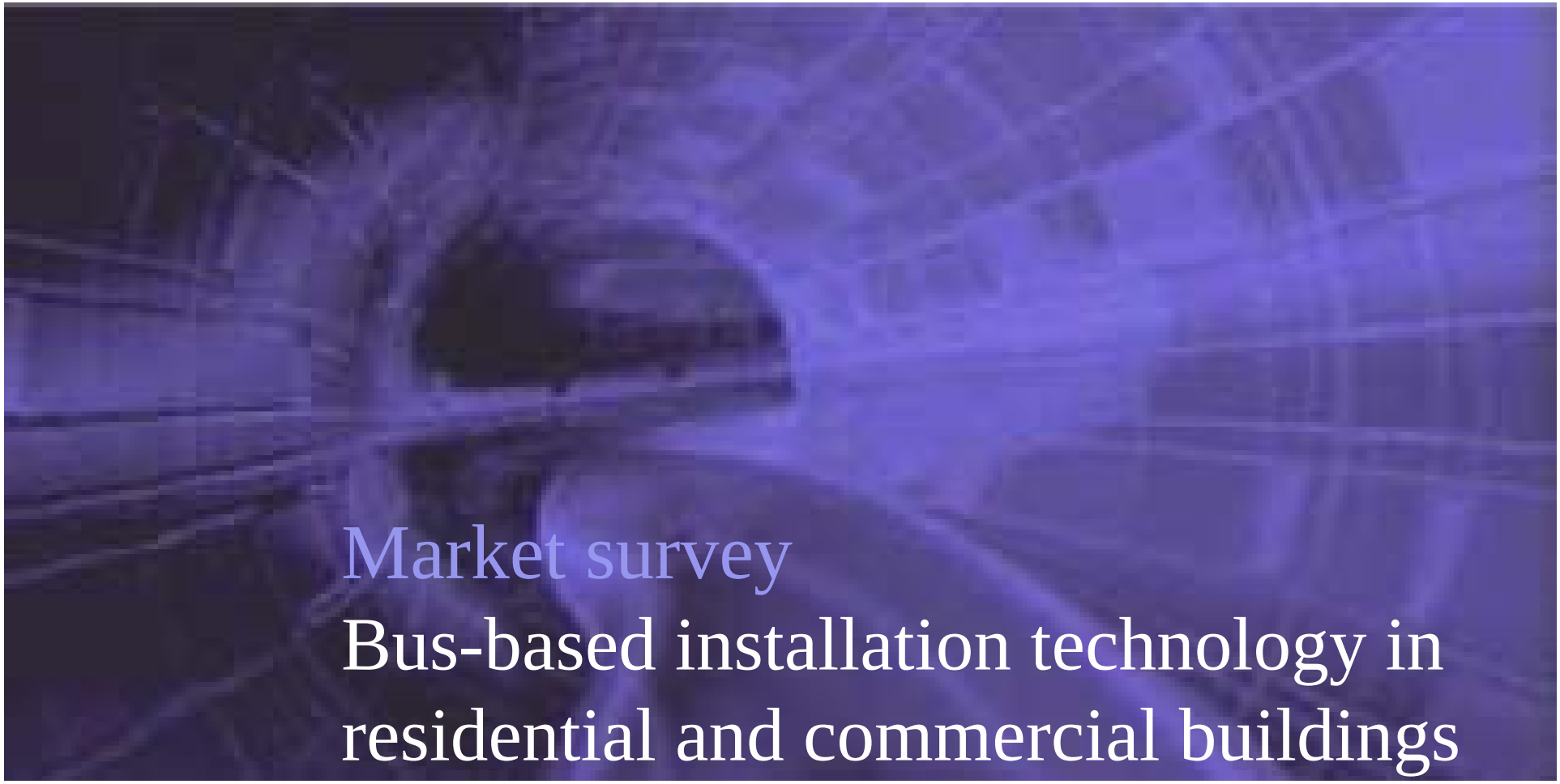
South Westphalia University of Applied Sciences

Combined campus and distance learning course
in Industrial Business Administration

Excerpts



Market survey
Bus-based installation technology in residential and commercial buildings

Fachhochschule Südwestfalen
Hochschule für Technik und Wirtschaft
University of Applied Sciences

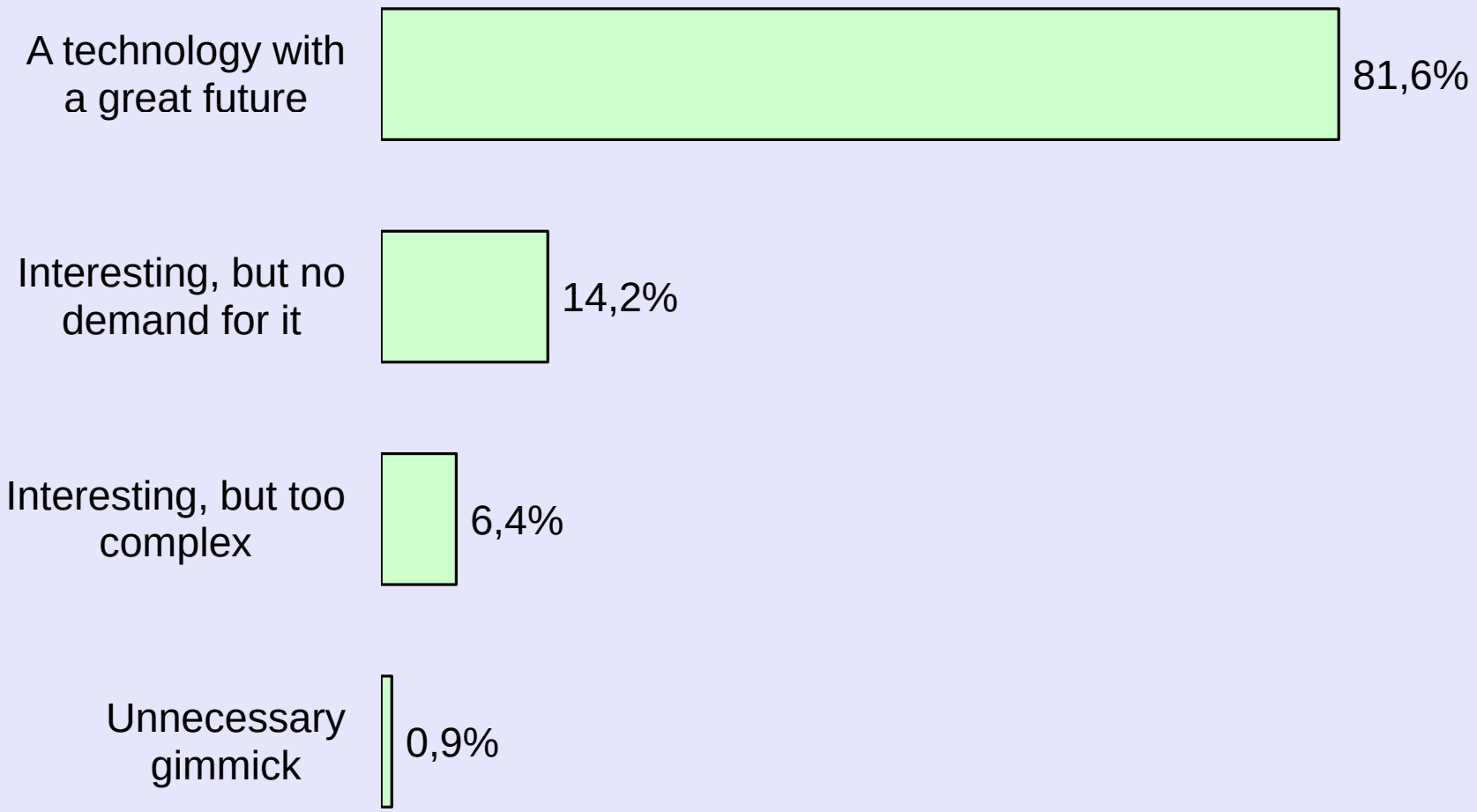
Contents

- General information
- Respondent data
- Level of skill in/appraisal of bus technology
- Bus technology usage behaviour
- Networking technologies used
- Conclusion/recommendations

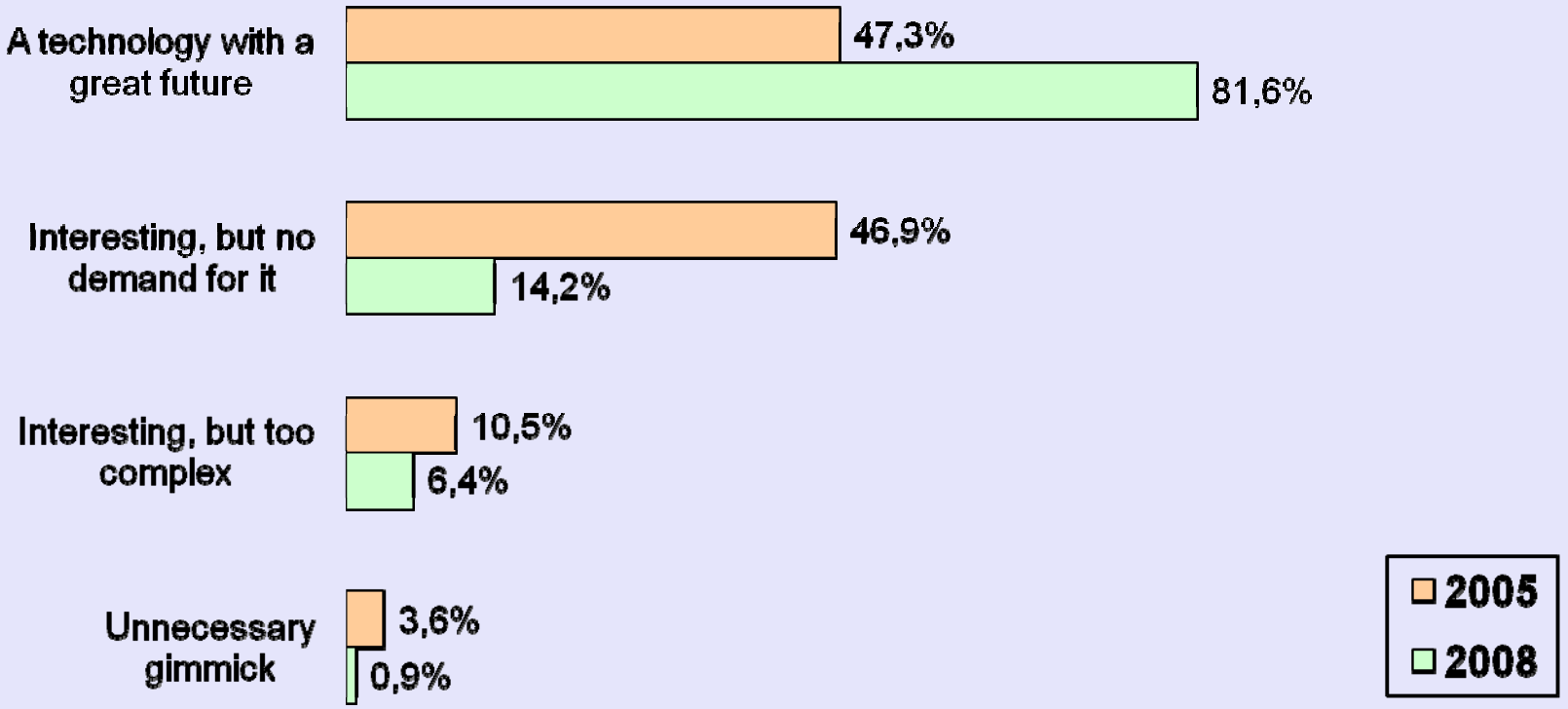
Level of skill in/appraisal of bus technology

- Appraisal of bus technology
- Benefits of bus technology for the client
- Companies' level of skill in bus technology

Very generally, what is your opinion of "bus-based installation technology"?



