



BETTED

Structures, needs and requirements for supply chains in the dairy sector

BETTED - D3.1



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Authors	Carmen Berger, Simon Hirzel		
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Contributors

Activity	Organisation
Concept, implementation and coordination of interviews and survey	<ul style="list-style-type: none"> • Fraunhofer Institute for Systems and Innovation Research ISI (Fraunhofer ISI) • University of Brescia (UNIBS)
Analysis of results and preparation of deliverable	<ul style="list-style-type: none"> • Fraunhofer ISI
Realization of interviews	<ul style="list-style-type: none"> • Institute for European Energy and Climate Policy (IEECP) • Riga Technical University (RTU) • ESCAN • Chamber of Commerce and Industry of Industry of Korinthia (CCIK) • Fraunhofer ISI • UNIBS
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1. Introduction

1.1. Background

The BETTED project (Boosting Energy Transition of ThE Dairy value chain) aims to support the energy transition of companies operating in the supply chains of the dairy sector, particularly small and medium-sized enterprises (SMEs). For this, the project seeks to promote the adoption of energy efficiency measures, the use of renewable energies and the implementation of heat pumps throughout the value chain. Furthermore, the project seeks to play a significant role in reducing the dependency on fossil fuels and accelerating the transition to cleaner energy sources. The three main pillars of the project include developing a capacity-building program, providing policy and regulatory recommendations as well as implementing customized and user-friendly tools to support the adoption of energy-efficient measures and sustainable practices.

In terms of tools, the planning of the BETTED project foresees that the existing toolbox¹ from the predecessor Horizon2020 project ICCEE (Improving Cold Chain Energy Efficiency) is to be enhanced towards a specific version for the dairy sector. Furthermore, it is to be extended in the areas of benchmarking, heat pumps, renewable energies and biogas. Regarding the development and successful deployment of these tools, it needs to be noted that tools and resources tend to be only taken up in practice if they fulfil several requirements:

- First, the information needed for the tools and provided by them must be of interest and relevance for the target group, i.e. results must be perceived as helpful by the targeted companies and their supply chains.
- Second, the yielded information must correspond to the processing capabilities of the target group, i.e. corresponding tools must find a balance between complexity, comprehensiveness and a realistic usability.
- Third, tools for analysing supply chains require information about the different members in the supply chain. While there is a minimum requirement for meaningful results, care must be taken not to ask for information that is not shared or obtainable.

1.2. Objectives and methodology

One of the initial steps in the BETTED project is to analyse the structures, needs and requirements for supply chains in the dairy sector with a perspective on revising and extending the existing toolbox. To do so, a combination of interviews and a broader survey was carried out. The interviews were implemented as semi-structured in-depth interviews following a

¹ Diaz, F.; Romagnoli, F.; Neusel, L.; Hirzel, S.; Paulus, J. Marchi, B.; Zanoni, S. (2022): The ICCEE Toolbox: A Holistic Instrument Supporting Energy Efficiency of Cold Food and Beverage Supply Chains. In: Environmental and Climate Technologies, 26 (1), 428-440. <https://doi.org/10.2478/rtuect-2022-0033>

common guideline. This guideline contains open and closed questions covering six areas of interest besides general information about the participants. Its structure mirrors the target areas of the tool design and development activities in the BETTED project, i.e. it covers the following areas:

- structural information,
- energy benchmarking,
- tools for the dairy sector,
- heat pumps,
- renewable energies, and
- biogas.

The entire guideline contains 69 questions, but not all questions were necessarily covered, depending on the area of expertise of the participant as well as available interview time and progress. The target group was specified as experts with ‘a good knowledge of the dairy sector’ or that ‘are responsible for energy/sustainability-related topics [...] and are familiar with the supply chain’. The interview guideline was accompanied by an invitation template for the potential participants. The interviews were realized by several team members of the BETTED project to obtain a geographically diverse view on the topic within Europe. In total, 20 interviews were carried out in May and June 2024.

After these initial interviews, an online survey was designed, implemented and distributed to companies in the dairy sector to verify or discard conclusions derived from the results of the interviews. In terms of coverage, the survey addressed the same areas as the interview guideline. The survey was available in eight European languages (English, Greek, German, Dutch, Latvian, Italian, Spanish and French) and open for participation from June to August 2024. Within that period, 42 participants completed the survey.

This report compiles the main results from both the interviews and the survey along the aforementioned areas. The analysis serves as an input to the ongoing tool development process in the BETTED project. The next section of this report contains the combined results following the areas of interest, except for the structural information where the interviews and the survey are presented separately. Please note that not all figures per question add up to the indicated number of participants as, depending on the question, some participants chose to skip them or select ‘No answer/I do not know’ as their choice in the survey. Also, some branching took place depending on prior answers in the survey, reducing the number of obtainable answers as compared to the full sample in the survey. In the interviews, some areas were also covered more intensely than others depending on the know-how of the interview partners and due to a need to limit the duration of the interviews.

2. Survey and interviews results

2.1. Structural information

2.1.1. Interviews

The interviews were conducted in six European countries: Spain, Italy, the Netherlands, Latvia, Germany and Greece. In total 20 interviews were conducted, out of which two in Spain, four in Italy, five in the Netherlands, four in Latvia, four in Germany and one in Greece. In total 15 companies were interviewed, two associations, one cooperative union, one retailer and a research and pilot area for farming.

The interviewed companies produce a broad variety of different dairy products with the production of cheese being dominant, followed by butter, cream and yoghurt (Figure 1). The organizations are also active in different parts of the supply chain; most of them work in processing, followed by production and storage and logistics (Figure 2).

Figure 1: Answer to the question "In which sector is your company (mainly) active? (multiple choice)"

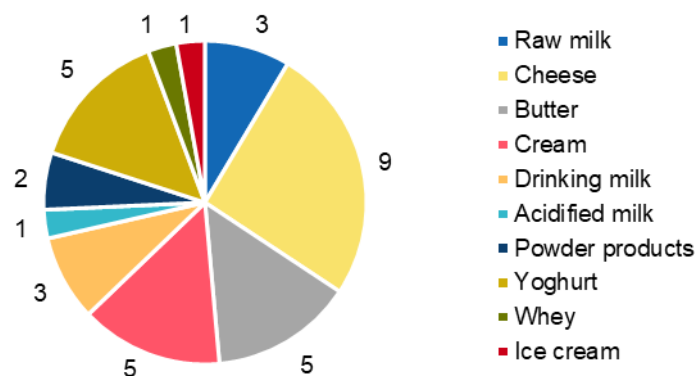
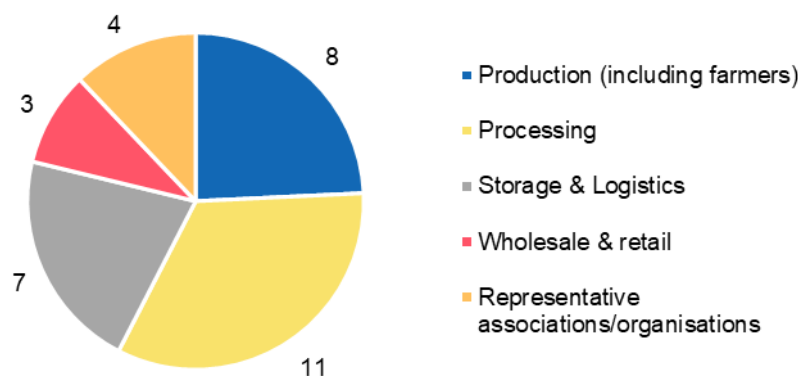


Figure 2: Answer to the question "In which areas is your company (mainly) active?" (multiple choice)"



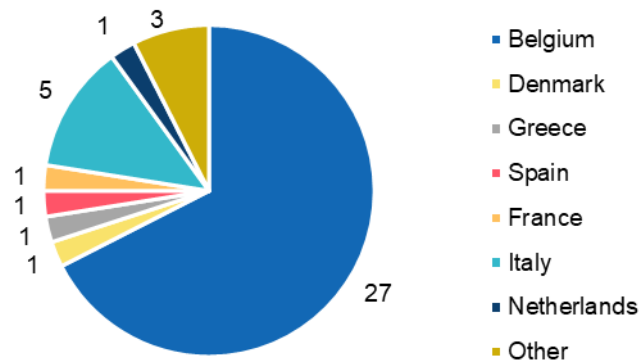
Four of the participating organizations have a formal energy management system, while seven indicate that they do not have a formalized energy management system, but that

someone is following up on energy-related matters. Two of the interviewees state that nobody is following up on energy-related issues in their organization.

