



DGNB certified Healthcare Centres – decision-making and design process

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SUMMARY

Sustainability certification schemes experience growing popularity – also in Denmark. Only few years ago, Denmark got its own sustainability certification scheme based on the German DGNB certification scheme. The objective of this study is to investigate if and in what way a DGNB-certification scheme will affect the decision-making and design process in the case of four Healthcare Centres. A case study design investigates the question, where semi-structured interviews has been the main data. The results show that it is important to collaborate in the design team from the beginning also with the DGNB consultant and create commitment to the project. Additionally, if too many parameters are fixed in the initial phases (point of no return) it is not possible to priorities the assessment points and can in the end affect the quality of the process. Therefore, when planning the project with the client one needs to be aware of these issues.

KEYWORDS

Sustainable architecture, DGNB-DK certification scheme, design process, Danish Healthcare Centres, low energy

INTRODUCTION

In recent years, research and the building industry greatly focused on issues as regards to lowering and optimising the energy use of buildings during operation. It has resulted in several pilot projects, which illustrate how it can be achieved (e.g. The Comfort Houses (www.komforthusene.dk), Home for Life (www.activehouse.info/cases/home-life)). At the same time voluntary sustainability certification schemes (BREEAM, LEED, DGNB), have been developed around the world - certification schemes that have a broader approach to sustainability than solely energy even though their age reflects the main focus in the schemes. The first generation of schemes still have a large focus on energy (Byggeriets Evalueringscenter, 2010). Recently, the Danish sustainability certification scheme, DGNB-DK, was developed (www.dk-gbc.dk; GBC, 2014). The scheme is voluntarily, however more and more clients have requirements for sustainability and wants either a full certification or use parts of it.

Along with growing focus on energy use in buildings new design methodologies was developed – like the Integrated Design Process (IDP) (Löhnert et al., 2003; Knudstrup, 2004) and newer variations some with slightly different names like “The Integrative Design Guide to Green Buildings” by Bill Reed and 7group (2009) and “Integrated Energy Design” by the INTEND project (Jorgensen and Synnefa, 2009). To what extend the IDP approaches are used in practise is hard to say, however some research show a tendency for more integrated approaches than earlier, however there is still room for improvement based on case studies of the Comfort Houses (Brunsgaard et al., 2014).

This research investigates the decision-making and design process (DMaDP) behind four DGNB certified Healthcare Centres in Northern Jutland in Denmark. In general, knowledge about the DMaDP

is important for us to constantly improve our design approaches and become more efficient. A conventional design process is highly complex as illustrated by Bryan Lawson:

As well as letting in daylight and sunlight and allowing for natural ventilation, the window is also usually required to provide a view while retaining privacy. As an interruption in the external wall the window poses problems of structural stability, heat loss and noise transmission, and is thus arguably one of the most complex of building elements. (Lawson, 2005:59)

The quote illustrates the complexity of design in general, but as requirements to energy use and indoor environment are tightened, the complexity of design is increasing even further. And with the recast of the EPBD, EU Member States face new tough challenges moving toward new and retrofitted nearly zero-energy buildings by 2018 and 2020 (Directive, 2010). The goals cannot be reached by using technology alone (e.g. efficient ventilation system and photovoltaic cells) since the strategies to fulfil low-energy and indoor environmental goals are highly related to the architectural design of the buildings (e.g. passive solar heat gains and passive cooling) and not to forget user behaviour. The general perception is that the “Traditional Design Process” cannot facilitate this complex task. On the other hand, a more integrated design approach can deal with the higher levels of complexity (Löhnert et al., 2003; Knudstrup, 2004). It is important we keep the quality of the built environment both technically, functionally and aesthetically. Therefore, we need to become better to handle very complex design processes and it is important to find out how DGNB-DK comes into plays in an already highly complex design process.

When adding a sustainability scheme to the design of buildings, the designer increases the number of parameters considered. A sustainability scheme also deals with low-energy and indoor environmental goals but the method also includes a wide approach to sustainability and focus on the whole life-cycle of the building taking into account e.g. accessibility, flexibility, Life Cycle Assessment (LCA) and Life Cycle Cost (LCC) (www.dk-gbc.dk; GBC, 2014). By adding more issues to the design, the complexity of the design process is therefore even larger in a case with sustainability certification compared to a conventional low energy project.