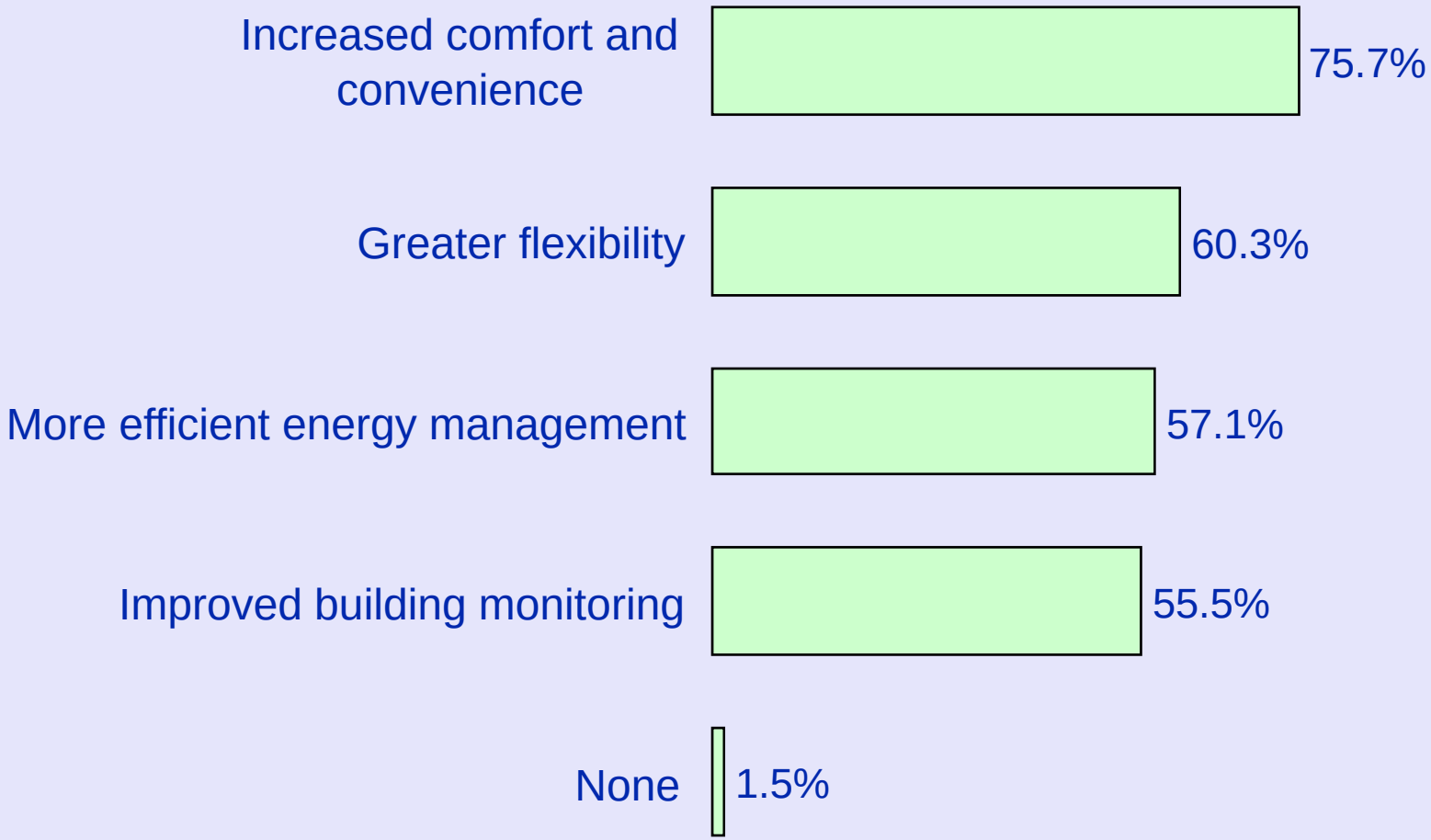
Very generally, what is your opinion of "bus-based installation technology"?



Very generally, what is your opinion of "bus-based installation technology"?

- 82% of respondents foresee a great future for bus-based installation technology. In 2005 only 47% did. 93% of HVAC companies see bus-based installation technology as a technology with a great future.
- 90% of those respondents with a very high level of skill in bus technology think that the technology has a future; for respondents with little or no skill in this area, however, the figure is just 60%.
- Among companies with 50 employees or more, 79% believe that there is a future in bus technology, whereas for companies with 3 employees or less, only 55% think this.
- In response to the question, "Very generally, what is your opinion of bus-based installation technology?", the proportion of respondents in Germany answering "A technology with a great future" varies between 48% (postcodes beginning with 0 or 1) and 72% (postcodes beginning with 7), while in Austria/Switzerland and Spain/Italy/Greece the figure is around 87%, and in the other countries 76%.
- Respondents aged 50 or less are more likely to foresee a positive future for the technology than older people.

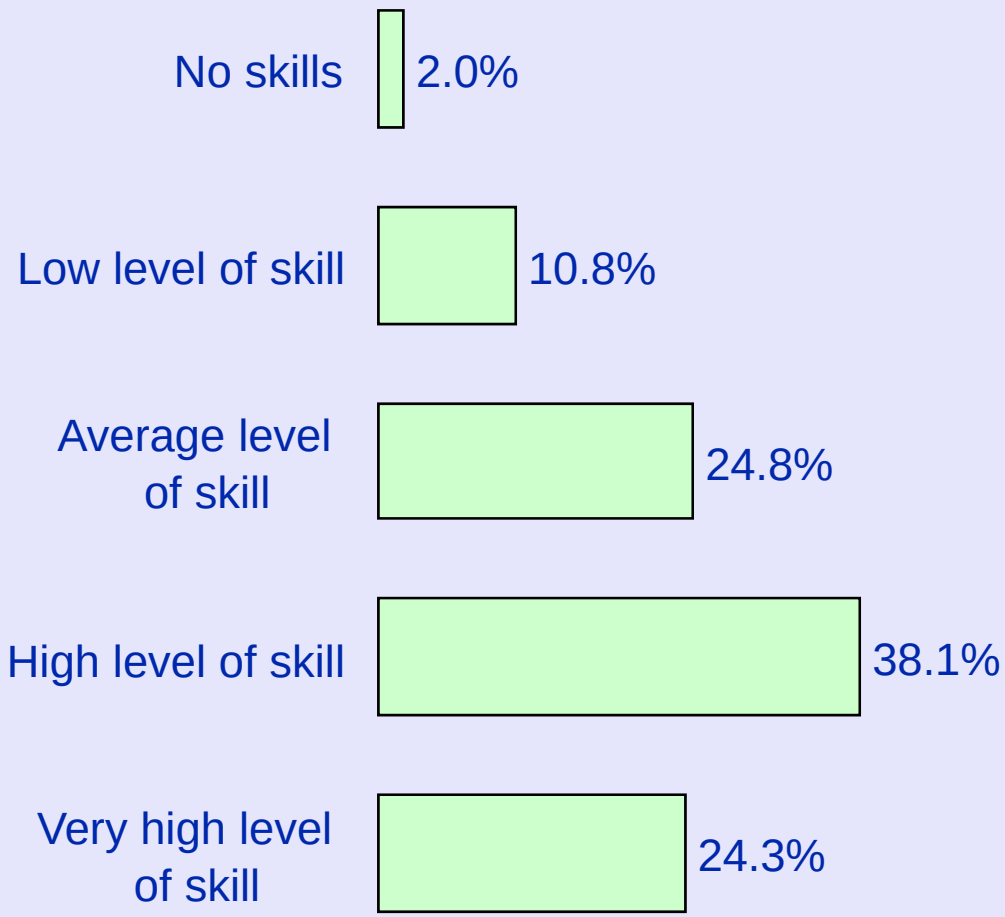
Generally, what do you see as the benefits of "bus-based installation technology" for your customers?



Generally, what do you see as the benefits of "bus-based installation technology" for your customers?

- 3/4 of respondents consider increased comfort and convenience to be a benefit of bus-based installation technology. Almost 2/3 think that greater flexibility is a benefit for customers.
- 57% of respondents believe that more efficient energy management is an advantage, while 56% think that customers will benefit from the improved building monitoring offered by the technology.
- Only 1.5% could see no benefits for the customer in using bus-based installation technology.
- Respondents with an above-average level of skill in bus technology see more benefits for the customer in all areas.

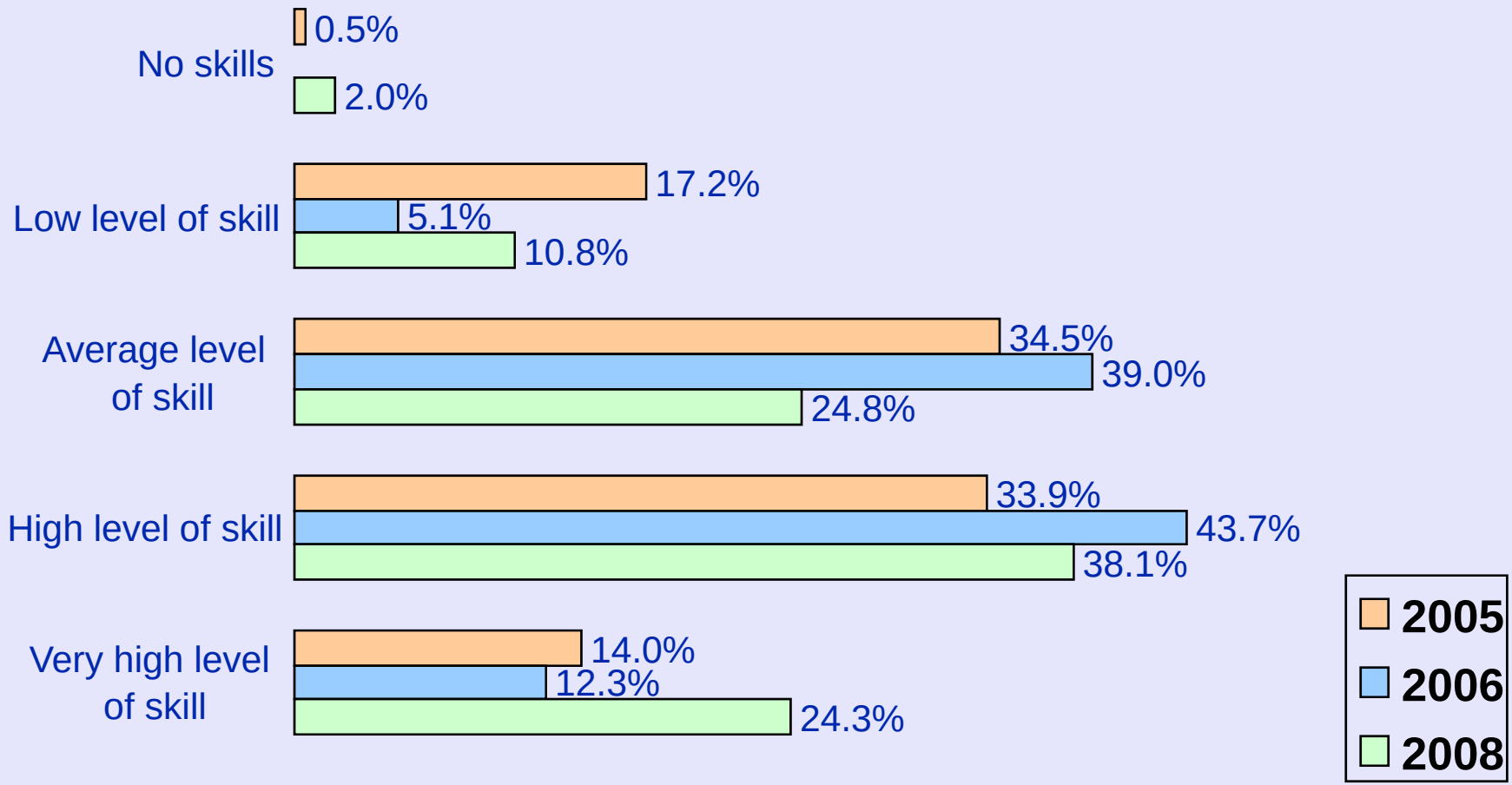
How would you rate overall your company's level of skill in "bus-based installation technology"?



How would you rate overall your company's level of skill in "bus-based installation technology"?

- Almost 2/3 of respondents rate their level of skill as high or even very high.
- Just 2% of respondents say that they have no skills at all in this area.

How would you rate overall your company's level of skill in bus-based installation technology?



How would you rate overall your company's level of skill in "bus-based installation technology"?

- The larger the number of buildings that a company fits with bus technology, the higher its level of skill is likely to be. While only 11% of companies that only equip one building per year with bus technology say that they have a very high level of skill, the figure for companies that fit the technology in between 21 and 50 buildings annually is as much as 60%.

- It is clear that levels of skill in bus-based installation technology increase according to whether a company already uses the technology. Indeed, 75% of all respondents at companies that have already used bus technology say that they have either a high or a very high level of skill. Among respondents who either do not use bus technology at all or only plan to in the future, the figure is around just 25%.

- 62% of respondents in Austria/Switzerland say they have a "very high level of skill" in bus technology, whereas on average only 16% of respondents in Germany say this.