2.1.2. Survey

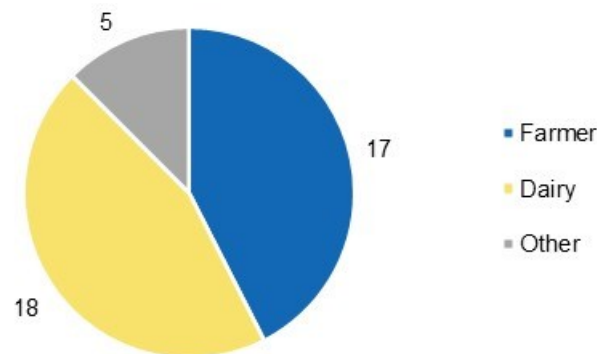
The organizations participating in the survey are in the large majority mainly operating from Belgium, followed by Italy and Denmark (Figure 3).

Figure 3: Answers to the question "Which country is your organization (mainly) operating from?" (n = 40)



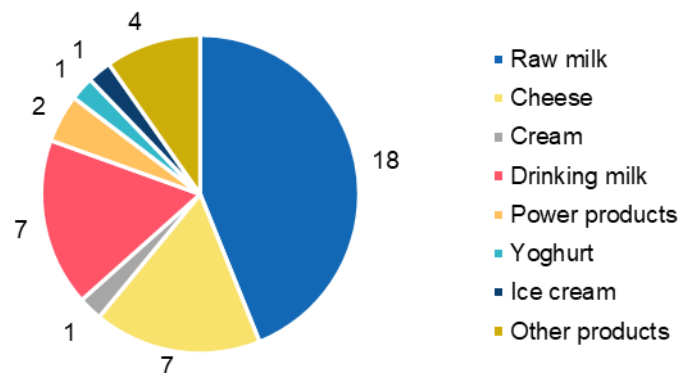
Most of them are working in dairy companies or are farmers, with both these groups being represented approximately equally (Figure 4).

Figure 4: Answers to the question "What type of organization are you working for?" (n=40)



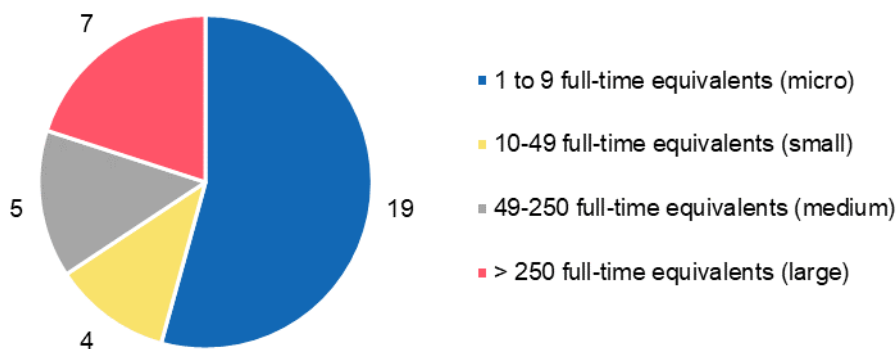
The companies participating in the survey produce a variety of different dairy products. Around half of them produce raw milk followed by the production of drinking milk and cheese (Figure 5). This reflects the proportion of type of organizations (farmers and dairy) participating in the survey.

Figure 5: Answers to the question "In which sector is your organization (mainly) active?" (n = 41)



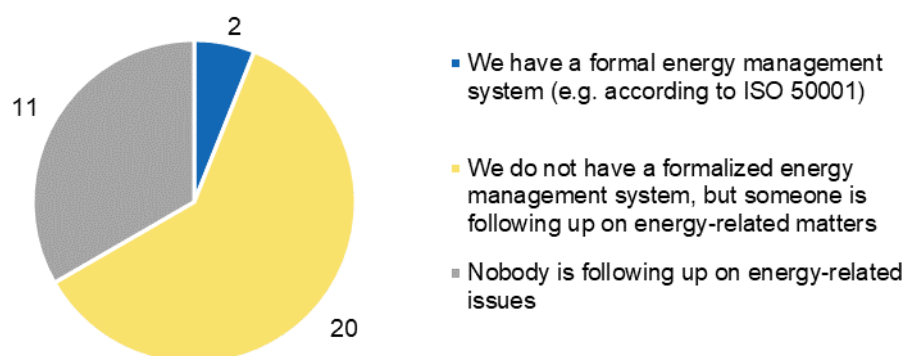
Regarding the size of the participating organizations, about half of them have 1 to 9 full-time employee equivalents. The rest of the organizations are split between small organizations with 10-49 full-time employee equivalents, medium-sized organizations with 49-250 full-time employee equivalents and large organizations with 250 full-time employee equivalents (7 answers).

Figure 6: Answers to the question "How many employees are working at your site?" (n = 35)



Only two of the participating organizations have a formal energy management system, the majority indicates that they do not, but that someone is following up on energy-related matters. Around a quarter state that nobody is following up on energy-related issues in their organization (Figure 7).

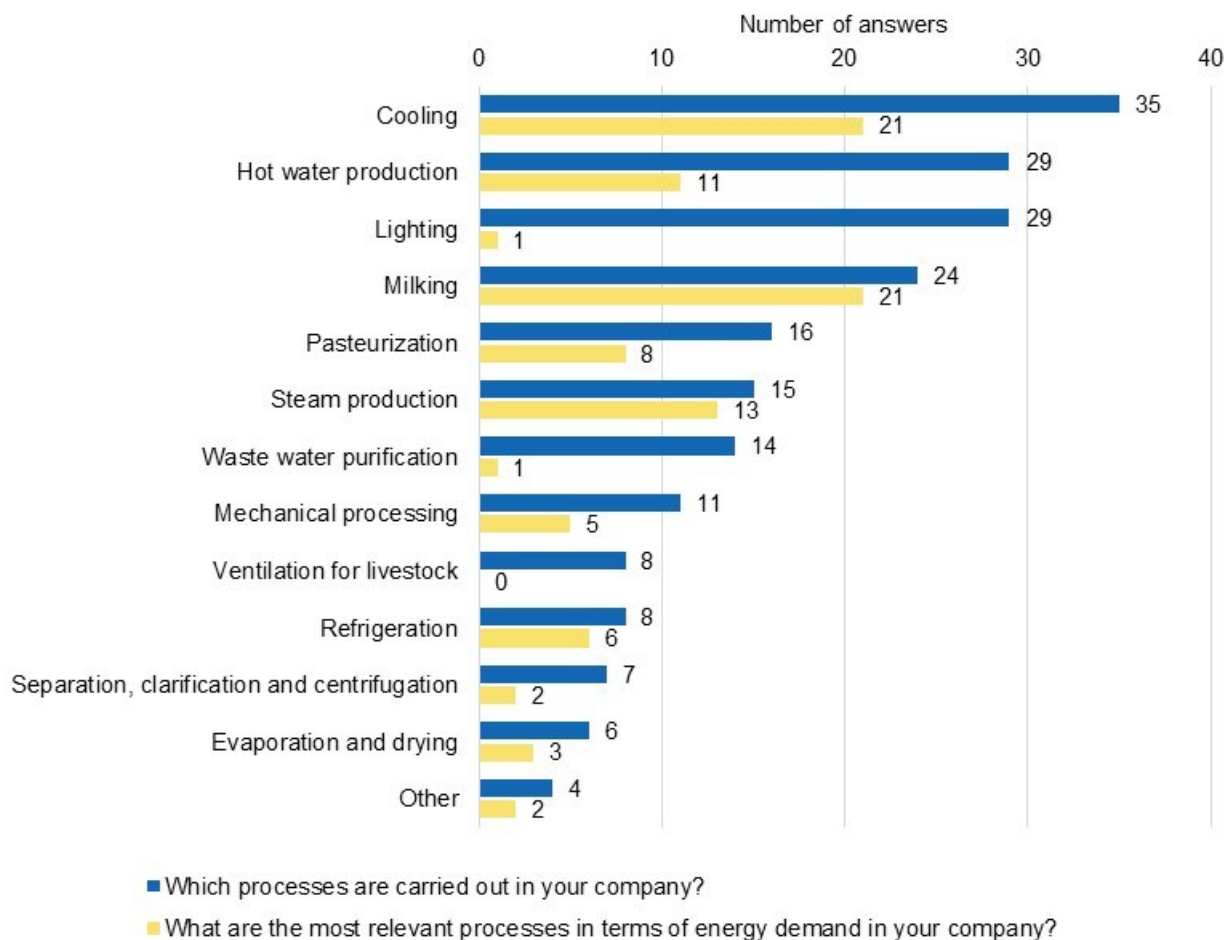
Figure 7: Answers to the question "How does your company manage energy-related matters?" (n = 33)



2.1.3. The role of energy efficiency

In the survey, organizations were asked which energy-related processes are carried out in their companies. The results suggest that a broad variety of processes are carried out, with cooling being the most often mentioned, followed by hot water production and lighting (Figure 8).

