

Helsinki Energy Challenge

**Answers to the clarifying questions sent
to the organizer before 22 June**

Helsinki

Mitkä ovat kaukolämpöverkon meno ja paluu lämpötilat vuorokausittain? Tai vaihtoehtoisesti, mikä on verkoston meno ja paluu lämpötilojen yhteys ulkolämpötilaan?/ What are the daily district heating supply and return temperatures? Or alternatively, what is the connection of the supply and return temperatures to the outdoor temperature?

We are not able to provide the daily data on district heating supply and return temperatures at this stage of the competition. An approximation that may be used for the supply temperature level can be found from the District heating of buildings, Regulations and guidelines, published by Finnish Energy, p. 9. https://energia.fi/files/1555/DH_of_buildings_PublicationK1_EN.pdf

We are searching for some fine-grained data (building level) for the following (see below). Would you be able to tell us if these datasets exist and if so, would you be able to publish them or share links to them?

Land use map (residential, industrial and commercial) - Construction period of buildings - Energy labels map - Existing district heating and cooling networks - Demand: current heating, gas and electricity consumption (building block, neighbourhood or district level) - Energy Potential Mapping - Sun (Solar potential on roofs - thermal and electricity) - Wind potential - high-temperature thermal sources - Biomass - Waste incineration - Deep geothermal heat -supermarkets - hospitals - datacenters - Offices - Low-temperature sources - Open water (surface water) -Sewage mains - Drinking water mains - Waste heat from buildings - Mid temperature sources - PV-thermal heat -Road collector heat - Storage - ATES open -BTES closed loop

Background information and links to additional material can be found in the background report prepared for the Helsinki Energy Challenge, available at: <https://www.hel.fi/static/kanslia/energy-challenge/heating-system-in-helsinki.pdf>

Some of the requested information can be found from the following links:

- (1) Map including information of e.g. land use in Helsinki can be found from <https://kartta.hel.fi/?setlanguage=en#>
- (2) Buildings in Helsinki: https://www.avoindata.fi/data/en_GB/dataset/helsingin-rakennukset
- (3) Information on the potential for geothermal energy can be found here (study available in Finnish only): <https://dev.hel.fi/paatokset/media/att/ad/ada15fd55e906cea901947438e9e55ee4aff5f2.pdf>
- (4) ground source heat pump study for Helsinki, including maps describing the potential (published in Finnish): https://www.hel.fi/hel2/ksv/liitteet/2020_kaava/5066_9_Maalamposelvitys_Sweco_2019.pdf
- (5) Solar energy map can be found at: <https://aurinkosahkoakotiin.fi/hsyn-karttapalvelu-kertoo-aurinkosahkon-potentiaalin-katollasi/>
- (6) Finnish wind atlas is available as an online tool at: <http://www.tuuliatlas.fi/en/index.html>

1) Can you please provide the amount of heat (MWh) produced by Salmisaari power plant per month (i.e. monthly "load curves")? An average of the last years would be great, or data series of the last years.

2) At the website of Helen, we found the information that there are plans to build a large heat storage at "three large oil caverns used for the storage of heavy fuel oil are located underground in Mustikkamaa". Can you please provide information if Helen is still pursuing this plan?

(1) Information on monthly load curves on plant level is not available at this stage of the competition. In the Background report (<https://www.hel.fi/static/kanslia/energy-challenge/heating-system-in-helsinki.pdf>), Figure 19, the average monthly heat loads for the total heat demand have been presented; the Helsinki Energy Challenge participants can estimate on high level the energy production by generation type, if needed. At this stage of the competition, there is no requirement to analyse the other heating capacity in more detail. It is also good to take into account that the use of other capacity, as well as Salmisaari plant, is likely to change in the coming years when Hanasaari plant will be decommissioned and some new production and storage capacity will be taken into use by Helen. These current plans are described in the background report as well.

(2) Helen is still pursuing the plan with Mustikkamaa heat storage and the storage is planned to be in operation in 2021.

Helen, as a public entity owned by the City of Helsinki, could be the customer for proposed solution and the public procurement regulation would be applied in the possible following procurement process for the solution. If a Team would win the challenge with a solution that Helen would procure, is it possible that the public procurement regulation would restrict Team's participation in the possible following procurement process by Helen, since they have promoted their solution in the design contest by the City of Helsinki?

Helsinki Energy Challenge is a design contest as specified in the Finnish Act of Public Procurement and Concession Contracts. The contest is organised by the City of Helsinki. The implementation of the winning plan, and the solutions included in it, as well as the possible co-development between the winner and the City of Helsinki, is a possible continuation of the contest, yet, a separate process from the Helsinki Energy Challenge. The City of Helsinki can continue with the Helsinki Energy Challenge winner(s) on further development contract negotiations without a new procurement process. Helsinki Energy Challenge will not impose any restrictions on the Challenge participants in other public procurement processes of the City of Helsinki or Helen.

I am not a participant in the challenge, but I am interested in the issue of altering the heating systems into a greener way. I could not find any winners/winning ideas from the years before. Where can I read about them?

This is the first time Helsinki Energy Challenge is being organised so there are no winners yet.

Do you have a rough number of yearly full-load hours of Gas power plants (combined cycle power plants like the Vuosaari plant) in Finland for electricity generation? If you have some numbers, it would be best to make a distinction between (1) base load and (2) flexible peak load gas power plants or (3) flexible peak load power plants in general.

We are not able to provide data on this level for the Vuosaari plant at this stage of the competition. In the Helsinki Energy Challenge, we are looking for solutions that can significantly affect the cessation of coal use in Helsinki by 2029 and speed up the City of Helsinki's journey to becoming carbon-neutral by 2035. There can be some impacts on the gas fired capacity as well, however, there is no requirement to replace gas, or potentially decreasing electricity production in Helsinki. Generally concerning gas fired electricity generation capacity, it is good to note that gas is used for electricity generation in Finland only in a few plants. In 2019, the total electricity generation with gas was appr. 4 GWh. The use of natural gas in energy production is more concentrated on district heat and industrial heat and steam production in Finland.

Our plan might encompass technical solutions that can be provided by different technology providers (e.g. Siemens, Alstom, etc). Do you have a preference to present a firm partner (i.e. "pre-select" one or several technology providers), or can this be left open?

In the application phase, the Helsinki Energy Challenge participants are requested to present, among other things, a short description of the relevant feasibility factors of the proposed solutions. The description should include the different actors and stakeholders involved in the implementation. We have set no expectations or preferences on the presented actors and stakeholders.

Can under 18 years olds participate in Helsinki Energy Challenge?

Yes, under 18 years old can join the Helsinki energy Challenge.

I think I know how to submit a strong entry but I don't have the money to finish a prototype. I'm poor. Can I still enter?

Helsinki Energy Challenge is open for all. During this challenge competition process it is not needed to create a prototype. This is a design contest so the competition entries are master plans on how to decarbonise the heating of Helsinki using as little biomass as possible. The proposed plan can include one or more technological or other types of solutions. In the competition program, in section 3.5. you will find the level of information that should be presented in the application phase.

Is there a local firm to implement our technology to the city of Helsinki?

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.

Is there in Finland a University, research center, or meteorological center that collects IR (longwave radiation) as our technology does not only capture visible light very much as PV but also IR 24//7/365?

We do not have information on whether this kind of data is collected. We encourage the competitors to directly contact any potential partners or information providers if needed.

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