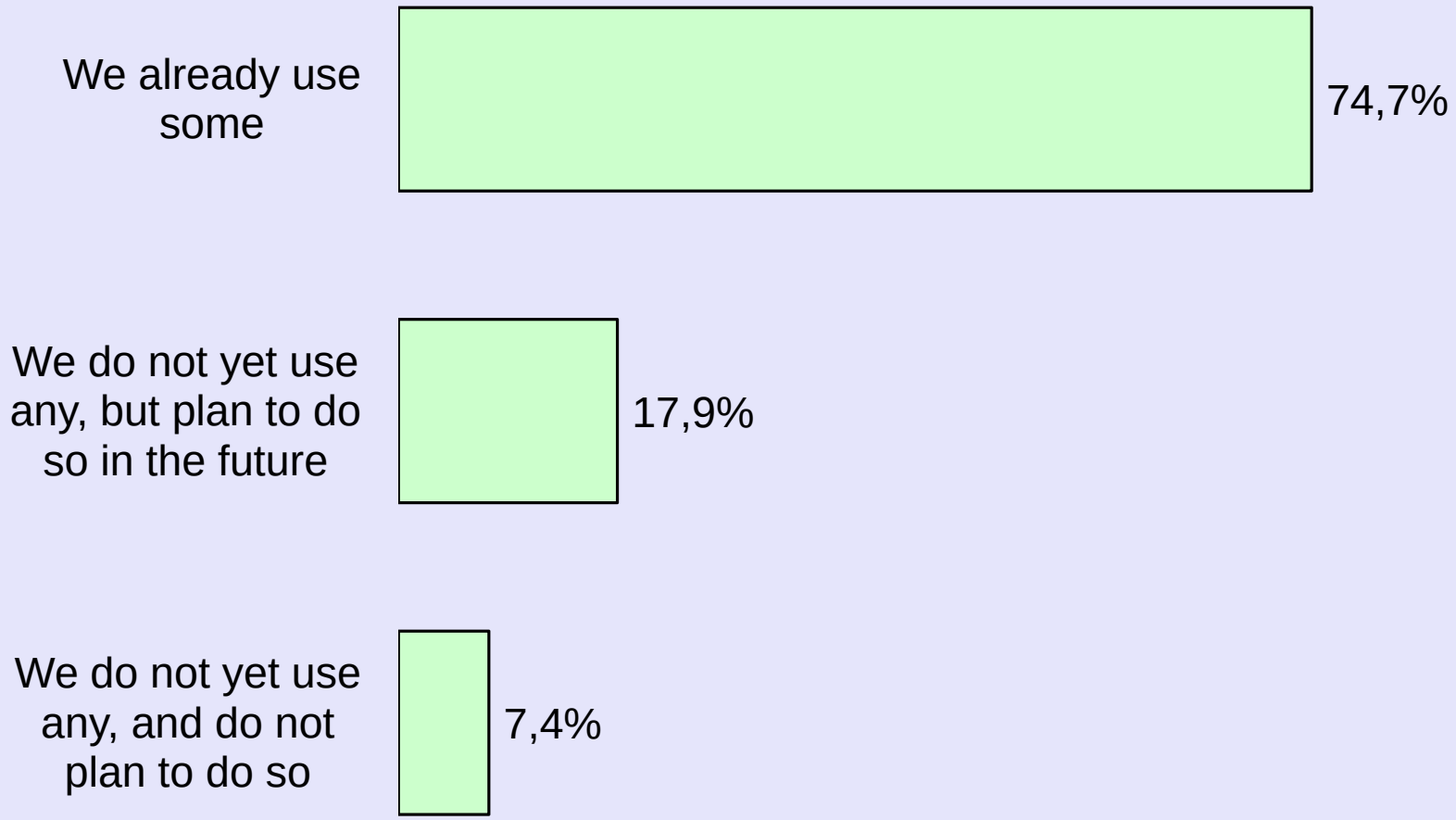
Contents

- General information
- Respondent data
- Level of skill in/appraisal of bus technology
- Bus technology usage behaviour
- Networking technologies used
- Conclusion/recommendations

Bus technology usage behaviour

- Usage of bus technology
- Total number of buildings worked on annually
- Proportion of these which are equipped with bus technology
- Proportions of residential and commercial buildings
- Who takes the decision to use bus technology
- Whether the company actively offers bus technology
- Current and future areas of use

To what extent does your company already use "bus-based installation technology"?

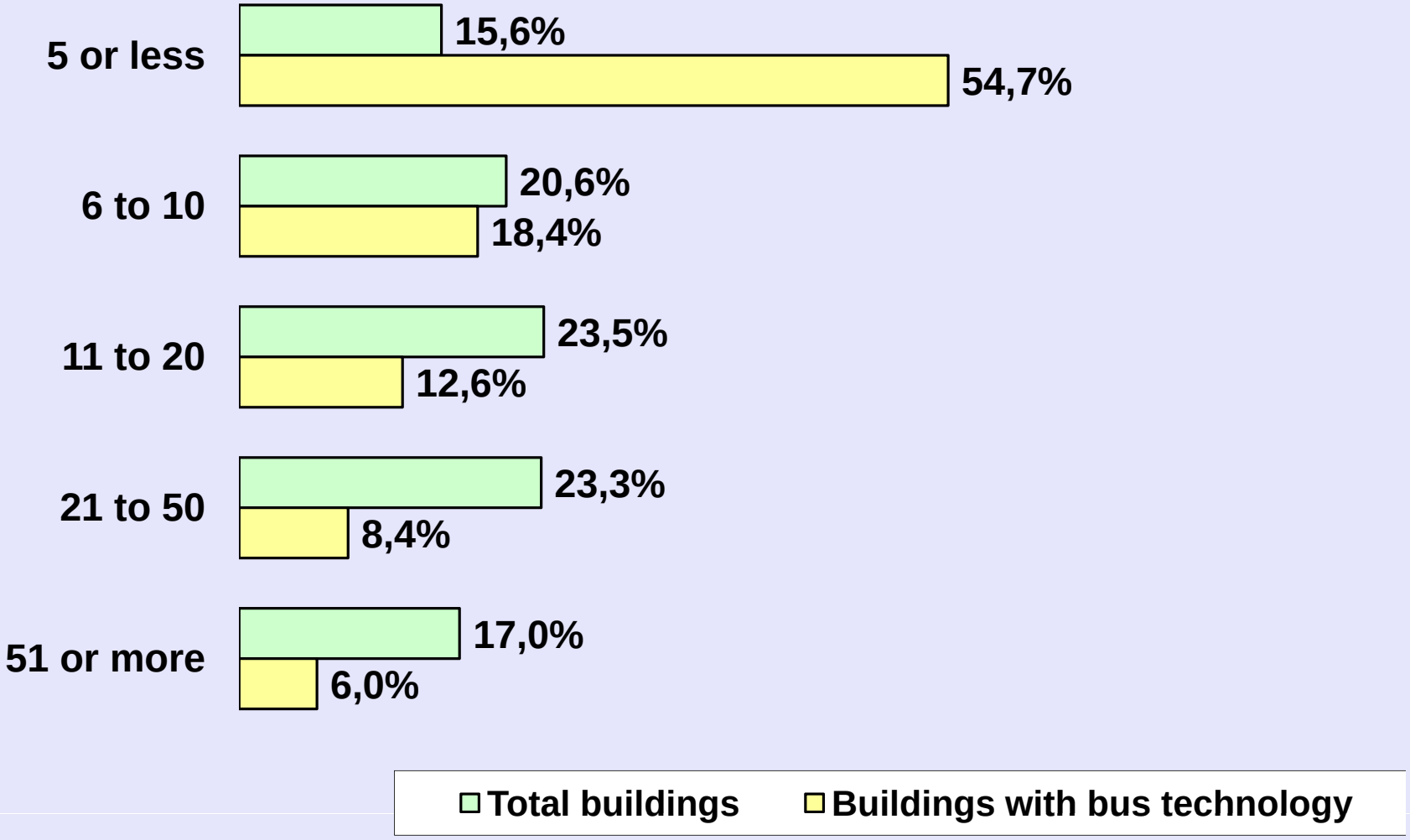


Fachhochschule Südwestfalen
Hochschule für Technik und Wirtschaft
University of Applied Sciences

To what extent does your company already use "bus-based installation technology"?

- 3/4 of all respondents said that their company had already used bus-based installation technology, while a further 18% plan to do so in the future. Only 7% neither use this technology at present nor plan to do so in the future.
- In 2005 as many as 28% did not even intend to use bus-based installation technology in the future, which may however be partly due to the different age distributions of respondents in the different years.
- HVAC companies are clearly in the lead in terms of usage of bus-based installation technology, with 93% of these companies using the technology. Architects were the least likely to use the technology (52%), with 22% of architects not even planning to use it in the future.
- As could almost be expected, 97% of respondents claiming a very high level of skill already use bus-based installation technology, while the figure for respondents with little or no skill in this area is just 24%. However, it is worth noting that 24% use bus technology already, despite having only a very low skill level or none at all.

On average, how many buildings does your company work on in total each year, and how many of these does it equip with bus technology?



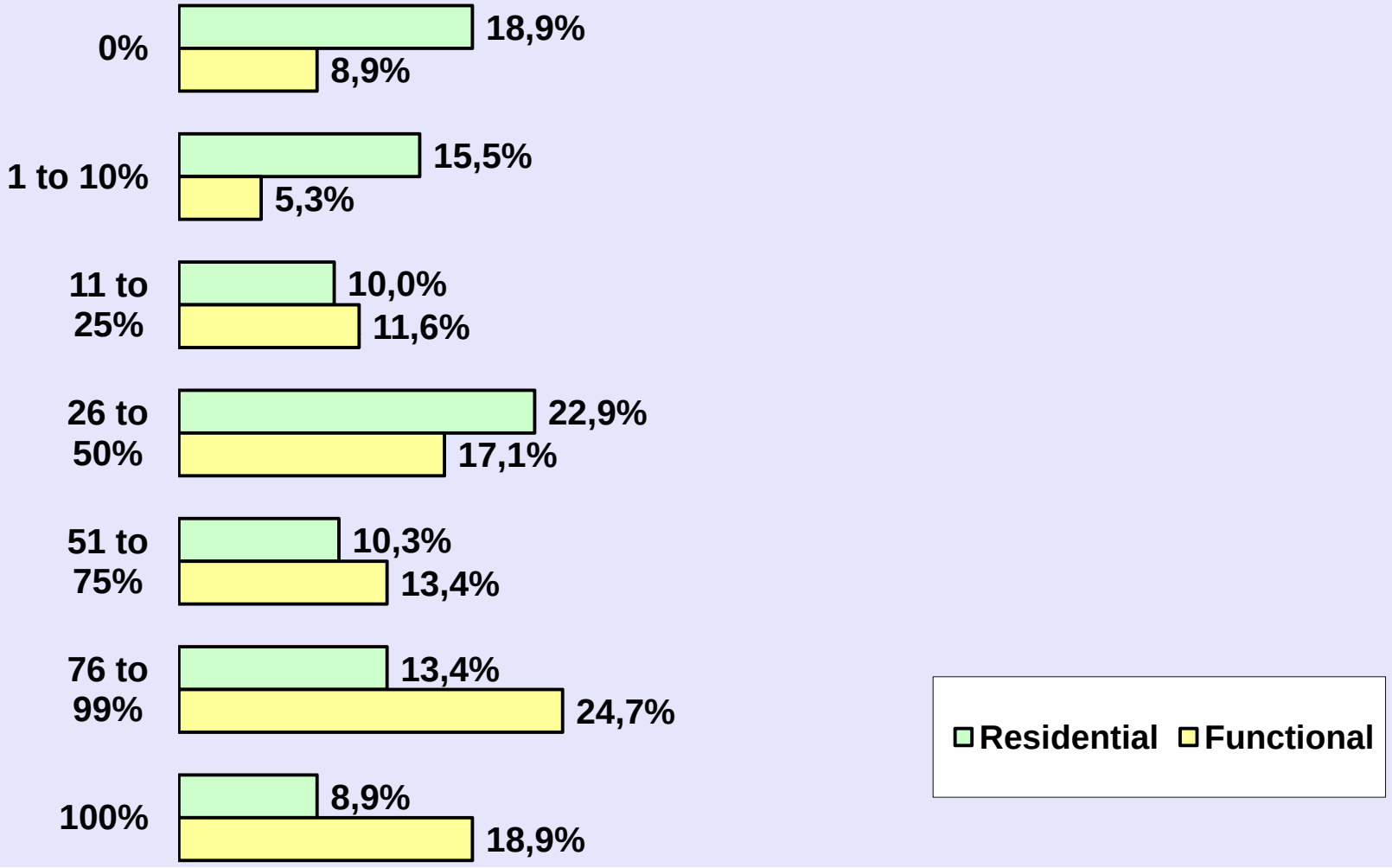
On average, how many buildings does your company work on in total each year, and how many of these does it equip with bus technology?

