Session 1 questions and answers

- What is the reason you are not looking into ATES (Aquifer Thermal Energy Storage, WKO in Dutch)?
  - This is not possible at the production location. There is not enough aquifer water and the risk of oxidation is too high.
- Is it not possible to look into ground source heat exchanger loops instead (bodemlussen in Dutch)?
  - Most houses in the neighbourhood cannot receive cooling in the house. Evaporators would be needed in all these situations.
- What is the reason the permit was revoked by the judge?
  - The biggest issue is noise pollution. The noise level at the surrounding houses was calculated, but the noise level for recreational use of the area was ignored. The other issue is the choice of location for the heat pump, which is not logical for people.
- Is the data on how much heat the buildings consume included in calculations?
  - Yes. PlanEnergi started calculating with the gas use data of the neighbourhood and made a forecast. The gas use has gone down the last couple of years.
- Is gas the only backup for the heat pump?
  - Yes.
- What will be the return temperature?
  - We hope to reach a return temperature of 40 degrees, but we do not know yet for sure. We are starting to measure return and flow in part of the houses and make adjustments to the houses to ensure a better return temperature.
- Does each house have their own gas boiler at the moment?
  - Yes, 98% of the houses has a gas boiler.
- What is de scope of the re-tender of the heat pump? Is service included, or is the tender only about building the heat pump installation?
  - The tender will be about everything related to the heat production facility: building the infrastructure inside the building. Maintenance is not necessarily included. It depends on the market. The 30 year contract from the first tender was not ideal. We want to go back to as little as possible, like in Denmark. This could be a maintenance contract of a number of years and some extra years security.
- Will the heat pump be large enough?
  - The heat pump is 800 kW. But this could become 1,2 MW.
- And the gas boiler?
  - We have a 2,5 MW gas contract.
- Is there enough electrical power?
  - Liander will install a 2 MvA connection, we will have a 1500 kW contract and need most of the time around 600 kW. Maybe we can support the grid in some way.
- Is the tender open to CO_2 heat pumps?
  - Yes.
- Is a non-natural coolant possible?
  - No.
- What kind of buffer is included?
  - At the moment only a tiny 26 cubic meter buffer is included. The permit of the building has several restrictions.
- Would it be possible to include an underground buffer?
  - This is not included in the current permits and would delay the whole procedure with 2 extra years.

- Is it possible to arrange a contract with Liander to balance the grid with the heat pump?
  - This is hard to establish with Liander. They are not eager to put effort in this idea.
- The heat pump is now 800 kW at a temperature of -10 degrees. Is it possible to offer a 800 kW heat pump at a higher temperature?
  - No. We are restricted in gas use.
- In what way are the inhabitants involved?
  - Inhabitants are represented by the cooperative WOW in the heat company WOW. Next to that there are regular meetings with the neighbourhood and a newsletter is spread in the neighbourhood. The housing cooperation is still positive.
- Do you have a SDE++ subsidy?
  - Yes, and a PAW, WIS and European LIFE subsidy. Money is not the biggest issue here, although we have to warn you to be careful to send in high offers at the tender.
- What is your main concern at the moment?
  - The permits are the main barrier. Past year we had some internal struggle with the cooperative, municipality and Kelvin, but we are working on a better way forward. The heat pump needs to fit the bill and the permit. And the interest rates for the loan will have to be low enough. It would not help if the interest rates would go up.
- Could the problem with the permit have been avoided?
  - A different location for the heat production could have been chosen, if this project would have started with a plan for Wageningen in total. But we started in only one neighbourhood. This project has to be an example project. Different adjustments were made to lower the noise pollution. Still people objected to it.
- How high will the evaporators be?
  - They will be 3 meters high.
- Is it possible to place barriers around the evaporators?
  - Slight deviations in the design are possible, but we have to be careful.
- Who is the owner of the heat company?
  - The cooperative and municipality.
- Will the tender be a European tender?
  - Yes.
- Are the specifications in the tender documents?
  - Yes. It will be a 2-step tender. A selection phase to choose 5 parties. And a quotation phase.
- It is not a design and build tender?
  - No. In the PlanEnergi session you will find more answers to these kind of questions.

