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IEA DHC

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DISTRICT HEATING AND COOLING

SUMMARY FOR NON-TECHNICAL AUDIENCES

THE DH BUSINESS MODEL 2050

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1 PROJECT OBJECTIVE AND METHODS FOR DATA COLLECTION

1.1 DISTRICT HEATING

District Heating (DH) is a technology that provides buildings that are connected to a distribution network with space heating and, often, domestic hot water. The heat is either generated in a production unit (it can be a combined heat and power plant or a plant for heat generation only) or obtained from an industrial process, or the urban infrastructure, and the heat carrier is water. Depending on the heat supply, the impact on the environment of district heating varies. When the heat supply is local (for example waste heat) and/or renewable the technology can play an important role in the European energy transition, reflected in the EU Strategy for Heating and Cooling (Commission 2016). It is impossible to look into the future and to provide information that, over time, will prove to be fully accurate. In this project, an attempt to make a well qualified and grounded estimation of the future business model of DH companies 2050 is made.

1.2 METHODS FOR DATA COLLECTION

Information has been collected by a number of complementary methods. The partners in the project represent different stakeholders (two cities: Albertslund in Denmark and Nice in France, DH company: one in Germany, knowledge organizations: University of Applied Sciences in Stuttgart and the Swedish Environmental Research Institute and one industry association: the Danish Board of District Heating). First, a literature review on policy and what it indicates for future DH installations, the role of DH today and in the future as well as heating alternatives that are likely competing with DH in the future was made. The review was conducted for the countries represented by the consortium (Denmark, France, Sweden and Germany) reflecting a mixture of mature DH markets (Denmark and Sweden), a DH market in expansion (Germany) and a nascent DH market (France).

For DH companies to remain on the heat market in 2050, they need to offer something that customers value. To understand current customer values and things that are desired in the future, interviews were performed. Three groups were targeted: professional building owners, customers and prosumers. The targeted population size was 5 respondents per target group in each of the four countries included in the project consortium (e.g. in total 60 interviews). In total, 51 interviews were performed. In France, the lowest number of interviews was conducted as a result of great difficulty to identify respondents to interview (possibly explained by district energy being a minor player on the energy market in France).

The data collected from the review and interviews served as the point of departure for the consortium to study the future customer value of DH. The process was started by future,

business conditions of DH being identified. The method used was the “value creation canvas” based on the original “business model canvas” (Ostewalder & Pigneur, 2010). The method is iterative and several sessions where the consortium partners were present were held to arrive at a future customer value for district heating. Next, applying the value identified the differences of the current and two alternative business models (reflecting two different customer values) were identified. The two alternative business models were illustrated for two different customer groups (a building owner and an industry (a prosumer)).

2 RESULTS

To arrive at the business conditions of DH in 2050, results from the literature review and interviews were combined, for full detail of these results and a detailed description of the business conditions the reader is referred to the full project report. Business conditions 2050

2.1.1 BUSINESS CONDITIONS FOR DISTRICT ENERGY COMPANIES 2050

The conditions are split in two groups where the first group is closely linked to how DHC systems are operated (1-4) whereas the second group (5-7) is linked to the way that society has developed. The conditions are summarized in figure 1.

1. **The heat demand is at similar levels as 2020 on an overall EU level, cool demand is higher than in 2020**

Assumption: adding the energy efficiency and the densification the heat demand is assumed to be at similar levels as in 2020 (e.g. the energy density is assumed to remain stable)

2. **Heat supply is completely decarbonized, and it is standard to recover waste heat of both high and low temperature**

Assumption: it is foreseen that combustion of fossil fuels is no longer possible. In combination with increased circularity, the volumes of waste for incineration are lower. This means that other heat sources are needed where waste heat is important.

3. **Heat supply is decentralized and combined with storage solutions**

Assumption: the focus on large, centralized production and distribution has been replaced by a focus on making use of available heat sources (of varying sizes). Heat is provided on demand, when the customer wants it, therefore the ability to store heat is increasingly important.

4. **Heat planning is mandatory at municipal level**

Assumption: it is standard for municipalities to have energy plans per sector where heating and cooling is one

5. **Circular economy and, as a result of circularity, coupled sectors**

Assumption: it is standard to work with circular flows to reduce waste of any resource. As a result of circularity being the dominant driver in the economy sectors that combined can save resources are combined

6. **Investors in energy are diverse**

Assumption: energy is a sector that has experienced a large transition period for a number of decades (2020ies-2030ies-2040ies). The investments have been forced to be sustainable (economic-environmental-social) which has become standard. The transition has fostered entrepreneurship and a multitude of possible investment projects that are attracting a diverse set of investors.

7. **A high level of digitalization is standard**

Assumption: Significant progress is expected. Making use of available data, algorithms, and integration across systems will support energy efficiency, improved flexibility and control, as well as improved and automated consumer activation.