Figure 8: Answers to the question "Which processes are carried out in your company?" and "What are the most relevant processes in terms of energy demand in your company?" (multiple choice)

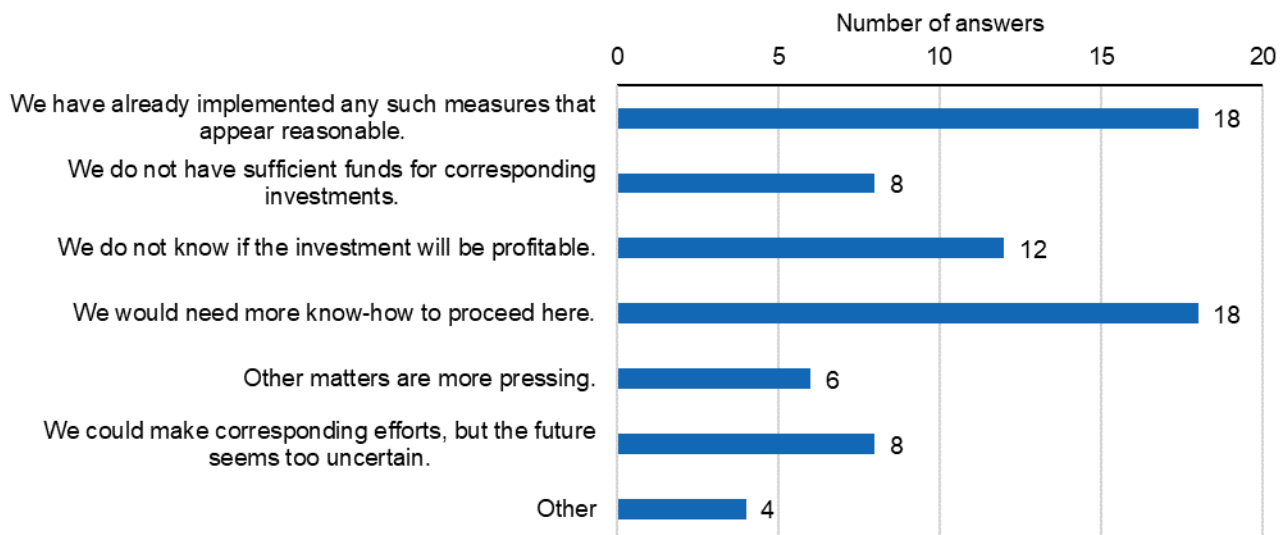


When asked beyond mere existence of processes and concerning their relevance to energy demand, however, cooling and milking are mentioned most often in the survey, followed by steam and hot water production. When the same question was asked in the interviews, refrigeration was mentioned five times, followed by steam production, which was mentioned four times and cooling that was mentioned three times. Ventilation was mentioned twice.

When asked where the organizations see the main challenges to improve energy efficiency and promote the use of renewables in their companies, the most frequent answers in the survey are that any measures that appears reasonable have already been implemented and that more know-how to proceed would be needed. Financial aspects along

with uncertainty of the future were also indicated as barriers (Figure 9). These results are in line with the findings from the interviews, where additionally a lack of knowledge concerning the different technologies was mentioned, along with uncertainties of the future and a lack of time to dedicate to energy efficiency and the implementation of renewables.

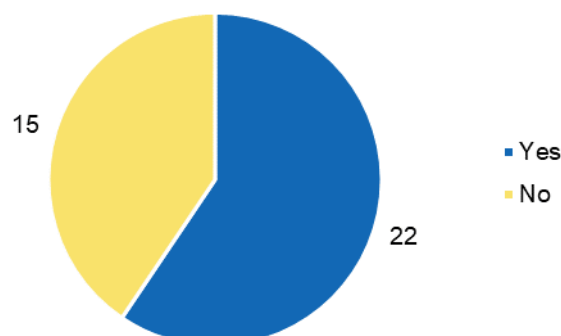
Figure 9: Answers to the question "Where do you see the main challenges to improve energy efficiency and to promote renewables in your company?" (multiple choice)



2.2. Energy benchmarking

Regarding energy benchmarking, slightly more than half of the participants in the survey indicated that the use internal energy benchmarking to compare their current energy consumption with past consumption (Figure 10).

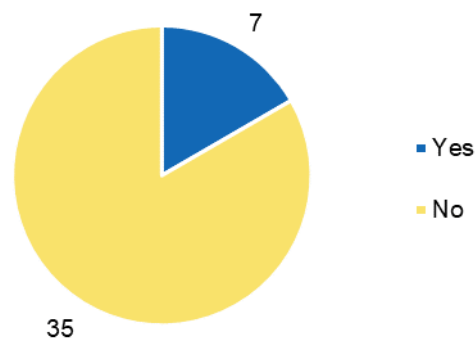
Figure 10: Answers to the question "Does your organization use energy benchmarking to compare its current energy consumption with past consumption?" (n = 41)



Regarding external benchmarking that seeks to compare energy demand to the demand of other companies, most organizations in both the survey and the interviews indicated that they do not make use of it. In the interviews, two out of ten interviewees stated that they use external benchmarking. A similar share is also observed for the survey (Figure 11). Results

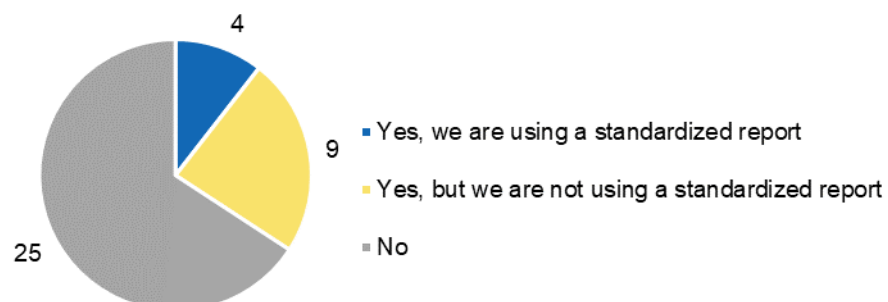
from the interviews suggest that there are multiple reasons for this: the comparison between different companies is not always straightforward or useful because of the diversity of products and processes in the dairy sector; companies tend to be reluctant to share data because of competitive concerns both with other companies and within the supply chain; which data can be shared and which not needs to be approved by positions higher up in the hierarchy of the companies. Overall, the topic of data sharing seems to be quite sensitive and dependent on different factors. An approach mentioned independently by two participants of the interviews is that reluctance to external benchmarking could be lowered if energy data were shared anonymously.

Figure 11: Answers to the question "Does your company use energy benchmarking to compare with other organizations?" (n = 42)



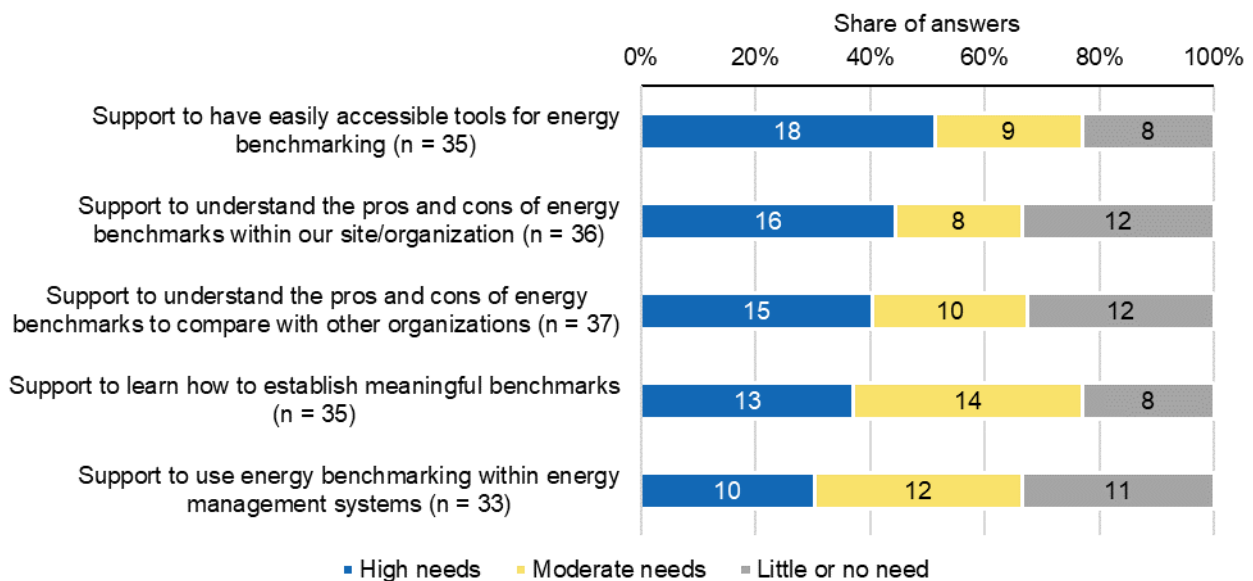
To get a better understand of whether companies are currently publishing data on their energy consumption, they were asked whether they have a Corporate Sustainability Report in line with the EU Corporate Sustainability Report Directive. In the interviews, eleven participants answered this question, out of which seven state that they do not plan on preparing one, two indicate to have such a report and two state that they are currently in the preparation process for it. The results from the survey show a similar picture: nearly two thirds of the organizations (25) do not currently have a Corporate Sustainability Report. Most (9) of the remaining organizations with a report indicated that they do not use a standardized one and only few (4) participants indicate that they have a standardized format (Figure 12). The later are all dairy companies and tend to be large or medium-sized companies.