The objective of this study is to describe if and in what way a DGNB-certification scheme will affect the DMaDP in the case of the four Healthcare Centres. And find out what we can learn from these projects about future DMaDP in DGNB certified projects?



Figure 1. Pandrup Healthcare Centre

METHODS

This section will firstly describe the setup of the research design. Secondly, describe the methods of data collection and finally explain the assessment of the DMaDP.

Setup of the Research Design

All four projects have the same developer – the Region of Northern Jutland in Denmark and they choose turnkey contracts as tender. It means the projects have two overall “design processes” – before and after the tender. To simplify, it will be called phase 1 and phase 2 in this research, see Table 1 for an overview of the content of phases and the involved stakeholders.

The research design is a case study design. Case study design has to be seen as a kind of experiment, which relies on analytical generalisations where a particular set of results is used to state a broader “theory” about the phenomenon (Yin, 1995). A case study can have different designs

depending on the type. The projects of the Healthcare Centres are investigated according to a single unit of analysis (DMaDP) and can therefore be defined as a multiple-case design according to Robert K. Yin (1995). Multiple case study designs allow the researcher to compare and contrast the findings derived from each of the cases. In this research, it put the researcher in a better position to discover variations in the impact of DGNB by comparing the four cases.

The cases and the design teams are made anonymous as the intention is to provide a general understanding of the challenge related to DMaDP in DGNB assessment and not to highlight specific design solutions and design teams. Table 2 show the distribution of design teams on the individual project and the specific phase. Note that some design teams appear on more projects.

Table 1. A general overview of content and stakeholders in the four cases

	Content of phases	Stakeholders
Phase 1	<ol style="list-style-type: none"> 1. Pre-qualification 2. An outline proposal (DK: dispositionsforslag) was designed 3. Tender documents was developed which included goals of the DGNB criteria 	Design team 1: Architect 1 Traditional engineer(s) 1 DGNB auditor/consultant 1
Licensing Round		
Phase 2	<ol style="list-style-type: none"> 1. The contractor/entrepreneur is found based on the tender 2. The preliminary project (regulatory project) was developed based on the outline proposal and the financial frame in the tender 3. Main project is finished 	Design team 2: Architect 2 Traditional engineer(s) 2 DGNB auditor/consultant 2 Other specialist e.g. landscape architect 2 Client design advisor: Architect or engineer 1

Table 2. Distribution of design teams in the individual project phases. The letter identifies the design team and the number identifies the phase they are involved.

Case	1	2	3	4
Phase 1	Design team A1	Design team A1	Design team B1	Design team C1
Phase 2	Design team D2	Design team E2	Design team F2	Design team F2

Method of Data Collection

The DMaDP were analysed through qualitative interviews of key actors in each design team (Bryman, 2004). Each interview was semi-structured, meaning the interviewer had a question guide with a series of questions in a general form. The interviewer was able to vary the sequence of the questions asked and ask further questions related to topics that seemed to be significant to the research (Kvale and Brinkmann, 2009). The interviews are transcribed, coded and analysed in the tool NVIVO (www.qsrinternational.com) which can handle large amount of data and suitable for doing comparative studies cross several cases. Documents, like minutes and tender files and participation in evaluation meetings and start-up workshops subsidise the interviews.

Assessing the DMaDP

In order to reach high-performance and high quality design of buildings the complex design processes, as described in the introduction, is ideally analogous to an integrated design approach. Therefore, the fundament to assess the DMaDP of the DGNB certified Healthcare Centres take point of departure in

principals of IDP by Löhnert et al. (2003) and Knudstrup (2004). The following text and Table 3 outlines the primary element, where the reader needs the primary literature to acquire the full and detailed description of IDP (Löhnert et al. 2003; Knudstrup, 2004).

Table 3. Illustrates the phases of the two similar IDP methods. The main difference is that the method by Mary-Ann Knudstrup (2004) is developed for problem-based teaching environment, where the IEA Task 23 by Günter Löhnert et al. (2003) is developed for praxis. Both methods start from overall ideas and goals, to conceptual sketching/calculations and finishing with a synthesis phases with detailed calculations/documentation and selection of specific technologies.

	Phases				
Löhnert et al. (2003)	Basic	Pre-design	Concept design	Design development	Construction
Knudstrup (2004)	Project idea	Analysis phase	Sketching phase	Synthesis phase	Presentation phase

Firstly, both IDP methodologies underline the importance of having an iterative process – An iterative process means that ideas and solutions are tested against constraints in loops where the level of knowledge and understanding about the design problem grows as the process moves forward – one iteration is used as the starting point for the next iteration. As the process is moving forward, the design is approaching its final stage. Working iteratively means, you might also have to take larger steps back in the process if greater amount of conflicts in the design show.