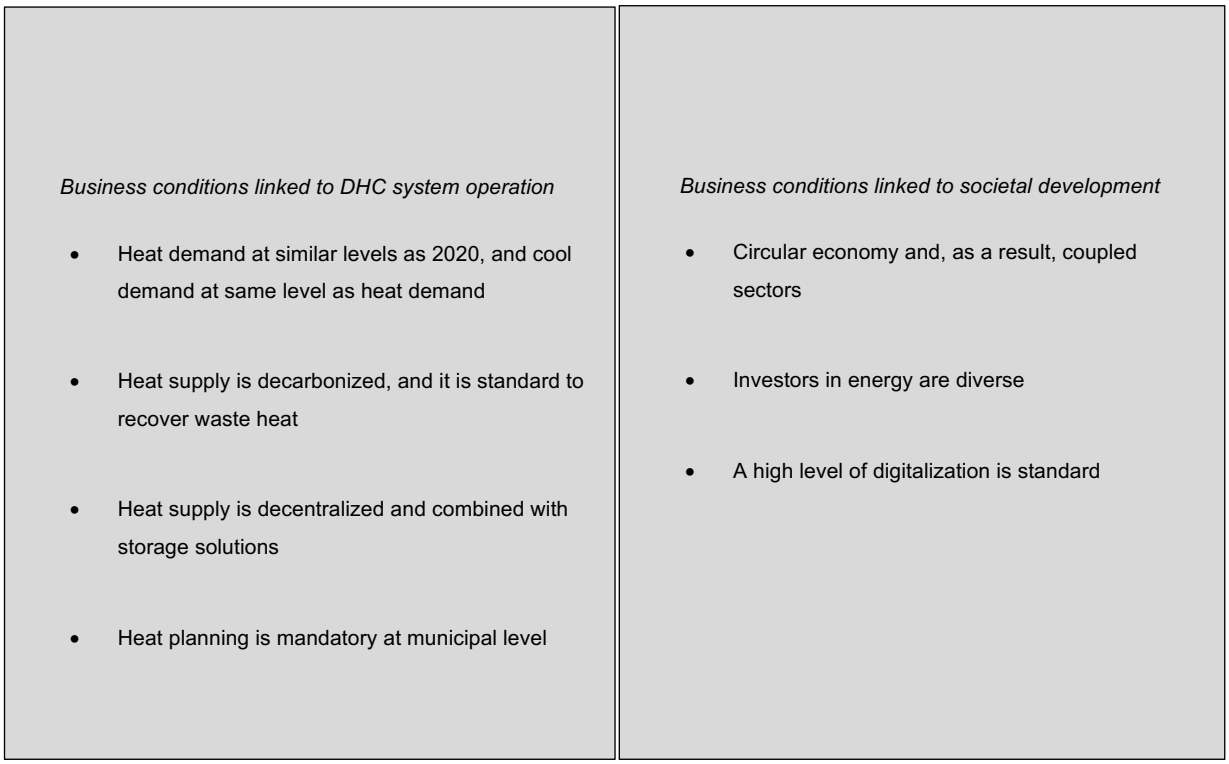

Figure 1 Summary of the business conditions of DHC systems in 2050

2.1.2 VALUE PROPOSITION

Based on the information collected by means of literature review, interview and the resulting business conditions for 2050, work was done on the value proposition canvas. It was identified that two customer values can be feasible in 2050. These are:

(i) We provide cost efficient, convenient energy service packages that require a low level of active involvement (“passive customers”)

(ii) We involve our customers into the process of optimizing the heat system, with maximum transparency on their impact on the system ("active customers")

It is assumed that in 2050 a majority of the district energy customer population is happy with a solution that is offered to them as long as it reflects the value they are looking for (value i). A minority of the population will be forerunners, identifying new solutions and paving the way for new customer behavior (value ii). For the district energy companies it means that the business model is tailored to meet customer value (i) but it allows customers that want to be actively engaged to be so (value ii). It has become standard to work closely with the customers interested in active participation. It is with the customers that the energy companies identify new needs and new solutions to further improve the district energy provision. This kind of co-creation leads to an ongoing process of improvement that keeps costs at a competitive level compared to heating alternatives.

In 2022 we are talking about energy citizens and how to incentivize and nudge towards efficient behavior. In 2050 we have solved many of the issues by automizing processes and systems. We have smart buildings and smart hardware supporting customers to adjust to efficient heating and cooling consumption patterns.

Based on the identified future customer value it was concluded that in 2022, the unique selling point of district energy is security of supply, carefreeness and comfort at a reasonable cost. Another positive aspect is that the carbon footprint can be limited. In 2050, the unique selling point can be the carefree delivery: heat and cool works (without any customer effort) at a standard that is high (the boundary conditions taken for granted so aspects like sustainable heat supply are standard). The cost of the energy service is competitive to other alternatives, The customer is assured of this by the ongoing, performance improving activities that are standard in district energy companies. This all reflects value proposition (i). To this, the possibility to actively work with the energy company is added for some customers: the ones interested in value proposition (ii).