Figure 12: Answers to the question "Does your company have a Corporate Sustainability Report aligned with the EU Corporate Sustainability Report Directive?" (n = 38)



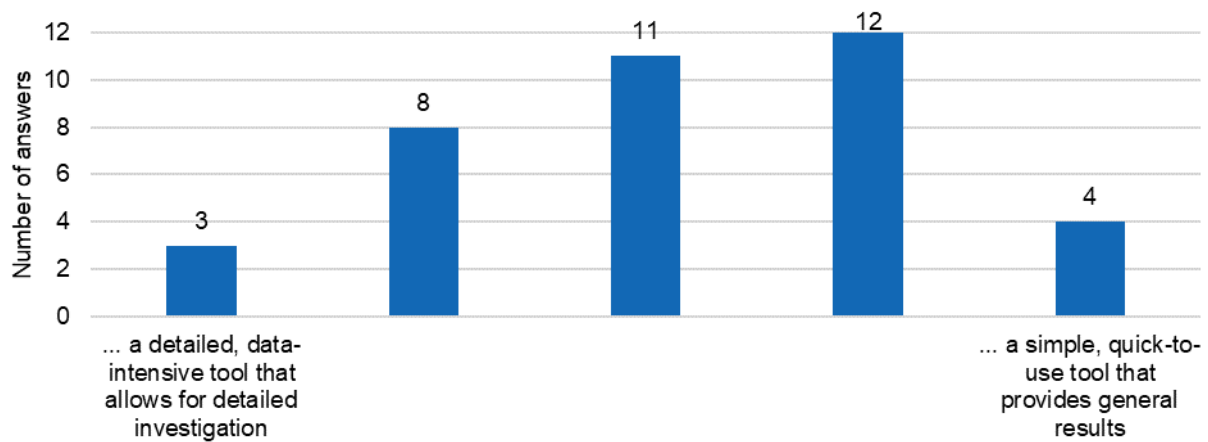
In the survey organizations were also asked in which areas they would need further support to develop energy benchmarking. Slightly more than half indicated that they have a high need for easily accessible tools for energy benchmarking. Yet also a larger group indicated that they still need to better understand the pros and cons of energy benchmarks. The remaining areas have fewer 'high priority' indications, yet still there are many companies that see a moderate to high need for understanding how to establish meaningful benchmarks (Figure 13).

Figure 13: Answers to the question "In which areas would you need further support to develop energy benchmarking?"



Finally participants were asked about the level of complexity of a potential energy benchmarking tool. The results of both the survey and the interviews suggest a preference towards a more simple tool, that provides general results. In the interviews, out of 8 participants responding to this question 6 stated that they would prefer a more simple tool whereas one interviewee stated that a tool that can both would be ideal and one stated that for smaller companies a simpler tool would be better and for larger companies a more complex tool would be preferred. In the survey the results also suggest an overall preference for a simpler tool (Figure 14).

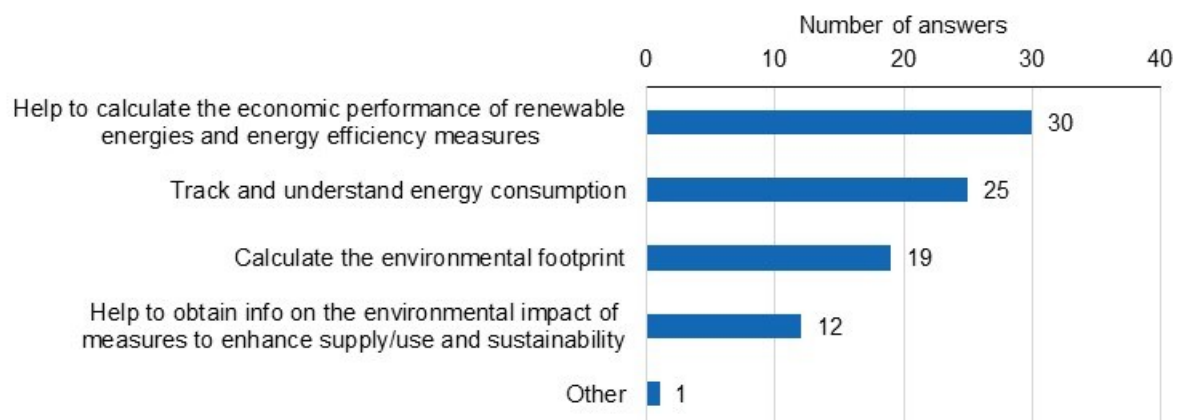
Figure 14: Answers to the question "If you were to use an energy benchmarking tool, how would you like the tool to be? I would prefer..." (n = 38) on a scale from 1 (detailed tool) to 5 (simple tool)



2.3. Tools

Regarding the extending existing tools from the predecessor project, participants were asked about what a tool should help them to do. Interviewees mentioned the tool should help them assess the economic feasibility and cost-effectiveness of different energy efficiency and sustainable measures, including their long-term benefits. Moreover help with the monitoring and analysing of energy consumption was also mentioned. These results are validated by the survey where participants mentioned the most that the tool should help them calculate the economic performance of renewable energies and energy efficiency measures the most often, followed by the desire to track and understand the energy consumption and to calculate the environmental footprint (Figure 15).

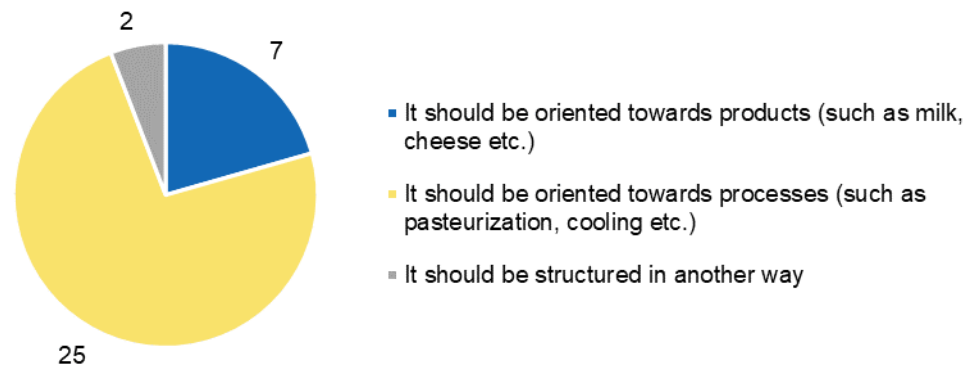
Figure 15: Answers to the question "If you could wish for a tool to help enhancing energy efficiency and deploying renewables in your company, what would it allow you to do?" (multiple choice)



Organizations were also asked whether the tool should rather be aligned to production steps and processes or products. The results of both the interviews and the survey suggest that a potential tool should rather be oriented towards processes and production steps. In the interviews, out of 10 participants that answered this question 7 stated that the tool should be oriented towards processes, one that it should be oriented towards products and two stated

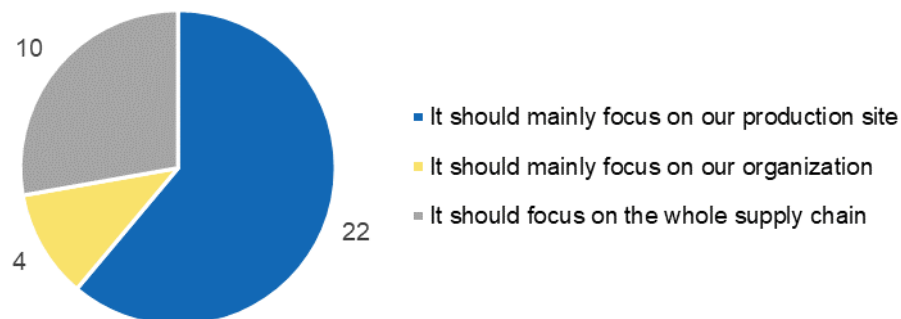
that it should be oriented towards both the processes and products. In the survey the majority of participants indicated that the tool should be oriented towards processes (Figure 16).