Secondly, it is important in an IDP to involve all relevant stakeholders from the beginning of the project bringing-in necessary competences earlier, typically engineering knowledge. This allows additional tests of constraints in the early design stages resulting in a holistic concept and avoids repair-work later in the design process, which usually has drawbacks for the economy and quality of the design.

Thirdly, by bringing together the different stakeholders earlier, the principal is to evaluate the design continuously in loops of iterations throughout the process as regards to both technical, functional and aesthetic issues. It can be supported by overall estimation/calculations/simulations of e.g. energy use and indoor environment in the beginning, which then become more and more advanced and detailed as the project finds its final. Therefore, an awareness of assessment tools in the specific phases is therefore essential. E.g. evaluation of thermal indoor environment by 24 hour average calculations in the beginning and moving to BSim simulations in the synthesis phase. The same principle expects to be added when working with sustainability certification schemes – also the DGNB matrix, e.g. overall estimation/calculations in the beginning and more detailed in the final stage.

Therefore the anchor points in the assessment of the DMaDP are:

- Iterations and method
- Stakeholders and collaboration
- Assessment tools

The topics listed here, have therefore been the central topics of the interviews. However, through analysis (coding in NVIVO) other important themes emerged and refined the picture of the processes. All topics are interrelated and overlap, however treated separately to communicate the understanding of the topics. Together they contribute to determining the overall character of the design process. Within the scope of this paper, it is not possible to discuss the process of each case, why key common aspects are presented in a more general manner through quotes to illustrate points.

RESULTS

In the following, selected topics present the results, starting with Contract Form, followed by Methods and Collaboration, moving on to Assessment Tools and ending with Architectural Design Development.

Contract Form

The type of contract has shown to have a significant impact on the design processes, firstly because two different design teams designed the same project and secondly because the design was highly detailed in phase 1. The latter the paper will get back to later.

The shift from Team 1 to Team 2 has especially two concerns. Firstly, the project change hands in the middle of the project and can influence the knowledge transfer and ownership to the project, as the second team has to finish another team's project. Secondly, the teams change character. In phase 1, they are a team of consultants for the clients, where the aim is to deliver a product fulfilling the needs of the client – focus mainly on the quality and having ownership to the project. Where in phase 2 the team is sub-consultant for the contractor, they provide a service for the contractor by detailing the building based on the outline proposal – focus mainly on economy, exemplified in the following:

“He (contractor) is not interested in turning up the volume to more than silver, but on the other hand he needs to be sure to reach the minimum requirements. It has been the focus from the beginning, yes we need silver but not more than that and we need to get there for the minimum cost.” (Architect, team E2)

Therefore, adjusting the project so it would fulfil the DGNB certification. Perhaps some design teams have been “hunting point” instead of discussing what makes the most holistic sustainable building of high quality. This could depend on the level of ownership to the project, which may well be weaker for team 2. Hopefully, the certification scheme is put together so the majority of projects will be holistic despite a potential “point hunting”.

Method and Collaboration

As regards to collaboration in the teams in phase 1 especially one team had great experience with working closely together from the beginning. It had significant influence on the approach to the project:

“I feel they (engineers and DGNB consultant) have been involved earlier than normally. And it has actually been profitable. Sometimes it can be difficult to get them to come out in the open, so to speak. It has not been the case in this team where they have been involved earlier in the sketches.” (Architect1, Team A1).

“...they (engineers in general) need material that is more concrete. Some engineers are skilled in thinking conceptual and others are expert in calculating facts. It depends on whom you work with. The engineer and DGNB consultant in this team, has in several years been front-runners in the whole field of sustainability therefore they are naturally very pleasant to work with and they are skilful. Not all have those competences.” (Architect2, Team A1).

“We have had an earlier dialog with them (engineers) about if we were on the right track, is there something we need to adjust to be able to get the building certified?” (Architect1, team 1)

The other two teams in phase 1 was not equally explicit in their description of the collaboration, however the following quote indicates to a larger extend solo-run from the architect in the beginning, later the support came in from the engineer.