2.1.3 BUSINESS MODEL CONCEPTS FOR CUSTOMER VALUES (I) AND (II)

The business model canvas for district energy 2050 is illustrated below. It builds off the model in 2022 (in black) to which the features of the canvas in 2050 are added for value propositions (i) reflecting the passive customer behavior (blue in figure 1) and (ii) reflecting the active customer behavior (green in figure 1). This means that the business model targeting the active customer behavior is the business model with the largest number of added elements compared to the business model in 2050 (e.g. black, blue and green text in figure 2).

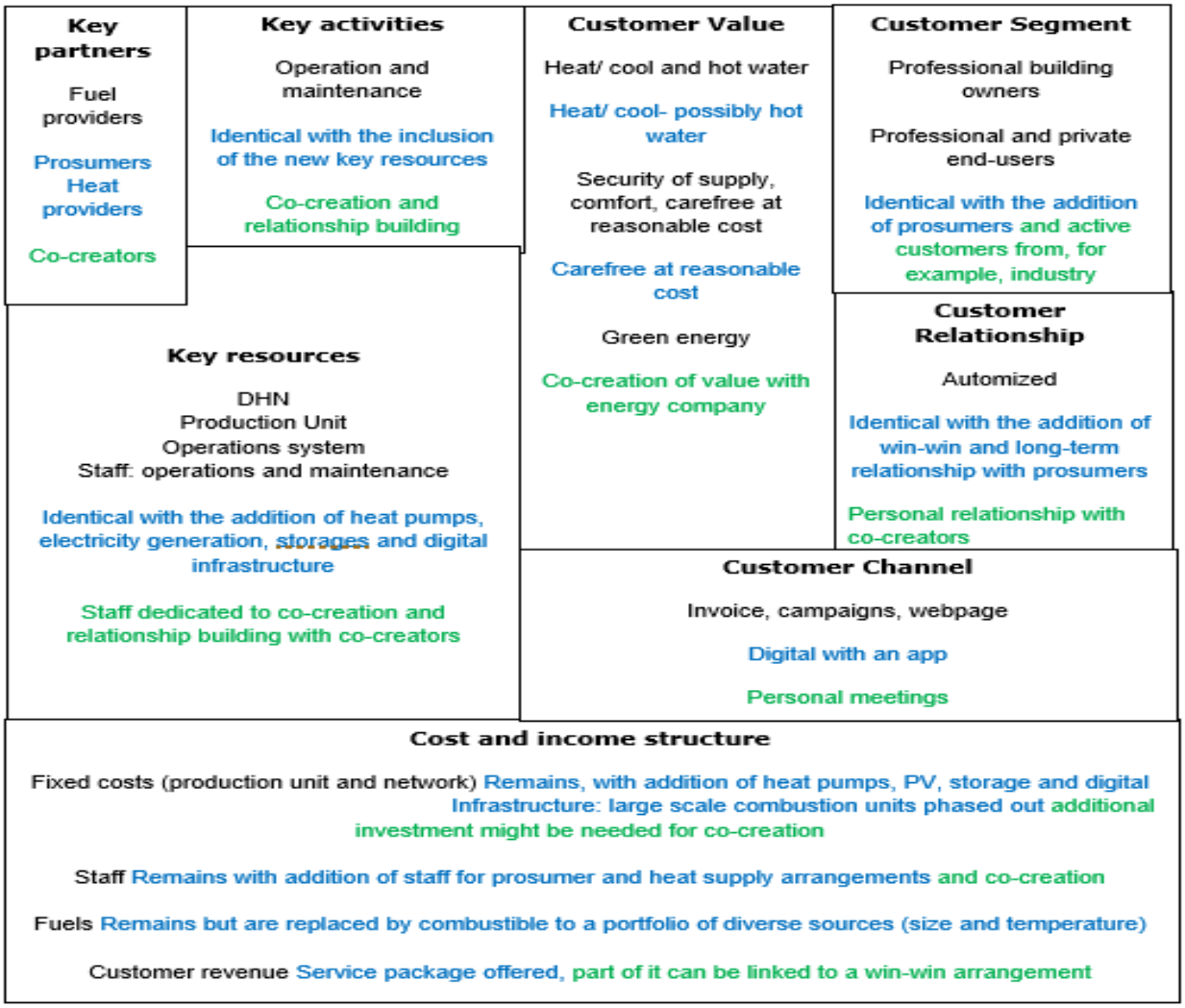

Figure 2 Business model characteristics 2050

Seen in the illustration, changes will occur to the current business model regardless of if the value proposition is (i or ii). The bulk of the customers are assumed to have a passive behavior whereas a minority of customers will be actively engaged in their energy use. It is through engagement with the active customers that the DH companies develop their business model further. These developments necessitate co-creation of value with the active customer and often joint investments. The development reached by the co-creation is capitalized on in the business model for the majority of customers, keeping the bulk DH offer competitive.

3 CONCLUSIONS

DH can be an enabler in the European energy transition. To remain competitive, the industry needs to upgrade the standard way of conducting business in 2022 using, for example, digital solutions to ensure efficient customer behavior rather than assuming that energy citizens will materialize and, through their actions, support DH development.

DH companies would benefit from engaging in co-creation and joint investments in value creating activities with active customers. Doing so, DH can remain a competitive heat provider in 2050.

4 REFERENCES

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