- In terms of numbers of buildings, answers given ranged from 0 buildings to 200,000 buildings per year. Because of a small number of high “outliers”, the average number of buildings is 263 buildings per year.

- 83% of respondents said that they worked on up to 50 buildings every year. Only 8% of those surveyed cited a figure of more than 100 buildings annually.

- HVAC companies are considerably above average in terms of the number of buildings they equip with bus technology. 33% said that they equipped more than 20 buildings annually with bus technology.

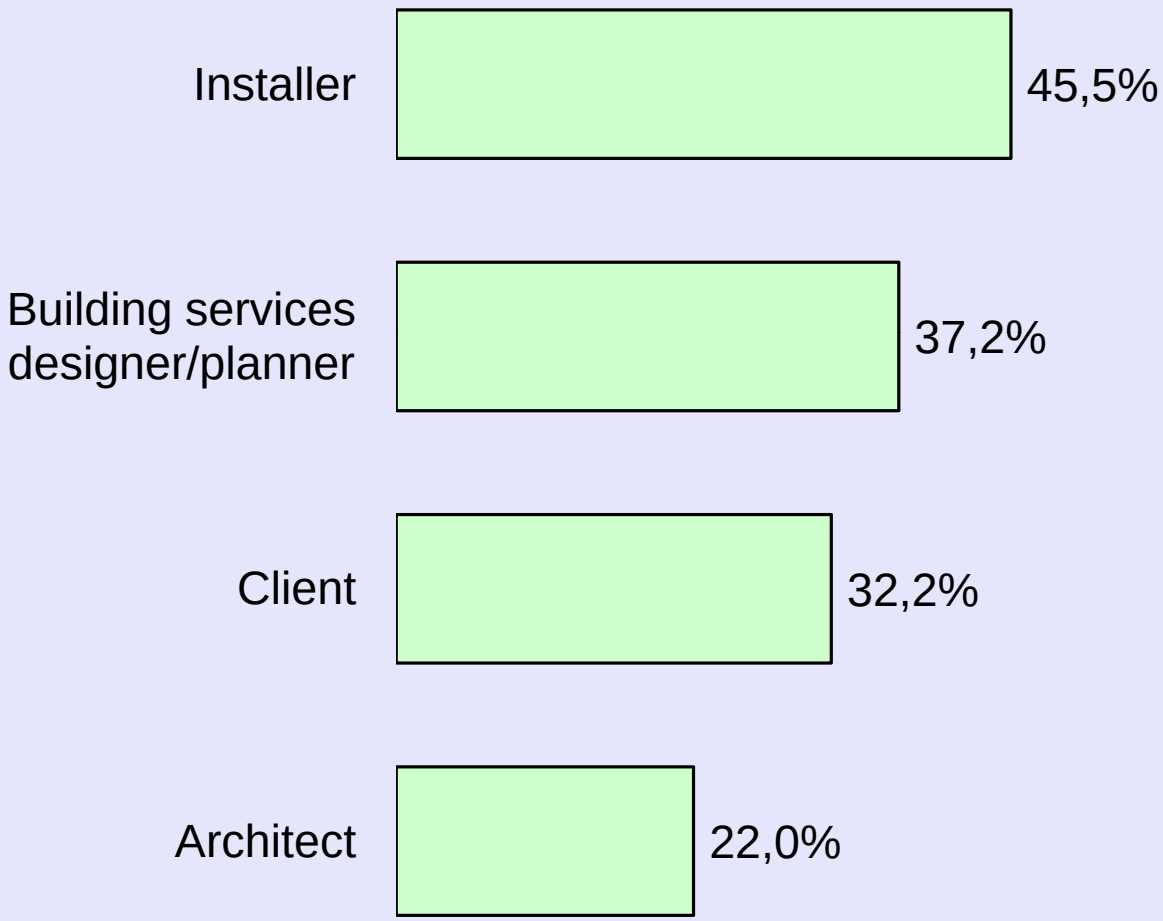
What is the share of residential / commercial buildings with bus technology?



What is the share of residential / commercial buildings with bus technology?

- 44% of respondents said that they equipped at least 3/4 of commercial buildings with bus technology, while for residential buildings just 22% did.
- In residential construction, almost every fifth company uses no bus technology, while for commercial construction the figure is just 9%.
- The larger a company is, the more likely it is to use bus technology in commercial buildings, and the less likely it is to use it in residential buildings. For example, 68% of companies with more than 50 employees fit at least 76% of commercial buildings with the technology.

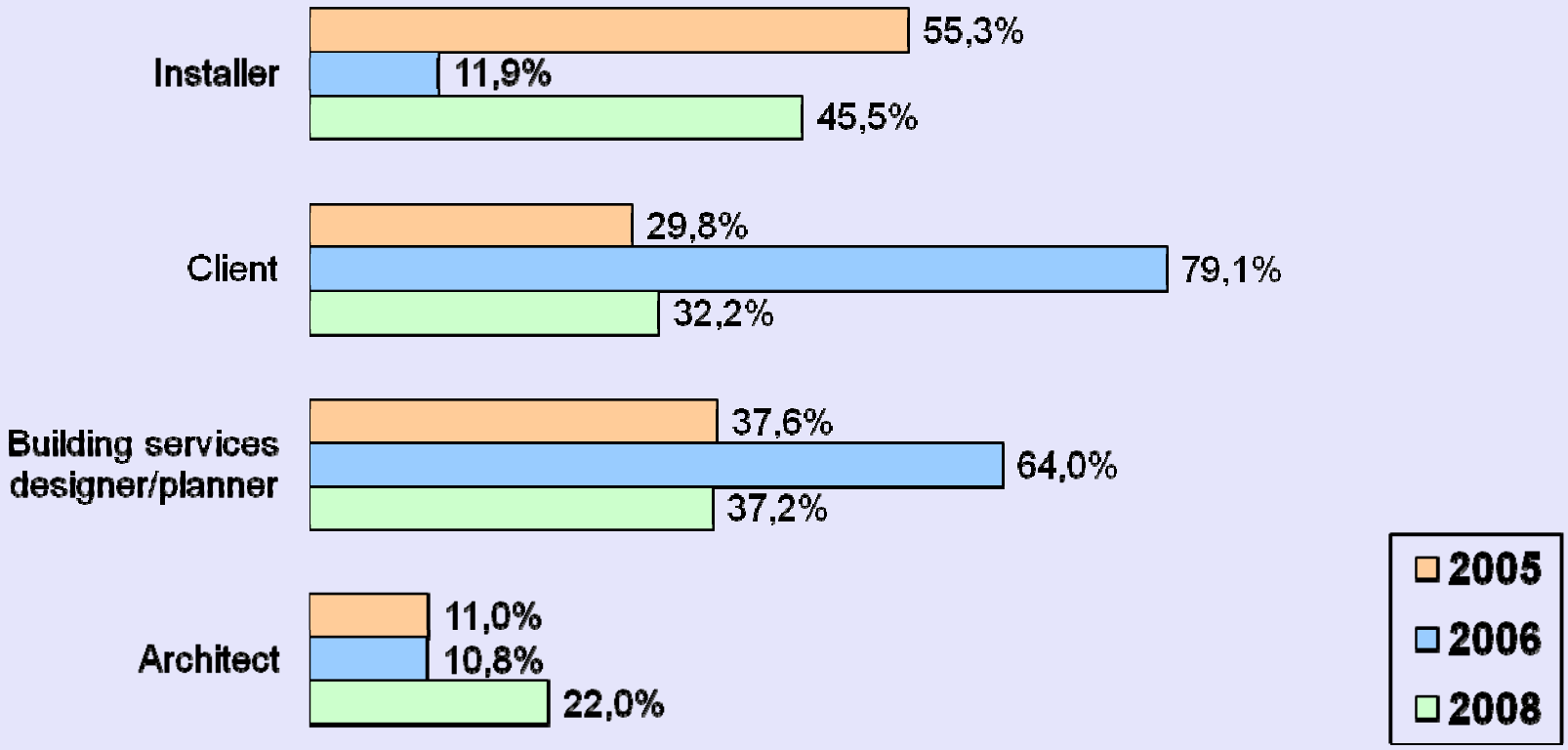
Who generally takes the decision to install bus technology?



Who generally takes the decision to install bus technology?

- Most frequently – that is, in 46% of cases – it is the installers takes the initiative/the decision to install bus technology.
- The building services designer/planner (37%), the client (32%) or the architect (22%) are also very likely to take the decision.

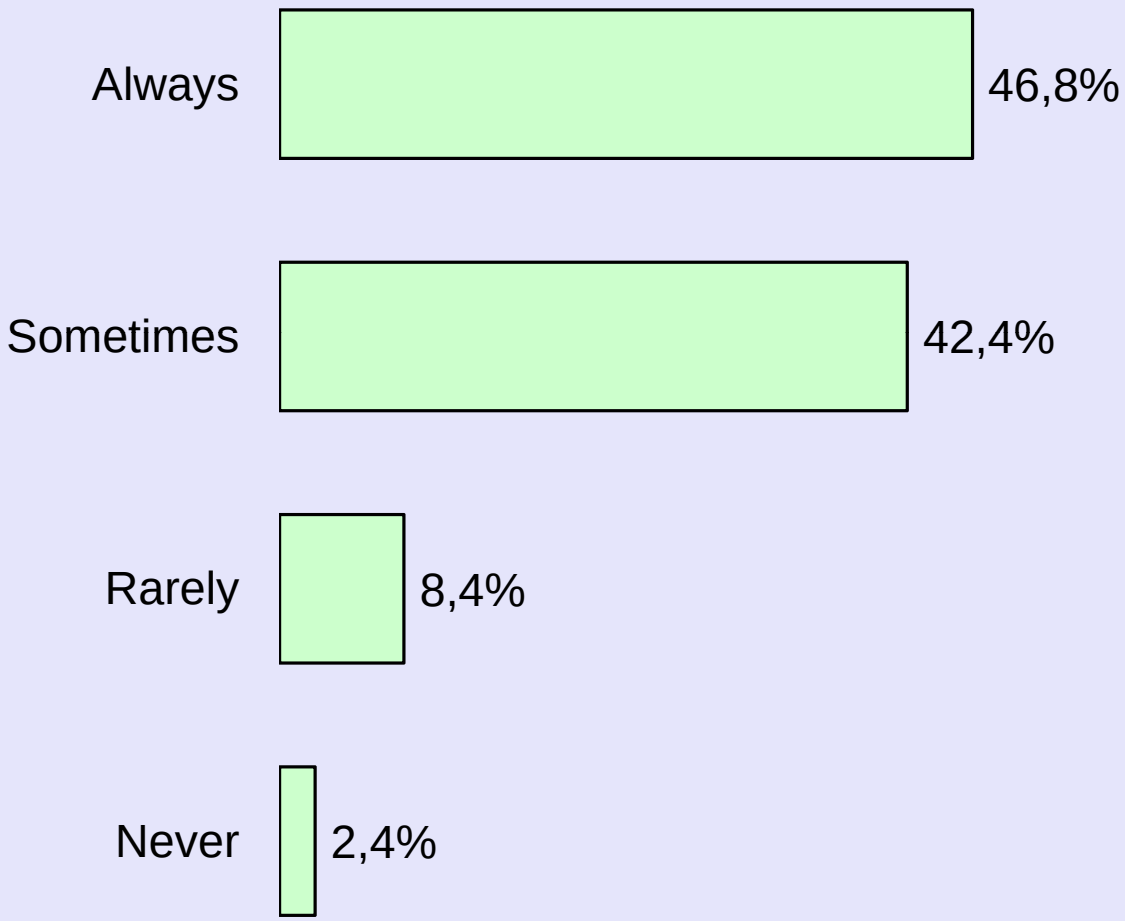
Who generally takes the decision to install bus technology?



Who generally takes the decision to install bus technology?

- Responses to this question from 2006 are quite different from the 2005 and 2008 results, which had been similar to each other.
- This is because the question asked in the "Bus technology in commercial buildings 2006" market survey was formulated as: "Who is primarily responsible for deciding whether a bus system will be used?", and applied only to bus technology in commercial buildings.
- While the installers were mostly likely to take the decision in both 2005 and 2008, the main decision-makers in 2006 were clearly the client with 80% (at that time the answer offered was "Client/investor") and the designer/planner (64%).