“The architects sketched the building the usual way and then I came in and evaluated on the sustainability criteria. Then I said things like; perhaps you should tune a little here and there. The energy concept was perhaps discussed a little more because it is not easy to fulfil low-energy class 2020, it has some consequences for the building, it had in any rate also a large impact on the progression of the project” (DGNB consultant, Team C1).

However, when asking them to reflect upon a good process with DGNB-assessment they all highlights the importance of implementing the DGNB assessment early in the project.

“You need to bring in the matrix (DGNB-assessment matrix) early to be able to get all the aspects in. In a way, you need to have it in the back of your mind all the time. The DGNB person (consultant/auditor) needs to be involved from the beginning, it is not something you can add on later, you risk that things are unaligned” (Engineer, Team B1).

In regards to managing the process, the teams in phase 1 did not have any significant change in the planning of project. In some cases, they had a few extra meeting because of DGNB. However, some

stakeholders think it would change as the level of experience becomes larger. Nevertheless, the topic of DGNB and the assessment was a consistent point on the agenda of the meetings.

Especially in the beginning of phase 2 the design teams had more meetings than usually where especially DGNB was the focus. In design Team D2 (case1) the DGNB consultant made the process more concrete by distributing all the criteria among the stakeholders in an “actions list” – meaning highlighting who had responsibility for the different aspects and setting deadlines. The stakeholders think it worked well however, they think the challenge was to understand what DGNB more explicitly was.

“I felt we miss the guidance from the DGNB consultant, for example to say: be aware of this, if you choose this then... We did not have the overview of it” (Engineer, Team D2)

The architect continues:

“We could use a little document which kick-started the process. Nobody says we need to have the large folder (DGNB manual¹) but on the other hand no one says it needs to be invisible, it is not a sustainable mind-set” (Architect 1, Team D2)

Design Team E2 (case 2) did not express the same lack of overview, instead they felt they were sufficient prepared by the DGNB consultant, however it sounds like they got a kind of checklist from the consultant:

“We had meeting which only was about DGNB where the consultant set the tone and informed us. He said if you want a silver certification, you need to do like this this and this...He handed-out ‘the big paradigm’ where he had given points to all criteria (including explanations) then we could see what was his preconditions. Then we had to make sure the main project could get the points, we had to build in the demands which he had set up...then it was constantly his job to make sure we did not get out of a side-track but had the necessary points” (Architect, Team E2)

Generally, the design teams in phase 2 expressed that they took over a project that was too detailed. Floor plans, facades and detailed description were included in the tender documents. They did not feel they had enough parameters to play with and there were no room for innovation.

“An area where we could do some changes was in selection of materials, but it is already in the quotation stage where we had three weeks and everybody (sub-contractors) had to calculate their prize. But the assignment was limited because they (Team A1) had written in the tender document almost exactly what they wanted. Therefore, we did not have much selection.” (Architect, Team D2).

Several design teams explained that the level of detailing has nothing to do with the DGNB-assessment but a choice from the client. However you can question if the high level of detailing in phase 1 is an advantage or not for the quality of the assessment. Several stakeholders mentioned that in phase 2 selection of materials and placement of windows was areas with the most design freedom. If so, it must point to that the complexity of the design development must have been high (a synthesis phase) in phase 1. Nevertheless, how well have the design been verified in this phase? Next paragraph will discuss this question.

Despite the challenges, several design teams think DGNB-assessment just adds an extra layer to the project and add an extra stakeholder in line with the architect and engineers. They think the assessment scheme contains topics evaluated in the project anyway, the aim is perhaps a little more ambitious and the means to get there are treated more evident. The DGNB-assessment also goes very well hand in hand with the existing quality assurance – a kind of extra quality assurance lies in the matrix. However, responsibility and fee for the work is not clear-cut because new topics are in play or treated in a different way.

Assessment Tools

When designing low energy and sustainable buildings, it is essential to use tools to document for example the buildings energy use and indoor environment to verify fulfilment of requirements during the development of the project and in the final design stage. Table 3 shows which tools are used in

¹ Until recently, the DGNB manual was confidential. Only certified consultants was licensed to read the manual and use the DGNB matrix.

each phase and reveals that few tools are used in the first phase. It is a bit surprising taking into account the relatively ambitious goals of the projects as regards to demands in DGNB and the level of detailing of the design in phase 1. The question is if the level of knowledge was sufficient when taking design decisions.

Table 4. The use of tools in the different phases.