Session 2 questions and answers

- Is it possible to choose a different setup in the building?
  - Yes. The yellow lines are restrictions. Within the yellow lines the setup can change.
- What is the reason the permit was revoked by the judge?
  - A lot of inhabitants of Wageningen have a ecological or biological background. The biggest issue for people living near the heat pump location is noise pollution. The noise level at the surrounding houses was calculated, but the noise level for recreational use of the area was ignored. The area is categorized by the municipality as a place of silence and darkness. The judge asked a better reasoning to allow a heat pump in this area.
- Is it possible to limit the noise pollution?
  - It is possibly an option to limit the indoor noise pollution. But it is hard to downsize the noise pollution of the evaporators.
- Is there an electricity limit?
  - There is no shortage of electricity at this location. We contracted 1500 kW and will use 600 to 1200 kW. If we produce more heat with the heat pump and use less gas, this will be positive for the CO_2 emissions.
- What kind of coolant are you open to? Ammonia?
  - We have a SDE++ subsidy which requires a natural coolant. Ammonia is possible.
- Did you take into consideration air-to-water heat pumps need de-icing systems in periods it is cold and moist?
  - We know this is an important aspect and we expect suppliers to come up with a solution.
- In Alexanderpolder a CHP (Combined Heat and Power, WKK in Dutch) system caused ice layers on the road next to it, when the mist of the system froze to the ground. Is this something to take into account here?
  - No, this system will be much smaller.
- Did you consider connecting this neighbourhood with other sources in and around Wageningen?
  - When we started we only looked at this neighbourhood. Nowadays we would have looked into a bigger setup in Wageningen. Maybe incorporating the heat production in an area with industry. In this case the neighbourhood will be an example for the rest of Wageningen. For example the student flats would be interesting to connect to the grid.
- Can you explain the difference between the contour maps?
  - The first one is the noise pollution of the heat pump system. The second contour map shows the noise coming from the road, without taking into account the heat pump. The noise from the road and from the heat pump will not be a continues sound. But it is not possible to pinpoint the hours. We tried to lower the noise pollution as much as possible, but people still complain. They do not trust the calculations. We are approached by them as if we were a big company.
- It still takes a while till realisation of the heat grid. Is there enough time before contacts expire?
  - The framework agreement for the grid itself will still be valid. And the house installation is at the end of the realisation phase.
- What will you do with the extra contracted electricity? Is it possible to sign a contract with Liander to balance the market with for example a capacity limiting contact for certain hours?

    - The extra capacity could be useful if we would expand in the future. Capacity limiting contracts are difficult to establish. Liander will not put much effort in companies that already contracted their electricity.
- Would it still be possible to run the heat grid as a CHP (Combined Heat and Power, WKK in Dutch)?
    - Yes. We have a contract for a maximized gas connection. The limitation is the nitrogen emission it would cause.

Session 3 questions and answers

- What are the space limitations in the building?
  - We will use 1/3 of an old building. The evaporators are limited to 100 m^2 on the field outside.
- Is the noise pollution mostly caused by the evaporators?
  - Yes, indeed.
- If the road causes 40dB of noise pollution, what is the reason to lower the noise pollution of the heat pump to 35 dB?
  - This is based on the law for noise at neighbouring houses. The municipality indicated the whole area a rest and darkness area. Without clear limits to noise. But the judge stated the noise pollution for recreation was not taken into account well enough.
- Is it possible to generate your own electricity?
  - Solar and wind power are sensitive in this area. We will probably not get a permit.
- Is it possible to connect to a nearby energy cooperative which generates power?
  - This would only be a financial agreement. There is no direct energy supply possible on this location.
- Why is noise pollution such a big issue here? There are no rules for traffic noise. Why would there be rules for the heat pump?
  - This is secured in Dutch law and it is a special area for recreation and rest appointed by the municipality.
- Why would the municipality not weigh the general interest as more important?
  - The objections came from people living nearby the production location. And also from a foundation with an interest in the area (Stichting Wageningse Eng). The municipality has to act on those objections. We try to follow the rules. The city council wants this project to succeed.
- Why did you not continue the first tender on the heat pump?
  - The tender was set up without the knowledge we have at this moment and without the right expertise. The contract was not extended and the costs raised above the budget. Considering a new tender caused discussions with the shareholders of our company. This tender is technically and legally far more advanced.
- Do you have an electricity connection?
  - We will have a 2MvA connection, which is not installed yet. The compact substation is build but not placed at the location.
- In 2022 83% of the inhabitants of the neighbourhood signed a contract. How do you know these people will still be interested?
  - The contracts are still legally binding. When we know more about the permits and realisation phase, we will ensure the commitment of the neighbourhood. Till now only a few people bought their own heat pump. People are frustrated they have to wait. But they do not take a risk while waiting on the developments. And if they would like to quit the contract, we are not going to force them to keep it.
- Does the bank need extra contracts with the inhabitants?
  - No, the contracts are still legally binding. The termination clauses are not receiving the right permit and not being able to reach a financial close.
- Did you look into the possibility of hydrogen?
  - At this moment it is not included in the permitting process. And it will probably be too expensive. It will also produce nitrogen.