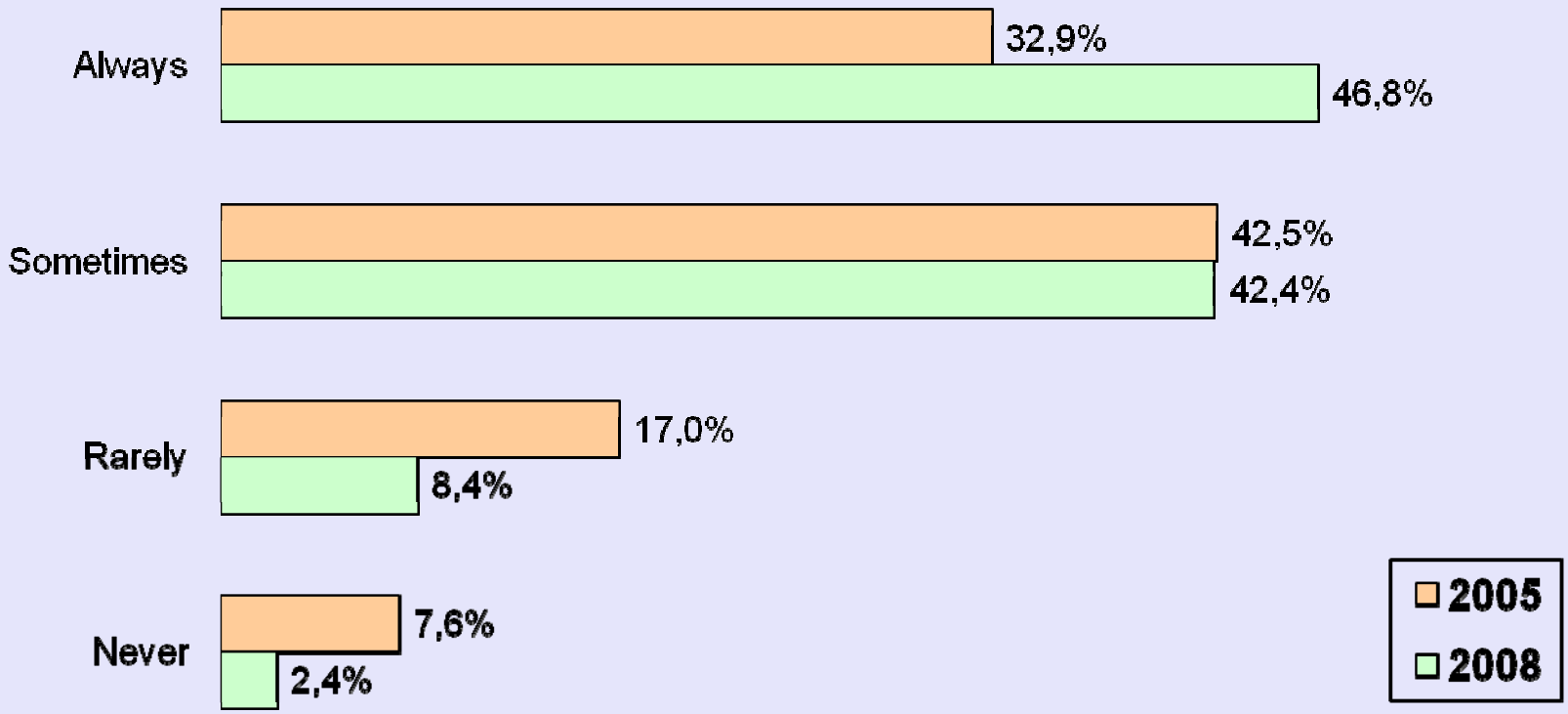
Do you actively offer bus technology to your client?



Do you actively offer bus technology to your client?

- Not even half of respondents said that they actively offer bus technology to their client. 11% of respondents said that they offer bus technology either rarely or not at all.
- 27% of companies that equip one building annually with bus technology always offer their clients the technology, whereas the figure is as much as 69% for companies that fit more than 20 buildings every year with bus technology.
- Building services designers/planners (59%) and HVAC companies (57%) are above average in terms of their likelihood of always actively offering bus technology.
- The higher a company's level of skill in bus technology, the more likely it is "always" to offer its clients the technology. While only 19% of respondents with little or no skill always offer it, for those with a very high level of skill the figure is as much as 78%.
- Whereas most German respondents said that they would "sometimes" actively offer their client bus technology, the majority of respondents outside Germany said they would "always" actively offer it.

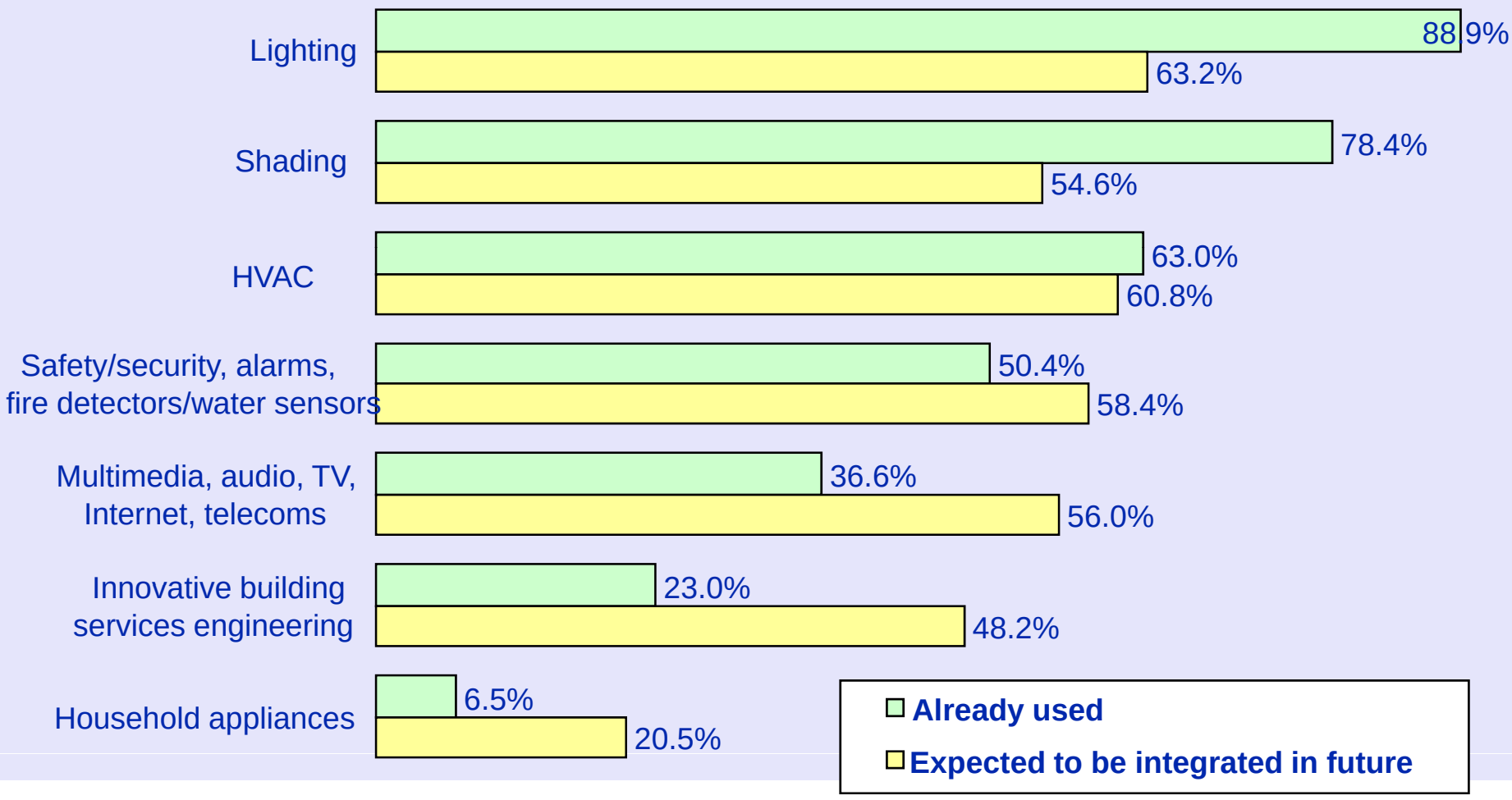
Do you actively offer bus technology to your client?



Do you actively offer bus technology to your client?

- In 2005 the proportion of respondents who said that they always actively offered bus technology was not even 1/3. The figure has increased by 29% since then.
- The number of companies who at least sometimes offer bus technology has remained almost exactly the same (with a change of just 0.1%).
- The number of respondents who offer bus technology either rarely or not at all more than halved between 2005 and 2008.

In what areas have you already used bus-based installation technology, and what trades do you think will be integrated increasingly into bus systems in the future?



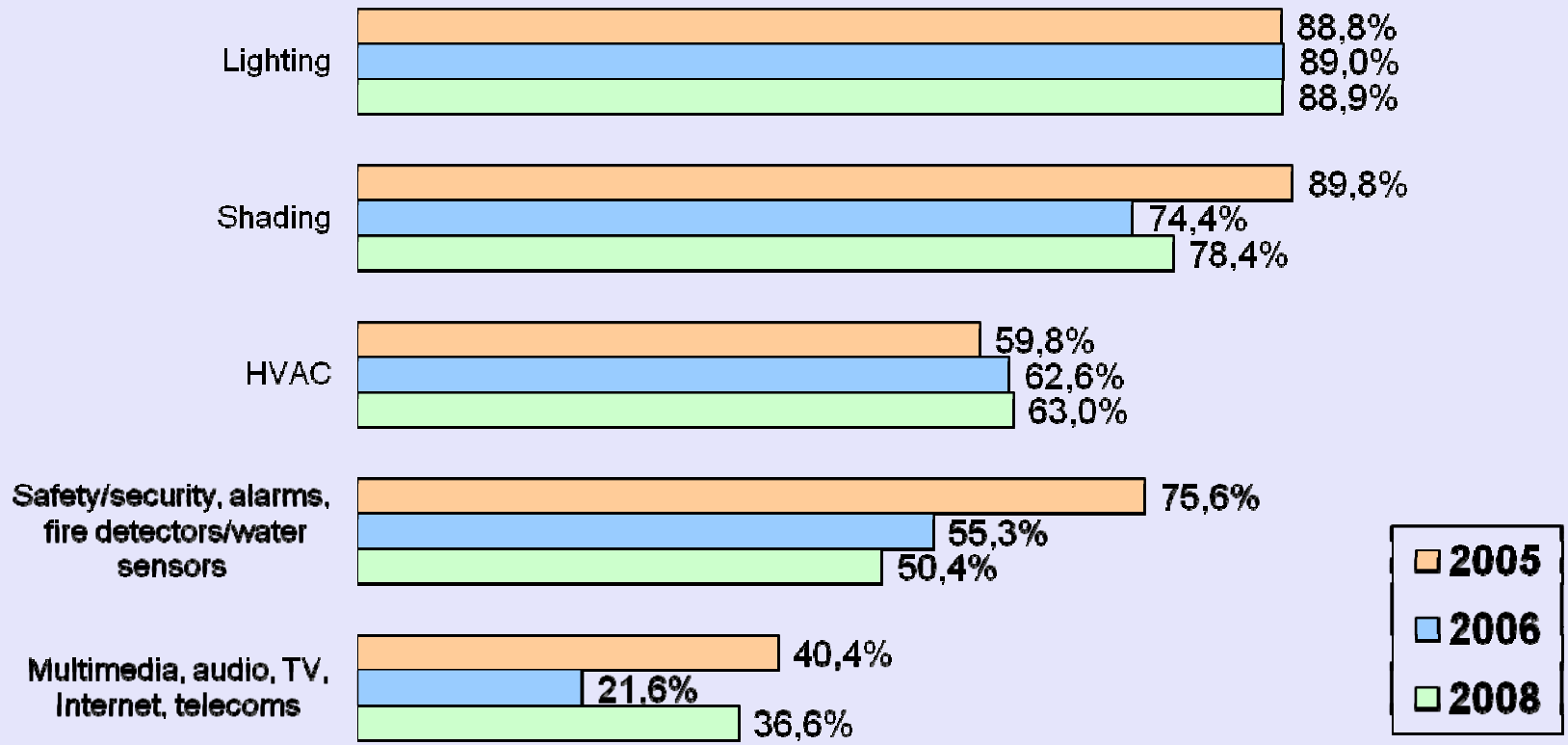
Fachhochschule Südwestfalen
Hochschule für Technik und Wirtschaft
University of Applied Sciences

In what areas have you already used bus-based installation technology, and what trades do you think will be integrated increasingly into bus systems in the future?

- More than half of all respondents have already used bus-based installation technology for lighting (89%), shading (78%), heating/ventilation/ air-conditioning (63%) and/or safety/security/alarms/fire detectors/water sensors (50%).

- Increased use of bus technology in the future is anticipated above all in the areas of multimedia/audio/TV/Internet/telecommunications and innovative building services engineering.

In what areas have you already used bus-based installation technology?



In what areas have you already used bus-based installation technology?

