

5GDHC ROLE-PLAY GAME: DISTRICT HEATING COMPANY (EnNet)



To: EnNet representatives

Welcome to a meeting on implementing fifth generation district heating and cooling (5GDHC) in Glasgow city. You are the largest district heating system operator in Scotland.

You have a proposal on how to switch to carbon-neutral heating and cooling in buildings by implementing 5GDHC. You have already successfully demonstrated the 5GDHC principles in various pilot projects. Now, you want to roll out this technology on a large scale, starting in Glasgow city.

You have been proposed by the Glasgow city hall to initiate a meeting about the possibilities for 5GDHC in this city. For this meeting, you have invited potential customers for your 5GDHC network, as well as local government representatives. You have also invited potential suppliers of heat to your network. You may be able to convince some of the stakeholders at the meeting to invest in the network.

Your goals for the meeting:

1. To convince the first potential customers/supplier to be connected to a 5GDHC cluster.
2. To convince the local authority to facilitate your 5GDHC network.

Description of the EnNet company: You are a district heating company operating in Scotland. You currently supply heat and cold to approximately 87,000 consumers and more than 1,400 business customers. You are working hard to expand and make your existing heat networks more sustainable. Currently, your operation in Glasgow city is based on old district heating technology, which supplies heat to customers from a central, gas-fired power plant. Your ultimate goal is to completely dismantle this fossil-based network and roll out sustainable 5GDHC networks to all your customers. However, big projects need big investments. Your financial resources are limited.

Future vision of the company: You want to be the obvious partner in a society in which sustainable, renewable energy is becoming the standard and customers want to buy or produce energy locally. Based on the energy needs of your customers, you develop and deliver innovative energy products and services. You do this together with all kinds of partners, such as municipalities, the province, residents' organizations and suppliers of heat and cold sources. In this way, you bring the transition to clean energy in Scotland.

Additional information

Your possible strategies in this meeting (optional):

1. **Focus on dialog with housing association, workspace provider, waste water treatment plant:** You are interested to connect several buildings and create clusters for 5GDHC. Your main priorities are dwellings and offices that are currently connected to gas boilers. Additionally, you can start to negotiate with waste heat producers (like waste water treatment plant). You are also interested in buildings that need substantial cooling (like supermarkets and offices with a large amount of computer servers). They can supply your system with heat sources.

2. **Focus on dialog with the municipality:** You can try to convince municipal representatives that 5GDHC is the technology that will help to reach the net zero targets. A great success in this dialogue could be a connection of the municipal building(s) to a first 5GDHC cluster network. Additionally, if any subsidies are planned by the municipality to be spent on GHG emission reduction activities, you can discuss to apply for them.

Please consider that some of the stakeholders may be sceptical about 5GDHC technology or fear big changes, investments and /or dependency on one provider!

Your secret interest: You are interested to introduce and implement sustainable, carbon-neutral district heating and cooling technology (for example 5GDHC) in Glasgow city to cover the growing 'green demand'. You would like to be a leading company on the market. Currently, you have no competitors, but you need to move quickly and speed up your roll-out.

Supporting tools:

- Please use the shared score card to track your group's achievements in the game.
- You can use a map of the city to see the location of your buildings.
- You can use Notes file to share your notes with team.
- Additional information about 5GDHC technology is provided for your support.
- In case if you have questions or you need support, you can always ask an Expert.
- You can always visit www.5gdhc.eu website for more information.

This is a role-game. Improvisation is highly encouraged!

Instructions:

Your team will start the dialogue in the first discussion round as you are initiating this meeting. Please brainstorm your dialogue strategy in your team and **choose one representative of your team** to speak. It is helpful to make notes (check the supporting tools).

Important task **for scores:** during the brainstorming with your team, identify what are the **barriers** for you to build a 5GDHC network and what are the **opportunities/solutions** to those barriers? (Use the score template).

At the beginning of the first plenary discussion round, a moderator will invite you to speak. You can start with a description of your proposal (short description of 5GDHC, advantages of the technology in general and for clients in particular, why would you like to implement 5GDHC in Glasgow). All necessary information you can find in supporting tools (additional information). You can also improvise.

After presenting your proposal, you can address your dialogues to the selected stakeholder. Make an offer to attract potential customers/supplier or convince local authority to help implementing 5GDHC in the city. Your team will have **max 5 min** to speak in the first discussion round.

Before the second plenary discussion round, you get 10 min to brainstorm again in your team. Your strategy may change or stay the same based on the outcome of the first discussion round.