Figure 16: Answers to the question "What should such a tool be aligned to?" (n = 34)



In the survey participants were also asked where the focus of the tool should lie, to which well-above half answered that the focus should be on their production site (Figure 17), an additional quarter answered that it should address the whole supply chain. Fewer put an emphasis on tools addressing the organization as a whole.

Figure 17: Answers to the question "What should the tool focus on?" (n = 36)



Participants of the interviews were also asked whether they would like the tool to incorporate general information about sustainability and sustainability in the supply chain. Five participants answered this question and stated that they would like the tool to incorporate this information.

2.4. Renewable energy sources

With regard to renewable energy sources, participants of both the survey and the interviews were asked if renewable energy sources are used in their production. Most of the companies confirmed this. This is in line with the results of the interviews, where also the majority of the interviewees (9 of 13 participants) answered that renewables are used in their companies. 4 answered that renewables are not used in their production.

Results from both the survey and the interviews suggest that the main renewable energy source used in the production is photovoltaic. In the interviews photovoltaic was mentioned 8 times while biomass was mentioned twice and wind power was mentioned once. In the survey photovoltaic is by far the most used renewable energy source followed by biomass, solar thermal energy and wind power (Figure 19).

Figure 18: Answers to the question "Do you use renewables in your production?" (n = 40)

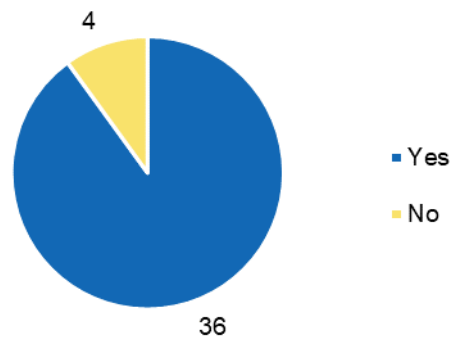
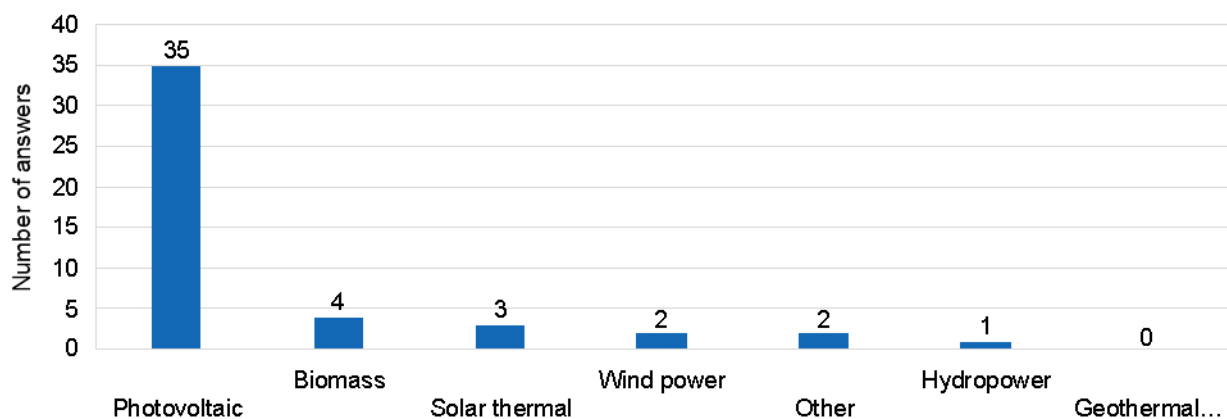
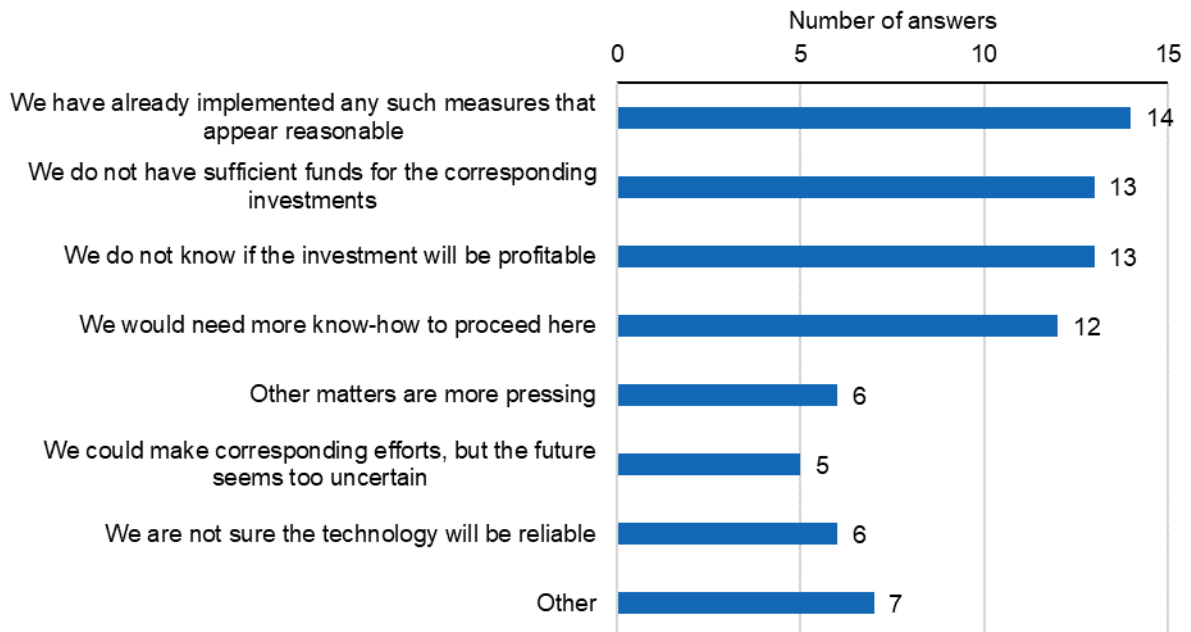


Figure 19: Answers to the question "What kind of renewable energy sources do you use in your production?" (multiple choice)



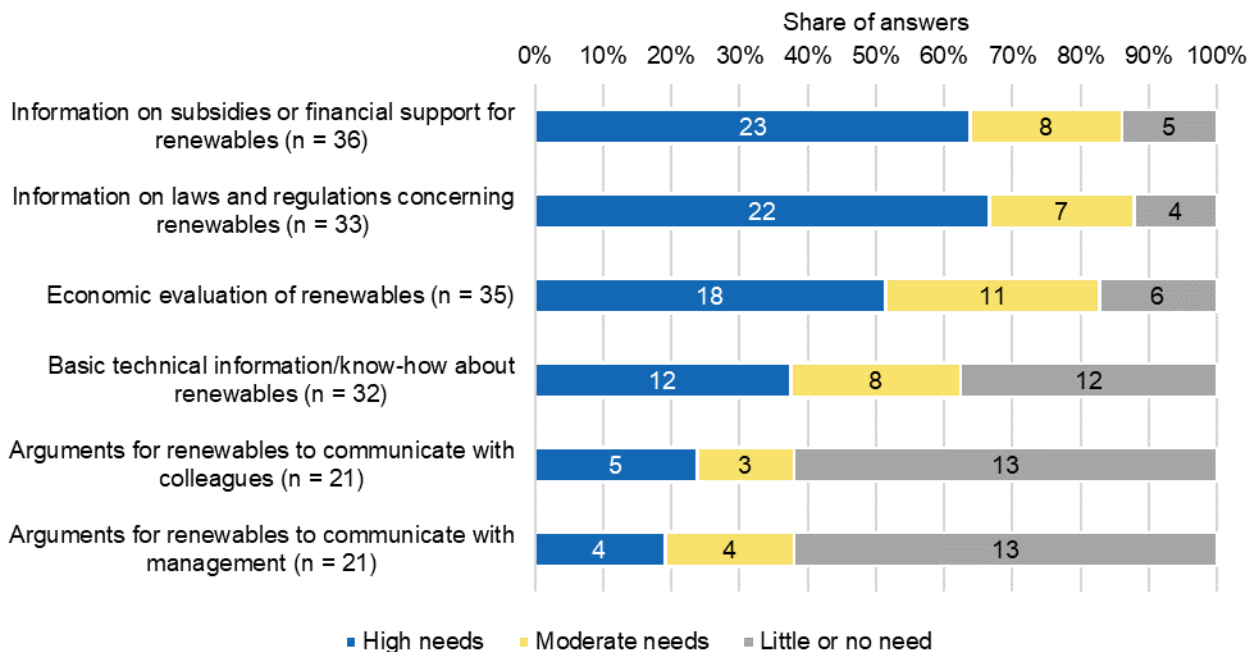
As barriers to the implementation of renewables, a lack of funding for the investment was mentioned six times in the interviews while time constraints to deal were mentioned 5 times and a lack of responsibility regarding the implementation of renewables was mentioned four times. All potentials already being used was mentioned twice. Participants of the survey mentioned similar barriers. Any measures that appear reasonable already being implemented was mentioned the most, followed by financial aspects along with a lack of knowledge as to how to proceed from the current situation (Figure 20).