- While the use of bus-based installation technology for lighting, shading and heating/ventilation/air-conditioning, barely changed over the years 2005, 2006 and 2008, the figures for the other areas vary considerably.

- In 2006, multimedia was cited less frequently, since the answers available related only to commercial buildings, while in 2005 safety/security was mentioned more frequently, as the possible answers referred only to private households.

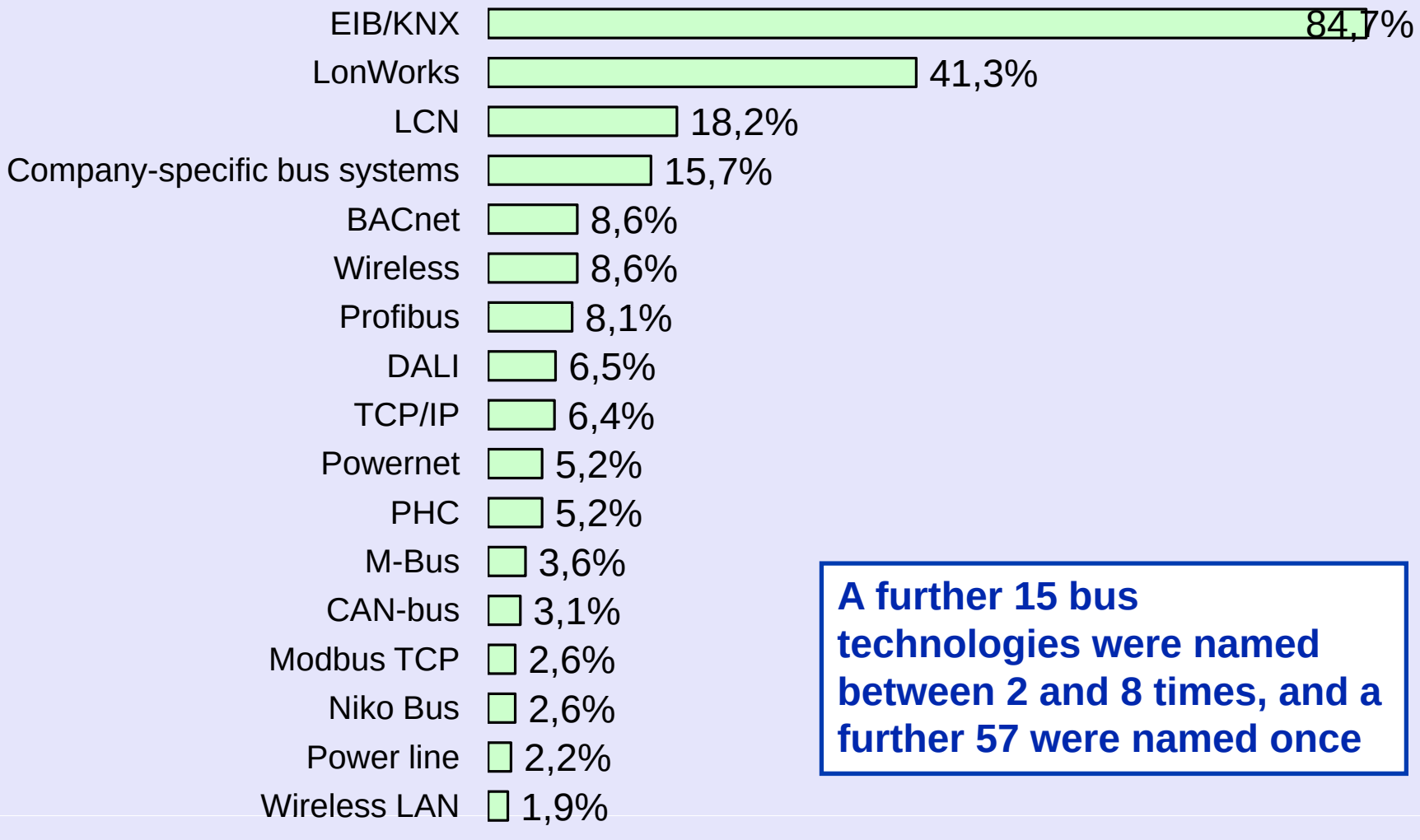
Contents

- General information
- Respondent data
- Level of skill in/appraisal of bus technology
- Bus technology usage behaviour
- Networking technologies used
- Conclusion/recommendations

Networking technologies used

- Bus technologies respondents have heard of
- Bus technologies respondents have worked with
- Which bus technology respondents have worked with most frequently
- Reasons for using the preferred bus technology
- Transmission media
- Appraisal of future demand in residential buildings
- Appraisal of future demand in commercial buildings

What bus technologies (both wired and wireless) for building installations have you heard of?



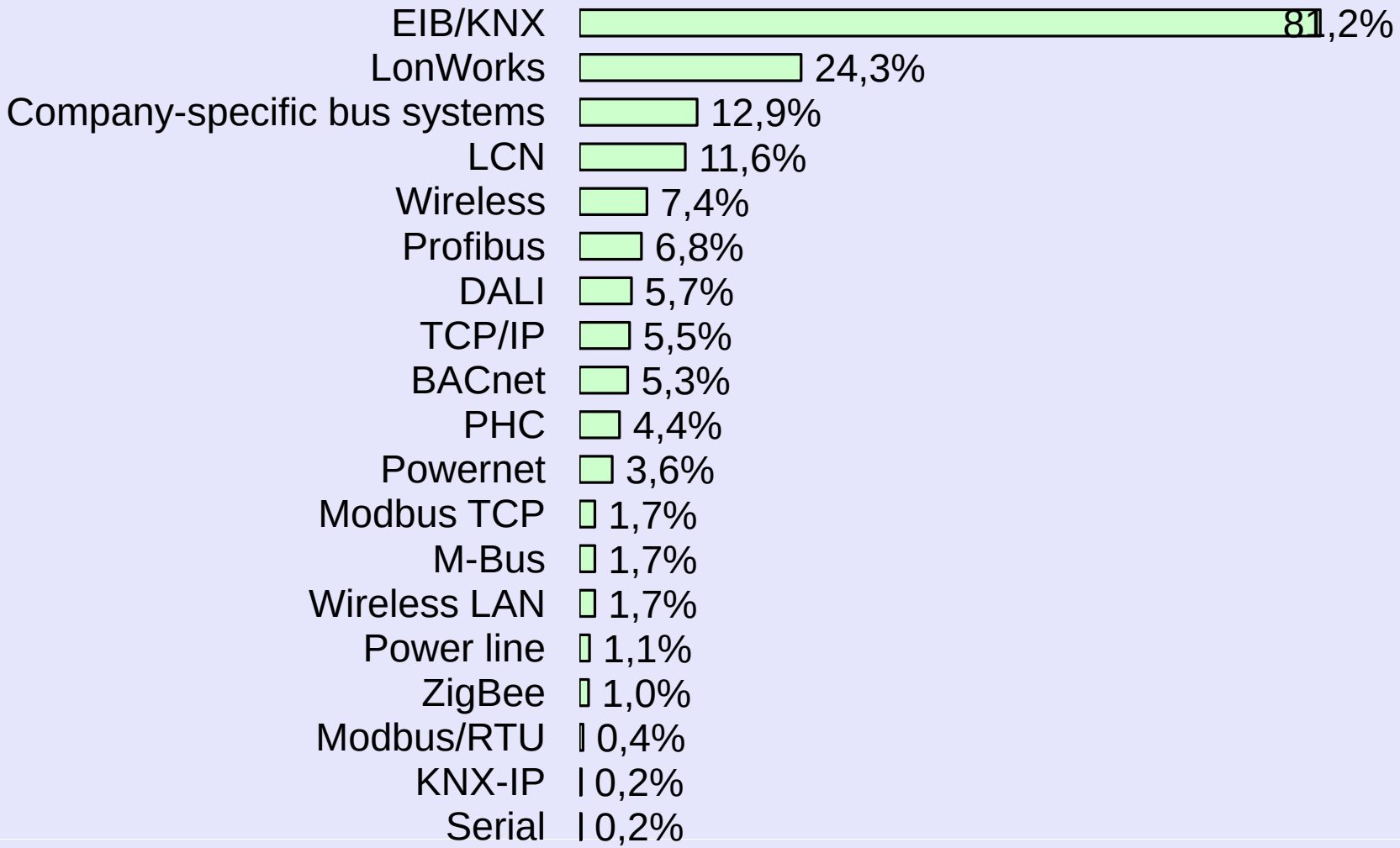
A further 15 bus technologies were named between 2 and 8 times, and a further 57 were named once

What bus technologies (both wired and wireless) for building installations have you heard of?

- Clearly the most frequently named technology, at 85%, was EIB/KNX. The second most commonly-known technology, though named not even half as often as EIB/KNX, was LonWorks (41%). LCN also made it over the 10% mark, with 18%.

- Respondents at HVAC companies had on average heard of more than 4 different bus technologies, with BACnet (38%), Profibus (29%) and CAN-bus (21%) being mentioned particularly often.

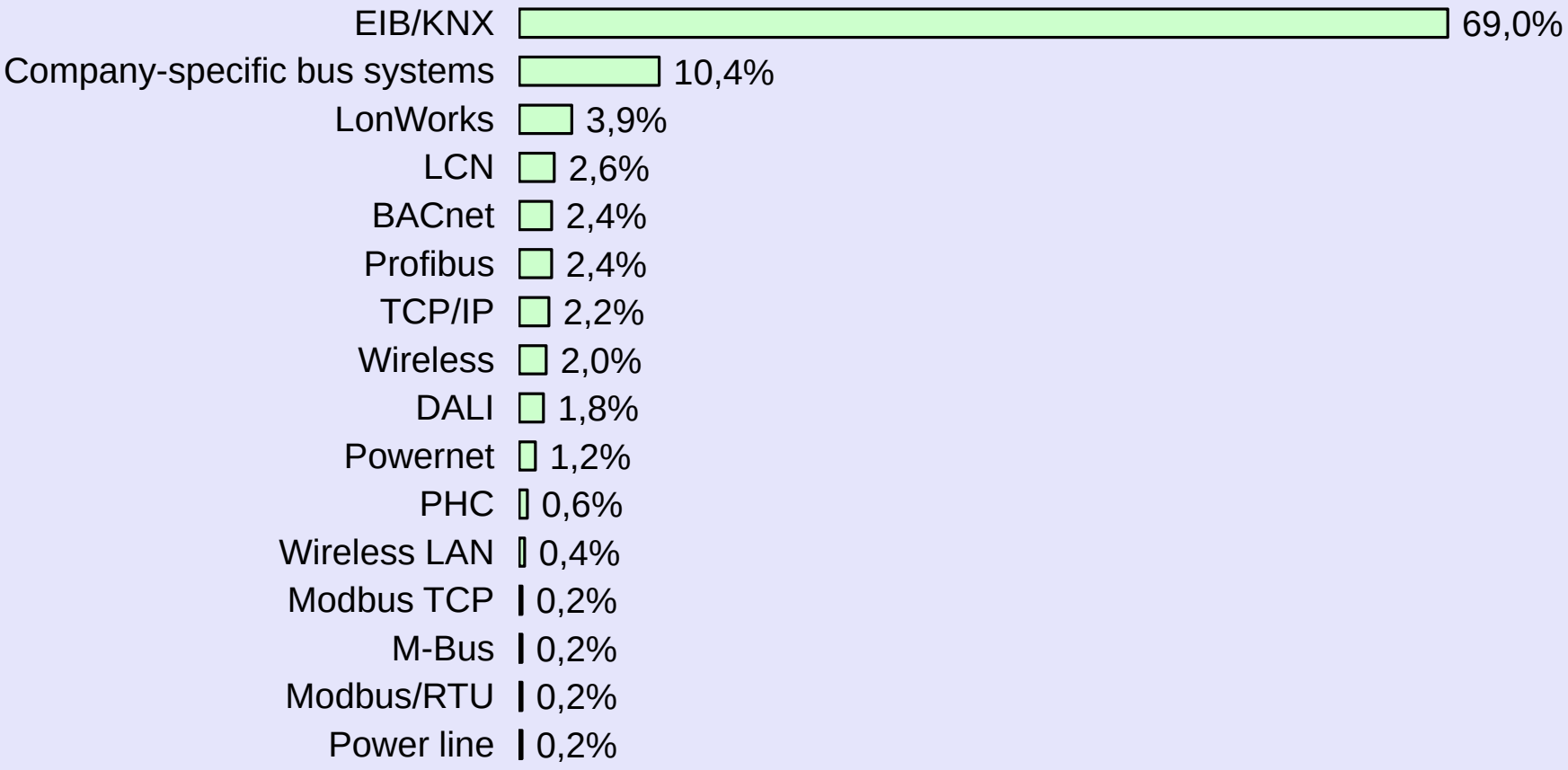
Which of these bus technologies have you already worked with?