In the second discussion round, the moderator will invite any stakeholder to start the dialogue. Your team will have **max 5 min** to speak in the second discussion round and make the final statement.

After the second discussion round you will get 5 min to calculate your scores with your team.

5GDHC ROLE-PLAY GAME: GLASGOW HOUSING ASSOCIATION (GHA)



To: GHA representatives

Welcome to a meeting initiated by district heating company EnNet. You are invited to discuss a proposal of EnNet company on how to switch to carbon-neutral heating and cooling in buildings by implementing fifth generation district heating and cooling (5GDHC). As the largest rental-home owner in Glasgow city, you are considered as a potential customer for 5GDHC network.

Over the last five years you have spent £200 million improving rental-homes across Glasgow city. Thousands of homes have benefited from new kitchens and bathrooms as well as upgraded heating systems. Each home has received a new gas boiler.

The proposal of EnNet company may be interesting for you, as you are planning to do renovation of several old buildings this year. You can consider switching to a new carbon-neutral heating and cooling system for your future renovations. Perhaps, you can plan to connect the new buildings to a 5GDHC network too. Make sure that the new heating and cooling system will suit your tenants' expectations. The costs for residents for heating and cooling should not exceed the (future) costs of alternative/traditional ways of heating and cooling!

Your goals for the meeting:

1. To find out if the new 5GDHC technology can meet your tenants' expectation. Select a potential building(s) for the 5GDHC connection in Glasgow city (use the map of the city in tools; you can improvise).
2. To negotiate the financial side of the connection to 5GDHC system (your costs should be minimum).

Description of the company: Glasgow Housing Association (GHA) is Scotland's largest social landlord with almost 45,000 affordable homes in Glasgow. You believe in 'Better Homes and Better Lives'. Tenants are at the heart of decisions – giving people a real say on what happens to their homes and neighbourhoods. GHA works with partners, including local government (municipality), to deliver projects, which make communities cleaner, greener and safer.

Future vision of the company: You are focused on transforming communities with modern, energy-efficient homes. You also know there is a huge demand for even more homes in Glasgow – and that's why you are investing £50 million in coming 3 years in new-buildings to suit all budgets.

Additional information

Your possible strategies in this meeting (optional). Please address your dialogue to at least **2 stakeholders**:

1. **Focus on a dialog with the district heating company:** You can discuss with the district heating company the advantages and disadvantages of the 5GDHC technology and potential risks of disruption of heat/cold supply; You can inform about your concern that 5GDHC is a new

technology and your tenants do not know what to expect. You can propose to lower the heating/cooling tariffs as an incentive for your tenants (in case if your buildings are connected to 5GDHC).

- 2. Focus on a dialog with the local authority:** *You can discuss with the local authority if any financial support can be provided in case the building(s) is/are connected to a 5GDHC cluster.*

Keep in mind that you take the interests of your tenants into account. It means to have 24/7, 365 days per year heating and cooling in their homes.

Your secret interest: You know that carbon-neutral district heating and cooling technology (for example 5GDHC) has a future. Gas resources are getting expensive, and they are limited. You can start transformation/connection of your buildings to a green heating and cooling system already today. It brings advantage to your image. Tenants with strong environmental position will always support you!

Supporting tools:

- *Please use the shared score card to track your group's achievements in the game.*
- *You can use a map of the city to see the location of your buildings.*
- *You can use Notes file to share your notes with team.*
- *Additional information about 5GDHC technology is provided for your support.*
- *In case if you have questions or you need support, you can always ask an Expert.*
- *You can always visit www.5gdhc.eu website for more information.*

This is a role-game. Improvisation is highly encouraged!

Instructions:

Please brainstorm your dialogue strategy in your team and choose **one representative of your team** to speak. It is helpful to make notes (check the supporting tools).

Important task (**for scores**): during the brainstorming with your team identify what are the **barriers** for you to connect to 5GDHC network and what are the **opportunities/solutions** to those barriers? (Use the score template).

At the beginning of the first plenary discussion round, the moderator will invite the district heating company EnNet to start the dialogue. The EnNet representative will present their proposal and approach one of the stakeholders with an offer. If EnNet addresses the dialogue to you, you can respond. If EnNet does not approach you, you can approach any stakeholder (based on your strategy) when the moderator provides you the time. Your team will have **max 5 min** to speak in the first discussion round. You can always improvise.

Before the second plenary discussion round, you get 10 min to brainstorm again in your team. Your strategy may change or stay the same based on the outcome of the first discussion round.