Figure 20: Answers to the question "What are the reasons your company is not using (more) renewables?" (multiple choice)



Lastly, participants were asked in which areas they need further support to deploy renewables in their production. The results from the survey suggest that support is mainly needed regarding the economic evaluation, subsidies and laws and regulations concerning renewable energies. Basic technical information/know-how about renewables is also needed, but to a lesser extent. Arguments to convince colleagues or the management seem to be less of a concern (Figure 21). These findings are supported by the results of the interviews where information on subsidies or financial support was mentioned 11 times as being of high or moderate need and technical assistance for renewables which was mentioned 10 times as being of high or moderate need. The need for basic technical know-how, as well as economic evaluation of renewables and information on laws and regulations concerning renewables was each mentioned seven times as being high or moderate. The need for both arguments to convince the colleagues and the management was mentioned only three times each.

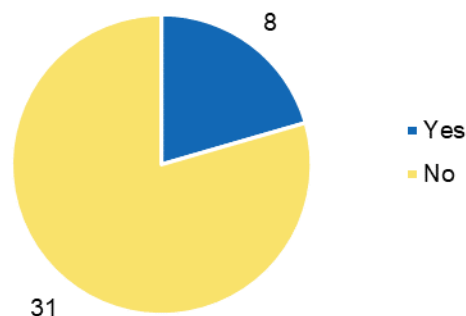
Figure 21: Answers to the question "In which areas would you need further support for deploying renewables?"



2.5. Heat pumps

About using heat pumps, both survey and interviews participants indicated that they do not use heat pumps in their production very often. In the interviews, out of 17 participants answering this question only three indicated that they use heat pumps in their production. Similarly, nearly 80% stated in the survey that they do not use heat pumps in their production (Figure 22).

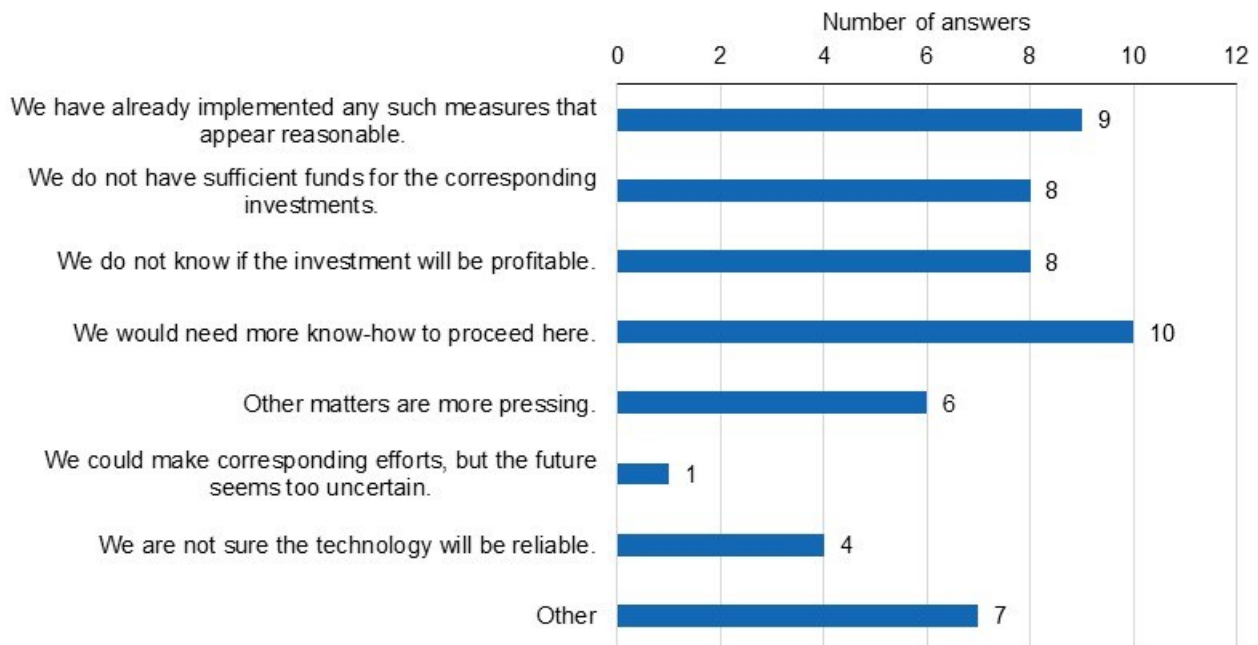
Figure 22: Answers to the question "Do you use heat pumps in your production?" (n = 39)



When asked about the reasons why they are not implementing more heat pumps, time constraints to deal with heat pumps was mentioned three times in the interviews, followed by a lack of responsibility regarding the implementation of heat pumps and the fact that all potentials are already covered, which were both mentioned twice. The technology being too complicated together as well as reliability concerns were both mentioned once. Participants

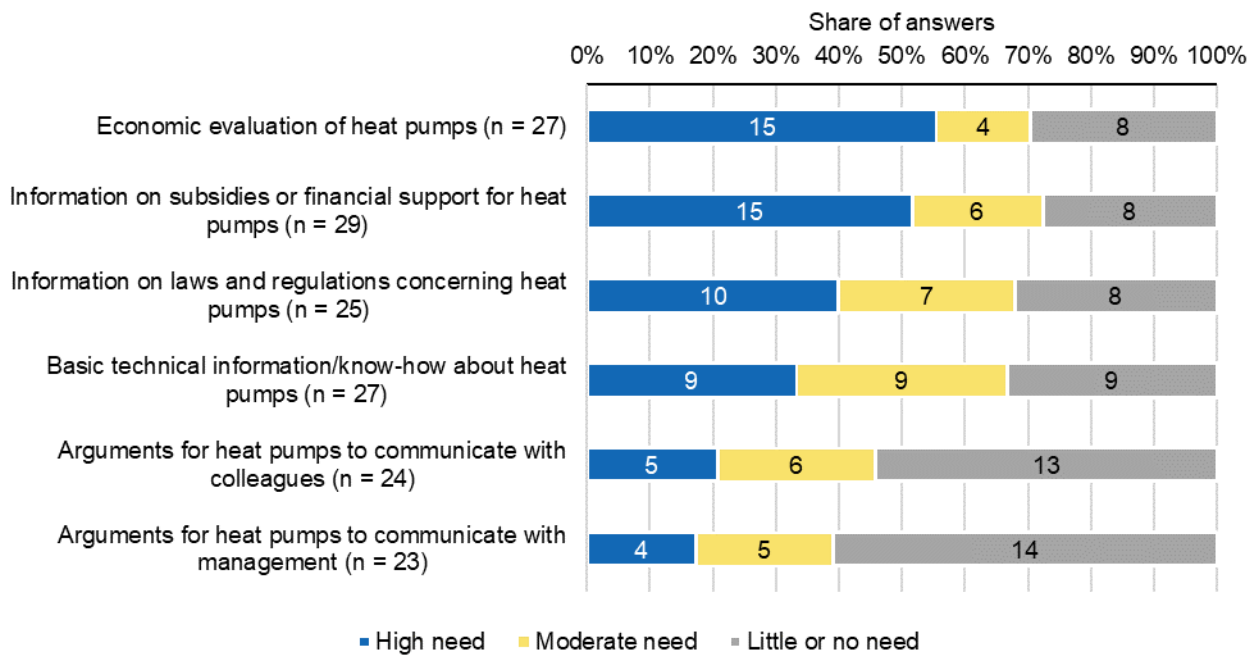
of the survey indicate as main reason the lack of knowledge as to how to proceed from their current situation, followed by the fact that any measure that appears reasonable has already been implemented and financial aspects (Figure 23).

Figure 23: Answers to the question "What are the reasons your company is not using (more) heat pumps?" (multiple choice)



Participants were also asked in which areas they would need further support to deploy heat pumps. In the interviews the need for technical assistance, along with the need for basic technical know-how and help with the economic evaluation of heat pumps were each mentioned 10 times as being high or moderate. The need for information on subsidies or financial support as well as the need for information on the legal context with regard to heat pumps were mentioned eight, respectively six times as being high or moderate. The need for both arguments to convince the colleagues and the management was mentioned only one time each as being high or moderate. The results from the survey suggest that support is mainly needed with regard to basic technical information/know-how about heat pumps, economic evaluation of heat pumps, as well as with regard to information on subsidies and information on laws and regulations concerning heat pumps. Arguments to convince colleagues or the management seem to be less of a concern (Figure 24).