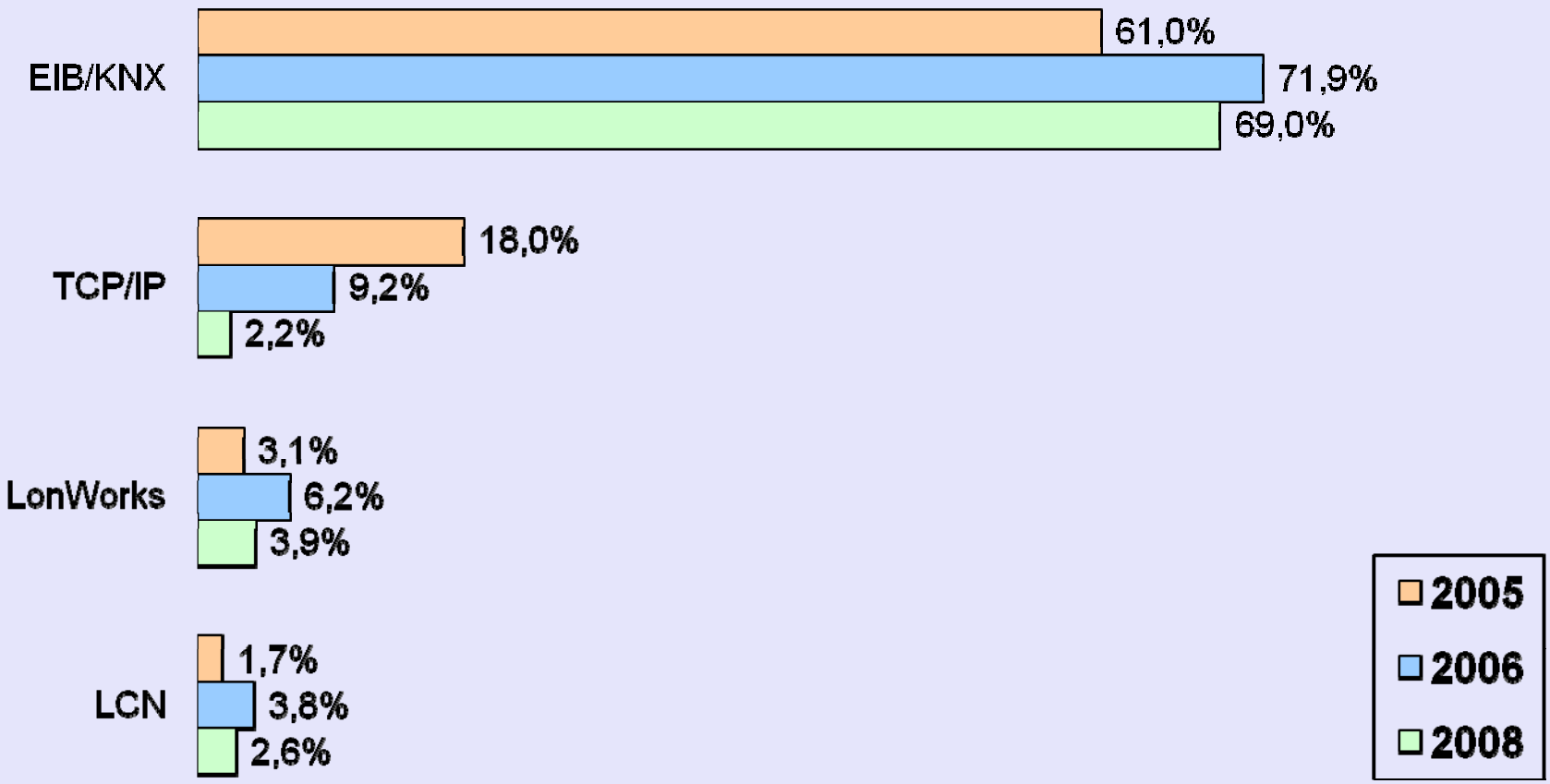
Which of these bus technologies have you already worked with?

- Here once again EIB/KNX is easily the best-known technology with a percentage of 81% - in other words, almost all companies who have heard of KNX have also used it. For only 4% of companies is this not the case.
- 24% of all respondents have used LonWorks, and 12% have worked with LCN. Here the difference between the number who have heard of the technology and the number who have used it is greater than for EIB/KNX.
- Only 65% of companies that equip more than 50 buildings annually with bus technology have already worked with EIB/KNX (whereas 81% of companies overall have worked with it).

What bus technology do you work with most frequently?



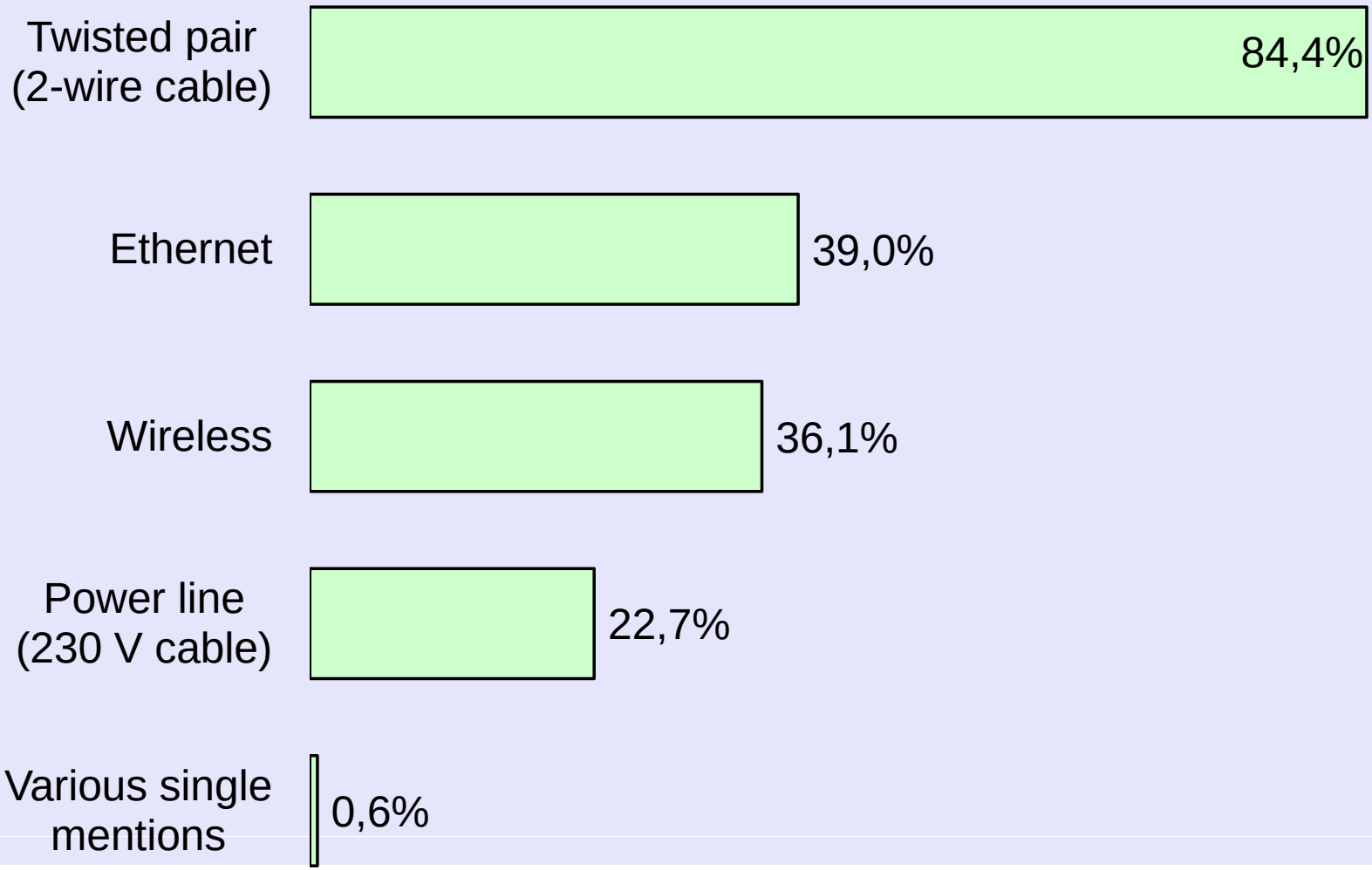
What bus technology do you work with most frequently?



What bus technology do you work with most frequently?

- Here, too, the order has remained unchanged. In 2008, 69% of all respondents said that they used EIB/KNX most frequently.
- The results for the years 2005, 2006 and 2008 can be seen to be similar. EIB/KNX is well ahead in all three years.
- The only deviation from this trend is that TCP/IP was named considerably more frequently in 2005 than in 2006 or 2008.

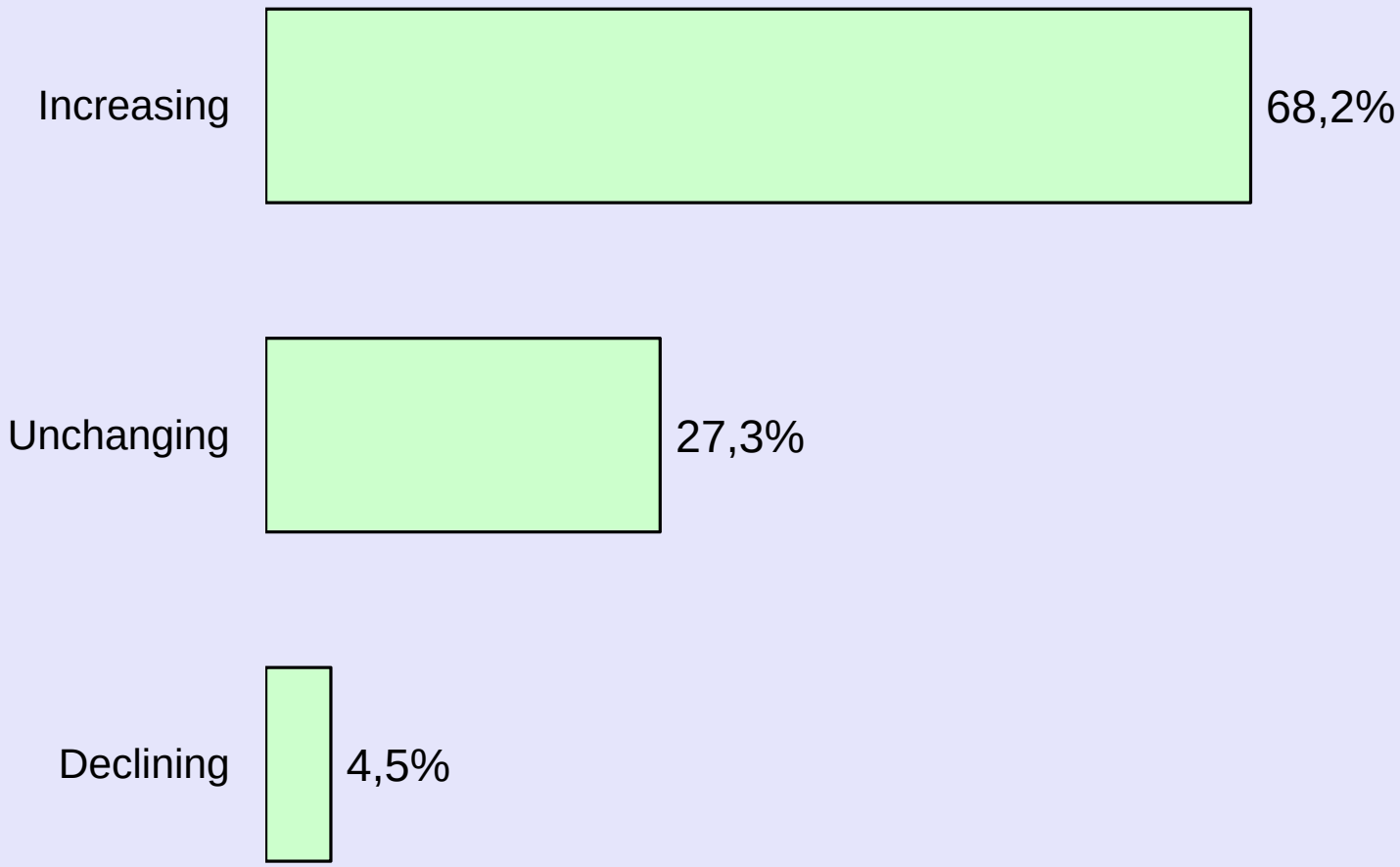
What transmission media do you use with bus technology?