	Tools – calculation, simulation, visualisation
Phase 1	Overall calculations of energy use Calculations of U-values Revit – BIM (only one team) (visualisations)
Phase 2	BSim (indoor environmental simulations) Be10 (energy calculations) Daylight calculation/simulations Revit – BIM (visualisations, extract quantities) LCA & LCC

Stakeholders from phase 1 express that they only did overall energy calculations to make sure they were on the right track. As regards to indoor environment, they did not investigate the performance of the project, but settled with specifying the requirements in the tender document and then it was up to the contractor to fulfil the goals. In relation to LCC and LCA they explained that it was too early to calculate in phase 1 as especially the selection of materials was up to the contractor.

In phase 2, the use of tools were more extensive however, it is self-evident because the DGNB scheme demands a relatively high documentation level. One team explain parts of their work like this:

"To take the challenge with the daylight as an example, we did not finalise the design solution totally. It was discussed at a very early stage...therefore, we had on-going dialogue about what we need to do to make it look like the outline proposal with that façade expression and window placement. Therefore, it has been a kind of ping-pong back and forth: if we do this, what does the engineer say to that as regards to daylight etc." (Architect, Team E2)

The quote is an example of the iterative process, here in regards to daylight. In contrast, another stakeholder expresses that he did energy calculations too early – It was too demanding to do so many iterations.

"We have made (energy) calculations from day one but that was a mistake... Then came a little change in a g-value and then you can start all over. We have done that two or three times. We were too quick doing the adjustments...Postpone the final documentation, the energy frame...go with the gut feeling...to avoid making changes and use resources." (Engineer, Team D2)

This engineer is perhaps the kind that prefers to calculate facts, instead of doing conceptual analysis, as exemplified by Team A1 in previous paragraph. The mind-set in an IDP is to do appropriate analysis as the project move forward making sure the project sticks to the goal. It will potentially minimise use of resources later in the process. If at team wants to work in an integrated manner, everybody needs to agree on it and see the benefits of it (Löhnert et al., 2003).

Besides the documentation tools, some processes also contained tools of more management character – like the action list in case 2 as mentioned earlier. The DGNB consultant distributed the different criteria of the assessment among the stakeholders. Then all knew who did what and when, to what deadline. Some criteria had more than one responsible stakeholder. The action list had a colour code, where red was "not satisfied or unfinished" and the colour green was "accepted or finished" and was updated continuously through the project. Then stakeholders could focus on each their area of responsibility. The action list is a way to handle and get an overview of the assessment process in this case. The question is, if it also could have been used in the phase 1 to give the overview, which some stakeholders were missing.

Architectural Design Development

Some would argue that when the complexity and technical sustainable issues increases, the architectural freedom and potentials in the design development decreases. It is somewhat confirmed in one of the cases however he/she looks positive on the future.

"...things needs to have points and that makes it a little technical. It is not thought as a free creative project. It is more a project about fulfilling criteria. DGNB can affect the creativity, but so can the fact that it is a healthcare centre...it calls for a little adaptation if you are used to a free creative process. There is a little 'accountancy' about it. Quickly, I think you will get experience and it will become easier for the individual to work with DGNB and work more freely" (Architect, Team B1)

As mentioned earlier, the design teams explained that the projects were designed too far and not much design freedom was left for phase 2, however it was not because of the DGNB-assessment. One explains that it can be a conscious strategy by the client to have more control and influence on the quality of the architectural design in a situation of a turnkey contract. However, as regards to the quality of the DGNB-assessment, is it the most appropriate strategy? After tender, the "room of choices" are reduced both as regards to architectural design development and sustainability (DGNB-assessment). In case 1, Team D2 also highlights the reduction in "room of choices" when handing in the offer as mentioned above. Therefore a project is faced with "points of no return" concerning several issues of the design - firstly, in the outline proposal and secondly, in the offer from the contractor.

The main design issues the design teams in phase 2 have worked with is selection of materials, daylight and window placements, however the latter has to be in respect to the already defined façade design. The design issues as concerning the daylight was primarily because the outline proposal could not fulfil the criteria of daylight – criteria that was equivocal as the DGNB-scheme, the building regulations of 2020 and regulations of working environment was diverse. It does not seem like the design teams in phase 1 have been aware of this challenge, as you would have expected them to do daylight analyses as discussed in previous the paragraph.