Figure 24: Answers to the question "In which areas would you need further support for deploying heat pumps?"



2.6. Biogas

With regard to using biogas as a particular source of energy, less than half of the participants have livestock at their site (Figure 25). Since livestock is potentially a direct source for biogas, these participants were asked additional questions on the production of biogas. In the interviews this was the case for three organizations.

Both in the survey and the interviews almost none of the companies produce biogas from manure. In the interviews none of the participants indicated to produce biogas from manure, while in the survey only one participant answered that it is the case (Figure 27).

Figure 25: Answers to the question "Do you have livestock at your site?" (n = 41)

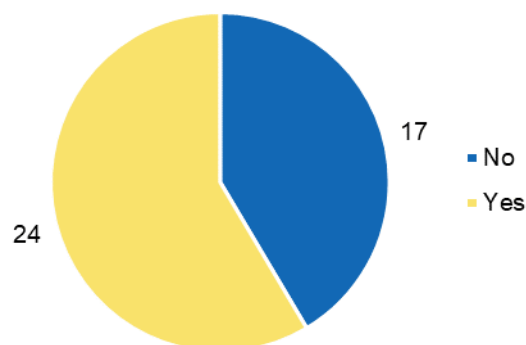


Figure 26: Answers to the question "How many cows do you have at your site?" (n=24)

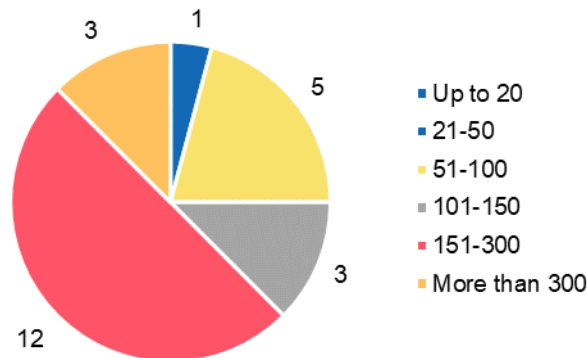
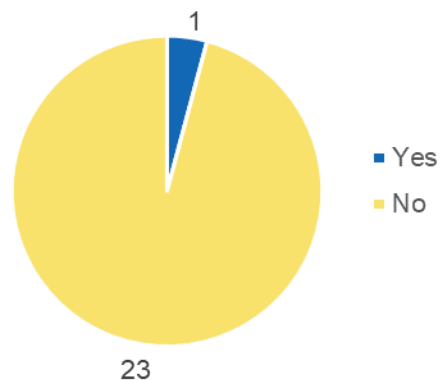
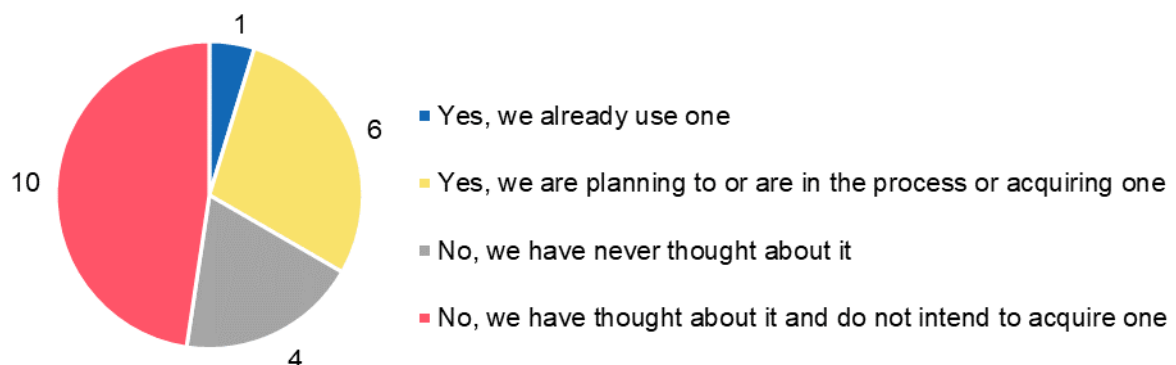


Figure 27: Answers to the question "Do you produce biogas from manure at your side?" (n=24)



Participants were also asked if they have considered acquiring a biodigester. In the interviews the question was only answered twice: one participant stated that they are planning to or are in the process of acquiring one and another participant stated that they have never thought about it. According to the survey, about a third of the organizations stated that they have or are planning to acquire a biodigester (Figure 28).

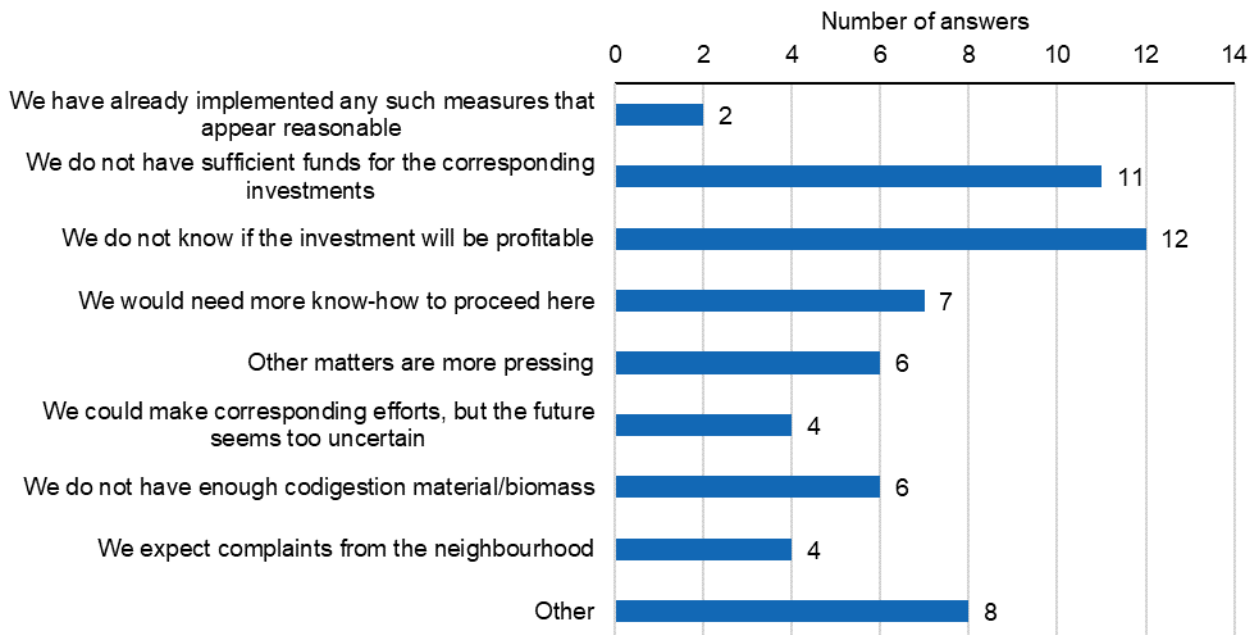
Figure 28: Answers to the question "Have you ever thought about acquiring a biodigester (large covered tank, to make raw biogas)?" (n = 21)



When it comes to the reasons why the companies do not produce any or more biogas, financial considerations are dominant in the survey (Figure 29). In the interviews time constraints to deal with the production of biogas along with the technology being too complicated