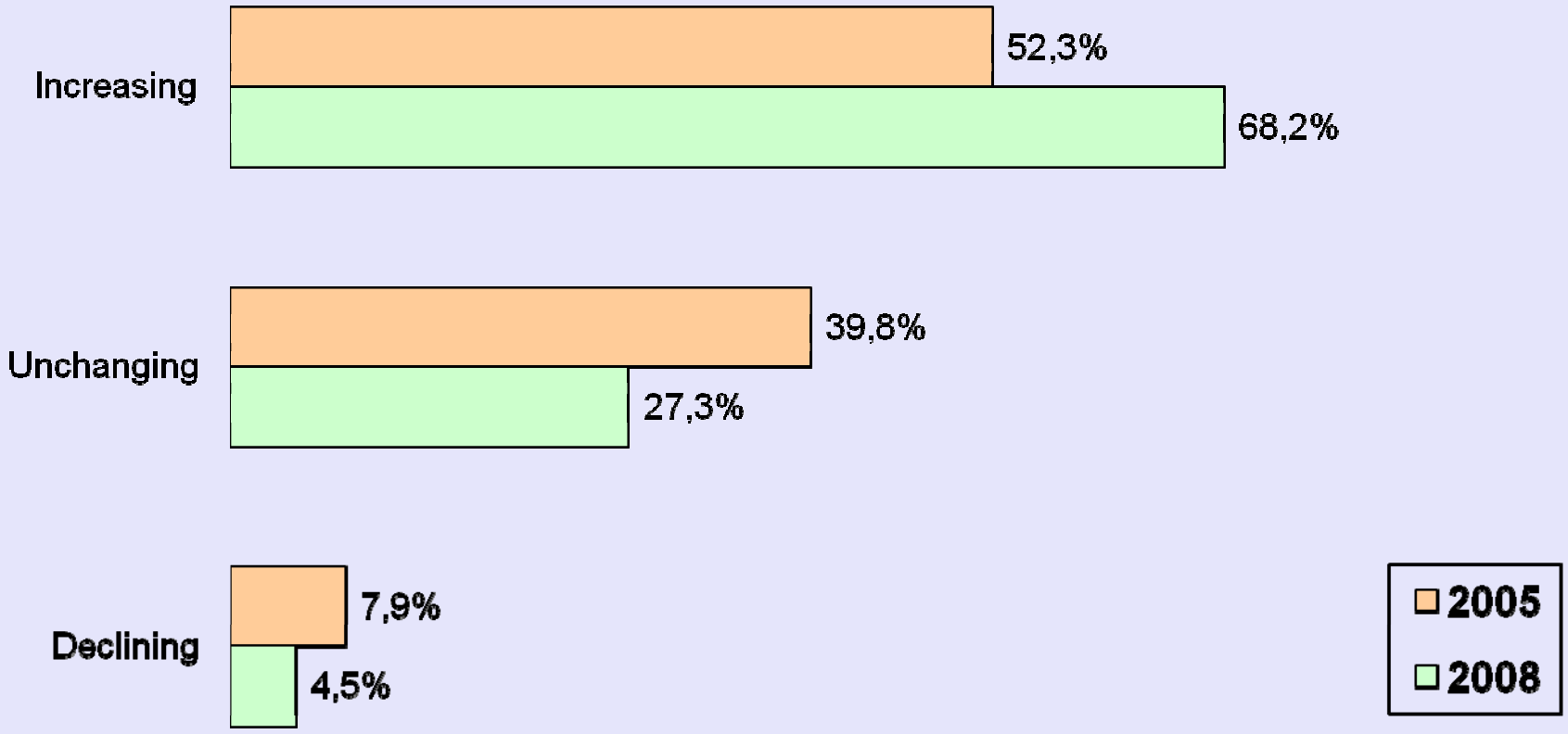
What transmission media do you use with bus technology?

- 84% of all respondents said that they use twisted pair cabling.
- Only 0.6% of respondents use transmission media other than either twisted pair, Ethernet, wireless or power line.
- Ethernet is used to an above-average extent particularly by HVAC companies (71%), and wireless particularly by architects (44%).

How in general do you rate future demand at your company for bus technology in residential buildings?



How in general do you rate future demand at your company for bus technology in residential buildings?

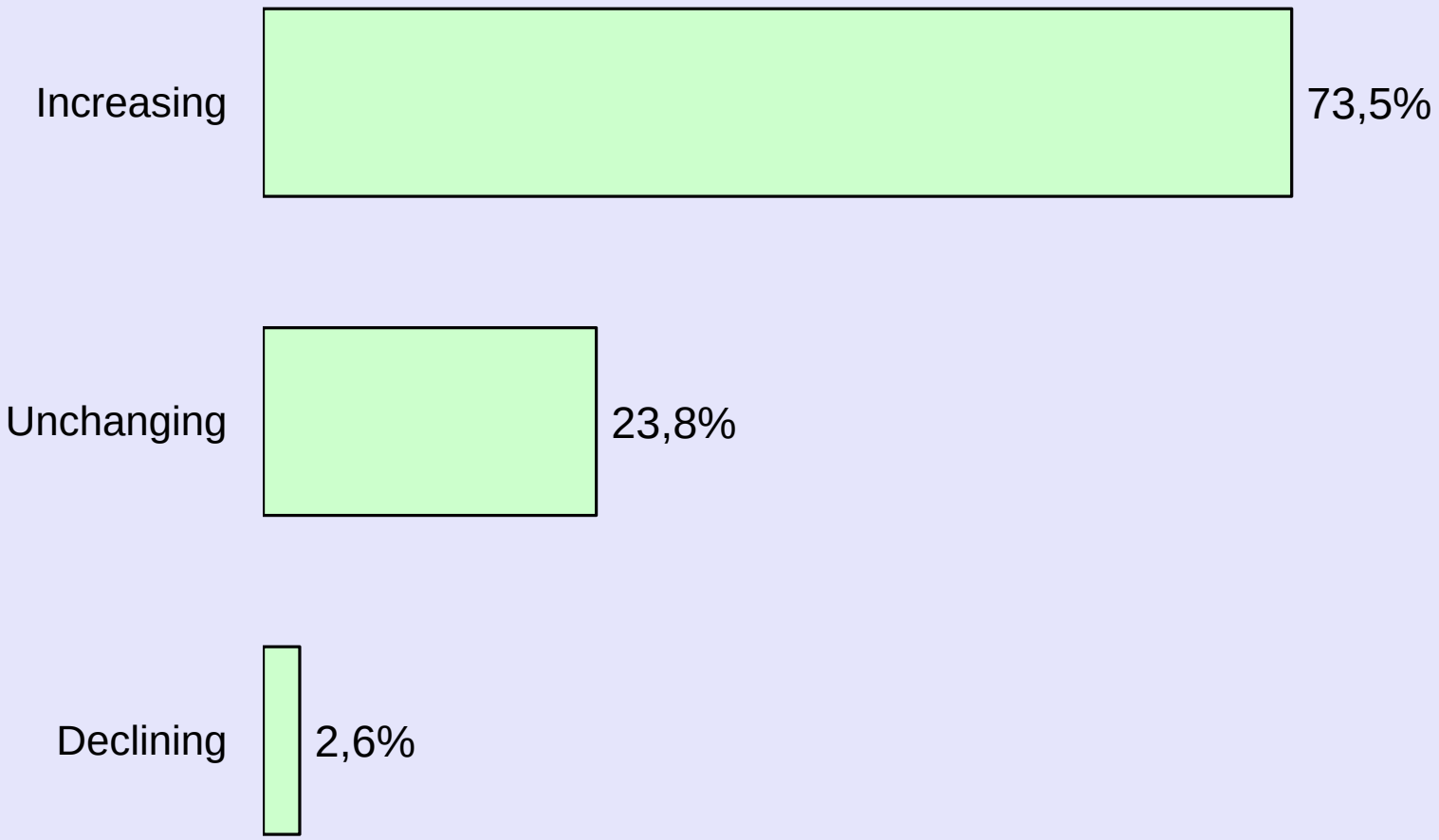


How in general do you rate future demand at your company for bus technology in residential buildings?

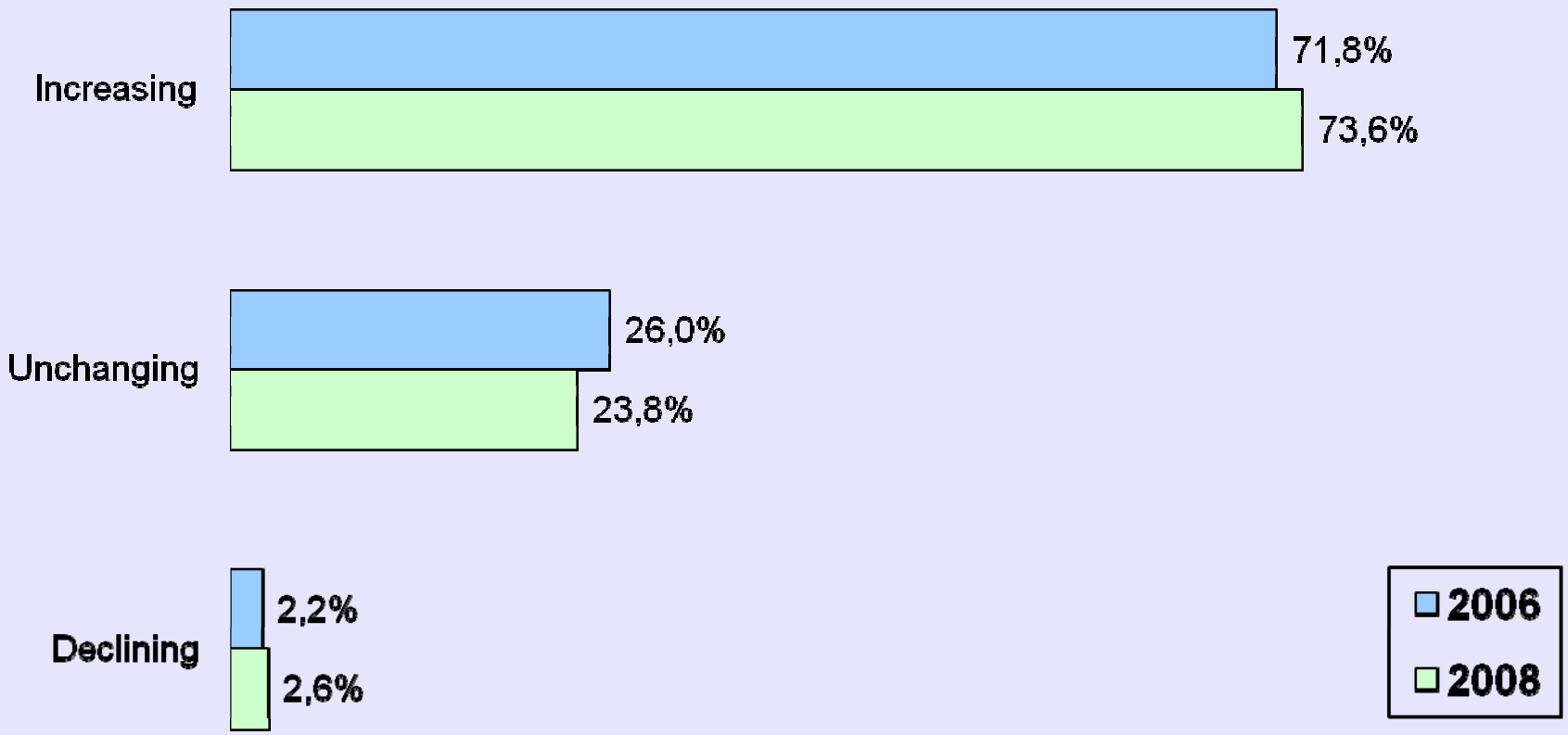
- Even in 2005, 52.3% of respondents expected demand for bus technology in residential construction to grow, while in 2008 the figure was 68.2%.

- In 2005, 7.9% of all respondents thought that demand would decline. By 2008 this figure had fallen to as low as 4.5%.

How in general do you rate future demand at your company for bus technology in commercial buildings?



How in general do you rate future demand at your company for bus technology in commercial buildings?



How in general do you rate future demand at your company for bus technology in commercial buildings?

- From 2005 to 2008 the figures have hardly changed.
- More than 70% of all respondents anticipate increasing demand for bus technology in commercial buildings.
- Just 2.2% (2006) and 2.6% (2008) of respondents foresee a decline.
- Only 69% of electricians think that demand in commercial buildings will grow.

South Westphalia University of Applied Sciences

Combined campus and distance learning course
in Industrial Business Administration

Excerpts

Fachhochschule Südwestfalen
Hochschule für Technik und Wirtschaft
University of Applied Sciences