DISCUSSION

Knowledge from only four cases forms the basis of this study, which means the findings will be tendencies or hint about how the DMaDP could be in other DGNB project. Additionally, the findings are limited to a situation of turnkey-contracts. Therefore, the way the DGNB-assessment affects the DMaDP is not clear-cut. However, the findings in this study have its eligibility – it will improve the awareness of possible challenges in such projects.

Working with highly complex buildings it is important to do analysis and using appropriate tools for the specific stage of the design as mention previously. Comparing the detailing level of the design with the use of tool in phase 1 there is divergence at least if thinking in an integrated manner. The strategy of detailing the project in phase 1 to be able to hold on to a specific architectural design in a turnkey-contract is kind of a sensible argument. On the other hand, it is a shame if it has consequences on performance and innovation in the project. It is doubted that the knowledge level as regard to LCC, LCA and indoor environment was good enough for the level of detail in phase 1 as no tools were used to evaluate these issues. For example, the challenge about fulfilling daylight requirements may not have been there if the visual indoor environment was investigated when designing the facades. The lack of ownership and responsibility for the project could be an explanation. The team in phase 1 does not have the final responsibility and may save the resources in doing thorough analysis, as others will take over the project in phase 2. On the other hand, maybe they do as they are used to? The documentation of indoor environmental issues is a relatively new issue in building designs. Previously, there were no legislation in this matter where in recent years it was tightened in Denmark – It is hard to change practises.

When dealing with DGNB-assessment the matrix should also become a part of the toolbox. It seems like the DGNB consultants has been a part of the entire project (both phase), however the overview and responsibility of the performance in the DGNB-assessment has only been on the DGNB consultants/auditors' desk. To create ownership and commit from all stakeholders it is important to involve everybody through the process and e.g. have kick-off meeting in the beginning of each phase. In both phases, it seems like the DGNB consultant have been an integrated part of the design teams and guided the team in the direction of a silver certification. Therefore, the DGNB consultant holds a considerable level of power. It means the DGNB consultant can affect the design considerably. It

means, the competences of the consultant are highly important, as the DGNB assessment scheme is performance-based. It means he/she needs to have an overview of how the different criteria affect each other, which has to be considered already in the tender phase.

Combining turnkey-contract with the choice of detailing the project to a high level in phase 1, does not fit the usual description of turnkey-contracts. It landed in a way between a turnkey-contract and general contract, where the project has been through project design. It is believed that it has affected the DMaDP. The question is where the synthesis phase has been in the projects and if the specific design teams has been aware of that. The authors believe it has been in phase 1 and that the design teams have not been aware of it. In a good and optimal IDP process, it can be problematic in the later phases if too many parameters are fixed, as it must be possible to change the prioritisation of issues in an iterative process – It also goes for prioritising the points in the DGNB-assessment. It is important that “room of choices” are present when needed and the “points of no return” are made at the right time and not too early. When planning the project with the client a discussion about this is highly important, so the different interests align.

Despite the challenges highlighted in this study all cases are silver DGNB certified today. Is the certification system too easy to fulfil or has the design in any case suffered on that behalf? The aim of the study is not to judge the certification scheme or final quality of the outcome. However, the process of getting there could perhaps have been improved. The aim with IDP, besides handling complexity, is to reduce large amount of resources to solving problems late in the process. By optimizing the DMaDP resources may have been reduced.

CONCLUSIONS

As interest for DGNB certification grows, the need to understand how to approach the design process become evident. With the point of departure in IDP the paper has presented result from four case studies – four DGNB certified Healthcare Centres in Northern Jutland in Denmark. The results show that it is important to collaborate in the design team from the beginning also with the DGNB consultant and create commitment to the project, as sharing knowledge will improve the decision-making. Furthermore, the design teams did not find it difficult to implement DGNB-assessment in a design project as the scheme just adds a layer more with an extra stakeholder in line with the architect and engineers. However, responsibility and fee for the work is not clear-cut because new topics are in play and treated in a different way.

It became clear that the turnkey-contract and the prioritisation within, had significant impact on the possibility to work integrated with DGNB-assessment. When planning the project one needs to be aware of the problems if fixing too many parameters in the initial phases creating “points of no return” and therefore not possible to priorities the assessment points. Consequently, when planning a project with the client, a discussion about “room of choices” and “points of no return” is highly important, so the different interests align. The quality of the process, and perhaps the final design of the building, can be improved by a more conscious planning and management of the process.

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