In the second plenary discussion round, the moderator will invite any stakeholder to start the dialogue. Your team will have **max 5 min** to speak in the second discussion round and make the final statement.

After the second discussion round you will get 5 min to calculate your scores with your team.

5GDHC ROLE-PLAY GAME: LOCAL AUTHORITY (GLASGOW CITY HALL)



To: Local authority representatives

Welcome to a meeting on implementing fifth generation district heating and cooling (5GDHC) in Glasgow city. You are a representative of the local authority, the Glasgow City Hall.

The Scottish Government aims to reduce greenhouse gas (GHG) emissions by 75% by 2030 and to achieve net zero carbon emissions by 2045. To achieve these ambitious decarbonisation targets, the heating and cooling system in buildings should be transitioned to a fossil fuel free system. However, there are doubts about how far a transition to fossil free heating and cooling can be achieved.

Transforming the buildings with old district heating (DH) networks and dwellings with independent gas boilers to a low carbon heat network involves a variety of work and planning that need to be coordinated, with leadership from your side.

In addition, all building owners should be encouraged to invest in energy efficiency measures. The transition from gas to another energy supply must be supported by government subsidies and/or the creation of (financial) barriers to consume natural gas.

You approached district heating company EnNet to come with a proposal on how to switch to carbon-neutral heating and cooling in buildings by implementing 5GDHC and organize a meeting with different stakeholders in Glasgow to discuss that proposal.

The proposal of EnNet company is in your interest. If you are convinced in 5GDHC technology, you can start planning which buildings first to connect to 5GDHC in the city.

Your goals for the meeting:

1. To bring together consumers, producers and prosumers of heat and cold in your city and to discuss how 5GDHC can help with achieving the targets of net zero carbon emissions in the city.
 2. To discuss if and how the local authority can facilitate/help the 5GDHC roll-out (for example encouraging building owners to switch to 5GDHC, free gas disconnection, provide subsidies, introducing new local rules in the city).
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Description of the local authority: The City Hall in Glasgow is the largest local authority in Scotland, employing just under 18,000 people to help deliver essential services to the city and its 620,000 residents. The City Hall manages a gross annual budget of over £2.4 billion that partially can be spent on funding the projects to turn the Glasgow to carbon-neutral city.

Future vision of the local authority: The City Hall will be encouraging district heating schemes, wherever possible, but with a particular focus on the climate neutral technologies. The DH projects can result in significant CO₂ savings and lower bills for the residents and businesses involved.

Additional information

Your possible strategies in this meeting (optional). Please address your dialogue to at least 2 stakeholders:

1. **Focus on a dialog with the district heating company:** You can discuss with the district heating company the advantages and disadvantages of the 5GDHC technology; how the technology can help in decarbonisation of the city.
2. **Focus on a dialog with building owners:** You can find out the opinions of the building owners about 5GDHC; If they are willing to become first customers of the new technology; How positive are they to be disconnected from gas? What support do they need from you?

Please consider that disconnecting buildings from gas is not an easy task. It is not only about technical aspects, but also acceptance of the new technology plays a major role. Not everyone is willing to give up their old lifestyle and believe. A very careful approach should be selected.

Your secret interest: You are interested to achieve net zero carbon emissions earlier than planned. You would like to turn Glasgow city to a carbon-neutral city and become one of the best example city in Scotland.

Supporting tools:

- Please use the shared score card to track your group's achievements in the game.
- You can use a map of the city to see the location of your buildings.
- You can use Notes file to share your notes with team.
- Additional information about 5GDHC technology is provided for your support.
- In case you have questions, or you need support, you can always ask an Expert.
- You can always visit www.5gdhc.eu website for more information.

This is a role-game. Improvisation is highly encouraged!

Instructions:

Please brainstorm your dialogue strategy in your team and choose **one representative of your team** to speak. It is helpful to make notes (check the supporting tools).

Important task (**for scores**): during the brainstorming with your team identify what are the **barriers** to build a 5GDHC network in the city and what are the **opportunities/solutions** to those barriers? (Use the score template).

At the beginning of the first plenary discussion round, the moderator will invite the district heating company EnNet to start the dialogue. The EnNet representative will present their proposal and approach one of the stakeholders with an offer. If EnNet addresses the dialogue to you, you can respond. If EnNet does not approach you, you can approach any stakeholder (based on your strategy) when the moderator provides you the time. Your team will have **max 3 min** to speak in the first discussion round. You can always improvise.

Before the second plenary discussion round, you get 10 min to brainstorm again in your team. Your strategy may change or stay the same based on the outcome of the first discussion round.

