harm the eligibility.

Helsinki