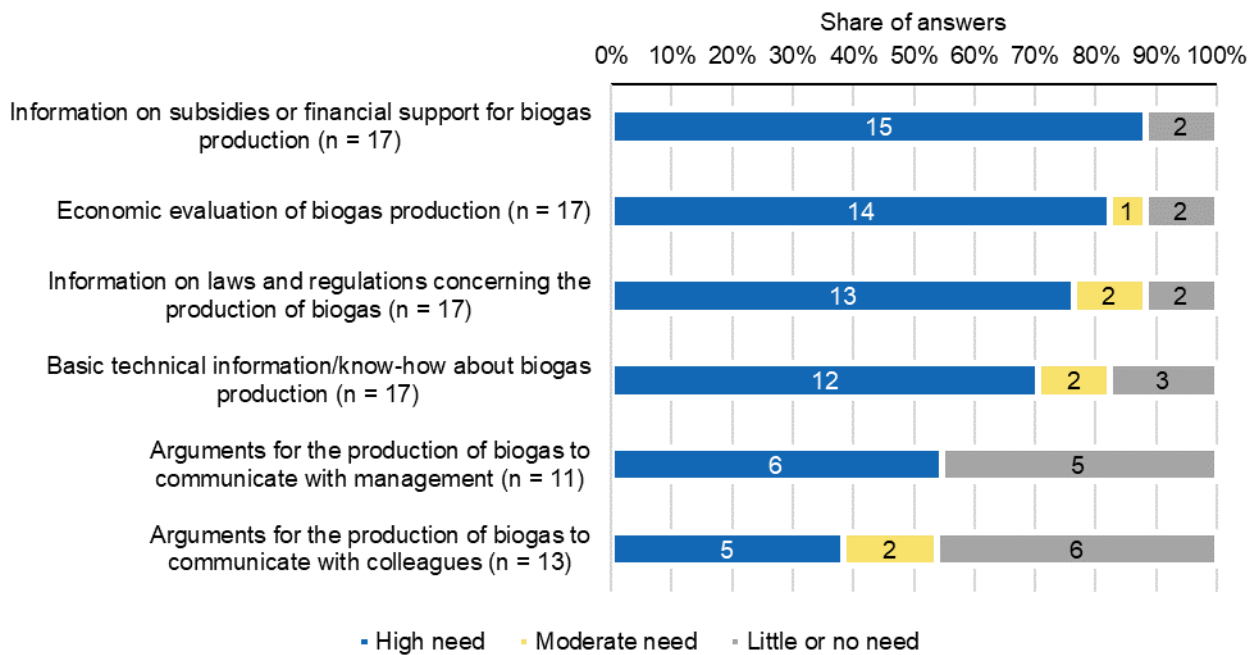
were both mentioned twice. A lack of responsibility regarding the implementation as well as the technology not being profitable were both mentioned once.

Figure 29: Answers to the question "What are the reasons your company is not producing (more) biogas?" (multiple choice)



Participants were also asked in which areas they would need further support for producing biogas. In the interviews the need for technical assistance for renewables, along with the need for basic technical know-how, economic evaluation of renewables and information on subsidies or financial support were each mentioned three times as being high or moderate. Information on the legal context concerning the production of biogas was mentioned twice as being high or moderate. The need for both arguments to convince the colleagues and the management was mentioned one time each as being moderate. The results from the survey suggest that support is mainly needed for basic technical know-how about the production of biogas, as well as with regards to economic evaluation, along with information on both subsidies and laws and regulations concerning the production of biogas. Arguments to convince colleagues or the management seem to be less of a concern (Figure 30).

Figure 30: Answers to the question "In which areas would you need further support for producing biogas?"



3. Conclusions for tool development

Regarding a generalization of results, it should be noted that the sample of interview participants reflects the views of companies offering a diverse range of products from raw milk production to various processed products and it includes companies operating in different parts of the supply chain, i.e. in production, processing, storage & logistics and wholesale & retail. Compared to the interviews, the survey participants have a geographical focus on the Netherlands, yet farmers and dairy sector organizations are covered alike and organizations of different sizes contributed to the results. The conclusions in this section always must be viewed against the sample's coverage and its overall size.

Concerning tool development in the BETTED project, the following general observations can be made from the results:

- **Relevant processes:** Results from both the interviews and the survey indicate the relevance of thermal energy flows in the dairy sector, either in the form of hot processes/steam or for cooling/refrigeration purposes. Milking was also identified as a very relevant process, which might mirror an elevated number of farmers participating in the survey. Lighting and mechanical energy in general seem to be less relevant and thus not a priority for tool development.
- **General barriers:** Barriers to improve energy efficiency and to promote renewable energies seem to mainly be mirrored by a lack of knowledge and financial uncertainty. A conclusion might also be that the organizations are missing information, not primarily about general potentials for improving energy efficiency and promoting renewable energies, but about where their organizations are standing with these points and how to improve their current situation.

Conclusions concerning an energy benchmarking tool

In terms of observations, the participating organizations tend to use internal benchmarking substantially more often than external benchmarking, amongst other reasons because of competition concerns and reduced comparability between companies in the dairy sector. The results of the survey also suggest that companies would need further support to develop energy benchmarking in a range of different areas. When asked about the level of complexity of a benchmarking tool, results suggest that a simpler tool in general is preferred.

Based on the observations, the following recommendations for the development of an energy benchmarking tool in the BETTED project follows:

- **Priority on data accessibility:** In view of the wider use of internal benchmarking tools and limited available data, the tool implementation could cover and improve internal benchmarking as a priority rather than external benchmarking. Since a key concern for external benchmarking is data availability, an opportunity could also lie in the provision of external benchmarks if a sufficiently sized dataset could be made publicly available for the use of companies.

- **Easy accessible tool:** In view of the answers related to required support, a simpler and more accessible tool seems to be preferred over a more complicated and data-intensive tool.
- **Inclusion of guidance on energy benchmarking:** A benchmarking tool offered by the BETTED project should not only be a solution focusing on numerical computation, but it should also guide the targeted companies in designing, setting up and making meaningful use of energy benchmarks.

Conclusions concerning a modified toolbox

The analysis of interview results underlines that companies see an elevated need for calculating economic performance of renewable energies and energy efficiency measures before proceeding to environmental impacts. Also, a preference can be observed for tools that are aligned with processes or both processes and products over addressing particular products. And finally, another observation is that many participants point out a preference for a production-site oriented tool. Nevertheless, a non-negligible share also seeks to cover the entire supply chain.

Based on the observations, the following recommendations for extending the available toolbox seem to emerge:

- **Process-orientation over product-orientation:** While the existing tools from the ICCEE project tend to focus on individual products, there seems to be a stronger emphasis on processes in the BETTED project. In view of the above-mentioned relevance of some process, a relevant area for extensions of the toolbox could be in thermal and milking processes.
- **Need for economic valuation:** There appears a clear requirement to assess the economic viability of energy efficiency measures and renewable energies.
- **Priority on sites, then the supply chains:** The results indicate that a priority should be given to tools that look at production sites before proceeding to the supply chains. A potential implementation could also seek to include both, allowing a detailed picture of the individual production site, but also linking these results to other areas of the supply chain. A corresponding solution should also take the ability and willingness for sharing data into consideration.

Conclusions concerning renewable energy sources

Most of the participating organizations in both the interviews and the survey currently use photovoltaics as renewable energy source with only a few companies using other energy sources such as biomass. The most relevant barriers to the further deployment of renewable energies appear related to financial aspects (lack of funds, uncertainty of profitability) as well as insufficient knowledge how to proceed.

The results suggest that companies could need further support for deploying renewables in a range of different areas, the main ones being support for economic evaluations of renewable energies and information about both financial support and on the legal context concerning their implementation.



Based on the observations, the following recommendations for tools addressing renewable energies in general are proposed:

- **Economic evaluation:** In line with the observation for the toolbox as a whole, an economic evaluation is needed for renewable energies. This evaluation should also include information on available subsidies and information on the conditions of using renewable energies.
- **Coverage of various renewable energies:** Photovoltaic energy seems already to be used quite broadly, but other energy sources do not seem to be well utilized or prioritized in comparison. Therefore, photovoltaic does not seem to be necessarily on a priority list for the work on tools, but opportunities for biomass, solar thermal energy, wind power and other largely location-independent energy sources could be a priority.

Conclusions concerning heat pumps

Most of the participating organizations in both the interviews and the survey do not currently use heat pumps in their production. Barriers to further implementation of heat pumps seem to originate from a mix of factors: a lack of know-how, economic evaluation concerns, or the statement that all reasonable measures have already been implemented.

The results also suggest that companies would need further support for using heat pumps in a range of different areas, the main ones being support with regard to technical know-how, as well as economic evaluation and information on both financial support and on the legal context concerning the implementation of heat pumps.

Based on the observations, the following recommendation for heat pumps appear to emerge:

- **Multi-angle approach:** While there are several indications on barriers and information requirements, there is no clearcut single area among the proposed set that seems to merit specific attention, though for example the economic valuation and financing emerges as an important topic again. In combination with the apparently limited use of heat pumps so far, an approach addressing the topic broadly could be beneficial. It could include information on specific implementation examples of heat pumps in the dairy sector, but also tools that allow to gain that allow to develop ideas on the technical implementation and the related economic gains from heat pumps.

Conclusions concerning biogas production

Most of the participating organizations with livestock at their site do not currently produce biogas and only a limited share of them has considered acquiring a biodigester. Barriers to the production of biogas primarily seem to be related to financial aspects.

Based on the observations made, the following recommendation can be suggested for biogas:

- **Technical knowledge and economic evaluation:** The results suggest that companies could benefit from further support for the production of biogas in a range of different areas, the main ones being support with regard to technical know-how, as well as economic evaluation and a need for information on both financial support and on the legal context concerning the production of biogas.
- **Awareness-raising:** In relative turns, a still substantial share of participants indicated that the companies did not yet consider using a biodigester, indicating a potential opportunity for awareness raising measures.



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