In the second plenary discussion round, the moderator will invite you to start the dialogue. Your team will have **max 5 min** to speak in the second discussion round and make the final statement.

After the second discussion round you will get 5 min to calculate your scores with your team.

5GDHC ROLE-PLAY GAME: WASTE WATER TREATMENT PLANT (WWTP)



To: WWTP representatives

Welcome to a meeting initiated by district heating company EnNet. You are invited to discuss a proposal from EnNet company on how to switch to carbon-neutral heating and cooling in buildings by implementing fifth generation district heating and cooling (5GDHC). As the wastewater treatment company, you are considered as a potential heat supplier for a 5GDHC network.

Every day, around 65 million litres of wastewater are treated at your plant. The wastewater that enters the plant is relatively warm because it is partly made up of shower water, hot tap water and water from dishwashers and washing machines. For this reason, even during a cold winter the temperature of the treated wastewater is 12 degrees, while in the summer it is 24 degrees. The residual heat from wastewater can be transferred to a 5GDHC network.

The proposal from EnNet company may be interesting for you, because 1) a permit is required for pumping the wastewater to open water and 2) you must ensure that the temperature of discharged water is low. You should negotiate with EnNet in your advantage.

Your goals for the meeting are:

1. Find the best option for your company. Choose the strategy from item 1 (a,b or c - see below) and discuss it with the district heating company or other stakeholders.
2. Look for ways to cut your costs and attract new investments to upgrade your site (for example sell residual heat).

Description of the company: This plant serves over 650,000 people living in Glasgow. It services an area of approximately 200 square miles. The site has been operating as a primary waste water treatment since it was built in 1904. It was upgraded in 2003 to incorporate secondary treatment and odour treatment facilities.

Future vision of your company: In 2030 the WWTP will be a major contributor to society's sustainability by converting waste into clean raw materials (bioplastics from wastewater, recovering raw materials from manure and urine), clean energy (residual heat from sewage treatment) and clean water (for ponds and irrigation). The WWTP is also looking for ways to cut costs.

Additional information

Your possible strategies in this meeting (optional). Please address your dialogue to at least 2 stakeholders:

1. **Focus on dialog with district heating company:**
 - a) You can discuss with the district heating company to directly transfer the residual heat to the 5GDHC network (using heat exchangers).
 - b) You can negotiate and provide the terrain of the facility for the 5GDHC seasonal storage of heat and/or cold (possibly for extra fee).

- c) *You can install heat pumps, so that you can supply heat at a higher temperature (to the district heating company or direct to customers) at a higher sales price.*
2. **Focus on dialog with the municipality:** *You can try to convince municipal representatives that your WWTP is contributing to the net zero targets of the city. You are a producer of clean energy (residual heat from sewage treatment) and you require investments in new technologies (like heat pumps) to sustain yourself and reduce costs.*

Please consider that your main task is still operation and cleaning of the wastewater. Becoming a heat supplier is your secondary role. However, if you play well, you can reduce the costs of WWTP operation and may even lower the rates for your customers.

Your secret interest: The sewage treatment plants have the potential to become the energy producers of the future.

Supporting tools:

- *Please use the shared score card to track your group's achievements in the game.*
- *You can use a map of the city to see the location of your buildings.*
- *You can use Notes file to share your notes with team.*
- *Additional information about 5GDHC technology is provided for your support.*
- *In case if you have questions or you need support, you can always ask an Expert.*
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Instructions:

Please brainstorm your dialogue strategy in your team and choose **one representative of your team** to speak. It is helpful to make notes (check the supporting tools).

Important task (**for scores**): during the brainstorming with your team identify what are the **barriers** for you to connect to 5GDHC network and what are the **opportunities/solutions** to those barriers? (Use the score template).

At the beginning of the first plenary discussion round, the moderator will invite the district heating company EnNet to start the dialogue. The EnNet representative will present their proposal and approach one of the stakeholders with an offer. If EnNet addresses the dialogue to you, you can respond. If EnNet does not approach you, you can approach any stakeholder (based on your strategy) when the moderator provides you the time. Your team will have **max 5 min** to speak in the first discussion round. You can always improvise.

Before the second plenary discussion round, you get 10 min to brainstorm again in your team. Your strategy may change or stay the same based on the outcome of the first discussion round.

In the second plenary discussion round, the moderator will invite any stakeholder to start the dialogue. Your team will have **max 5 min** to speak in the second discussion round and make the final statement.

After the second discussion round you will get 5 min to calculate your scores with your team.

5GDHC ROLE-PLAY GAME: WORKSPACE COMPANY 'XPLACE'



To: Xplace company representatives

Welcome to a meeting initiated by district heating company EnNet. You are invited to discuss a proposal of EnNet company on how to switch to carbon-neutral heating and cooling in buildings by implementing fifth generation district heating and cooling (5GDHC). As the largest workspace provider in Glasgow city, you are considered as a potential customer for a 5GDHC network.

Data centre offices are located in several of your buildings. Those buildings need a lot of cooling, as the working process of data centres generates a lot of heat.

Currently, your modern buildings (business centres) are equipped with a heating, ventilation and air conditioning (HVAC) system. The heat in the building is generated via the central heating room that contains a boiler connected to gas.

In some cases, the HVAC system can be connected to a district heating and cooling network¹. So EnNet company's proposal may be of interest to you. Try to find out what benefits the 5GDHC connection can bring you.

Your goals for the meeting are:

1. To discuss the benefits that 5GDHC connection can bring to your buildings (please consider also the cooling demand). Select which of your building(s) could potentially be connected to the first 5GDHC cluster (*use the city map*).
2. To discuss if your data centres can supply heat to 5GDHC system (you can be a prosumer).

Description of your company: Xplace is a workspace company that provides affordable, modern serviced office, industrial units for small and micro businesses, studios and co-working spaces in Glasgow city. The rental offices are located in the largest business centres across the city. Xplace owns and operates all its business centres and provides the highest level of customer service in all areas, from meeting rooms and kitchen areas to security and cleaning services.

Future vision of the company: You are planning to expand the workspace for your future business clients. New buildings are already planned. You are focused on reconstructing and building new modern, sustainable, green business centres in Glasgow city. Your offices should provide all necessary comfort for the business clients.

Additional information

Your possible strategies in this meeting (optional). Please address your dialogue to at least 2 stakeholders:

1. **Focus on a dialog with the district heating company:** *You can discuss with the district heating company about the benefits that the 5GDHC can bring for your buildings compared to the HVAC system. You can find out more about the cooling supply for your data centres offices in the buildings. Negotiate to include data centres heat supply to 5GDHC network.*

¹ For example, at a given time one building may be utilizing chilled water for air conditioning and the warm water it returns may be used in another building for heating, or for the overall heating-portion of the DHC network (likely with energy added to boost the temperature).

2. **Focus on a dialog with the local authority:** You can discuss with the local authority if any subsidies or incentives can be provided in case the building(s) are connected to 5GDHC cluster.
3. **Focus on a dialog with WWTP and housing association:** You can also discuss (in secret) to form a coalition with WWTP plant (as heat supply) and housing association (as cold supply), without district heating company. However, think about all risks.

Please consider that high investments in a new 5GDHC connection in your buildings could lead to higher rental costs for your business clients. On the other hand, it is expected that the costs of purchasing energy, certainly in the long term, will be much lower and that this will dampen the rise in rents.

Your secret interest: You know that with the new trend, modern green offices/spaces are an attractive offer for your customers. The carbon-neutral heating and cooling will contribute to green office image. Moreover, your high gas bills will not bother you anymore.

Supporting tools:

- Please use the shared score card to track your group's achievements in the game.
- You can use a map of the city to see the location of your buildings.
- You can use Notes file to share your notes with team.
- Additional information about 5GDHC technology is provided for your support.
- In case if you have questions or you need support, you can always ask an Expert.
- You can always visit www.5gdhc.eu website for more information.

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Instructions:

Please brainstorm your dialogue strategy in your team and choose **one representative of your team** to speak. It is helpful to make notes (check the supporting tools).

Important task (**for scores**): during the brainstorming with your team identify what are the **barriers** for you to connect to 5GDHC network and what are the **opportunities/solutions** to those barriers? (Use the score template).

At the beginning of the first plenary discussion round, the moderator will invite the district heating company EnNet to start the dialogue. The EnNet representative will present their proposal and approach one of the stakeholders with an offer. If EnNet addresses the dialogue to you, you can respond. If EnNet does not approach you, you can approach any stakeholder (based on your strategy) when the moderator provides you the time. Your team will have **max 5 min** to speak in the first discussion round. You can always improvise.

Before the second plenary discussion round, you get 10 min to brainstorm again in your team. Your strategy may change or stay the same based on the outcome of the first discussion round.

In the second plenary discussion round, the moderator will invite any stakeholder to start the dialogue. Your team will have **max 5 min** to speak in the second discussion round and make the final statement.

After the second discussion round you will get 5 min to calculate your scores with your team.