GUIDE
MULTI SERVICE CONTRACTING

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EFFECT4buildings

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Investments in energy efficiency are not currently happening at the rate needed, hindered by barriers such as high upfront costs, lack of access to finance, high perceived risk, lack of trust in new technologies, competing investment priorities, lack of knowledge, awareness and personal resources, and split incentives. Many of these barriers can be overcome, at least significant part, with well-designed financial tools and instruments.

The Interreg Baltic Sea Region Program 2014-2020 project EFFECT4buildings is providing building owners and managers with a set of financial tools and instruments to support the implementation of more energy efficiency measures, developed, and improved in real cases.

The main target group is building managers in charge of public or privately owned building portfolio.

The nine tools are:
- Convincing Decision makers
- Financial calculations
- Bundling
- Funding
- Energy Performance Contracting
- Multi Service Contracting
- Green Lease Contracting
- Prosumerism

EFFECT4buildings was implemented from 2017 to 2020 with the support from the Interreg Baltic Sea Region Programme 2014-2020. There were seven partner countries – Denmark, Estonia, Finland, Latvia, Norway, Poland, Sweden.

The project was also a part of the implementation of the EU Strategy for the Baltic Sea Region (EUSBSR), being a flagship project under policy area Energy and the horizonal action Sustainable development. Flagship projects demonstrate the progress of the EUSBSR and serve as pilot examples for desired change.

The full toolbox can be found on project webpage: www.effect4buildings.se

MULTI SERVICE CONTRACTING

In Multi Service Contracting (MSC), the building owner takes a holistic approach to the renovation process, adding value to planning and contracting by including parameters such as indoor climate, maintenance and operation management in energy renovation. When involved early in shaping the project together with the building owner, an MSC supplier can take responsibility for the performance of the parameters.

The MSC concept also helps determine key performance indicators and methods of monitoring and evaluating this performance, thereby increasing the quality of internal or external services delivered.

Let's understand the problem

Buildings are a key to improving energy efficiency and enhancing decarbonization. Other motivators for energy efficiency include improved indoor climate and the states of maintenance and operation. A holistic approach to energy renovation also provides the best overall economy since the marginal cost of the simultaneous improving of several parameters is very low.

Energy efficiency already covers a good part of the costs in indoor climate and maintenance improvements, thereby nearly equalising the initial and transaction costs. Furthermore, efficient maintenance and operation are crucial to achieve an energy efficient building.

Such a holistic approach depends on the organizational and budgeting structures. Some public stakeholders have experienced that renovation tasks, including indoor climate and facility management, break down into several activities, each having its individual budget. So, at least from a financial perspective, a holistic approach stops being truly holistic, additionally complicating the process by erasing roles and responsibilities rather than promoting cooperation between different units in the municipality.

Currently, buildings are renovated with a certain purpose and expected performance, but the average renovation process is neither monitored nor evaluated, nor is its performance followed up.

This situation calls for general re-defining and re-scoping of currently run projects, in order to prevent public stakeholders from experiencing additional unnecessary costs pushed up by ill-designed or ill-implemented building renovation processes. Among the most complex tasks in renovation are to predict, plan and maintain the performance of energy and indoor climate in an existing building in use. Yet, this depends on having the right knowledge of the building's operation, installations and use. Knowledge that is hard to map and accurately maintain over time.

The above discussion clearly shows that there is a need for a new approach to help building owners plan, contract, monitor and evaluate their projects from a holistic point of view, in order to maximize the values of their investments.

Solution

One approach for a building owner to achieve such a holistic view is to start cooperating with the constructor from the early stages of the project, and continuing this cooperation into the operation phase. This gives the constructor a possibility to complement the building owner with necessary resources and competences, both needed to make good decisions throughout the whole renovation process.

Such a holistic approach unlocks enormous potential for improving renovation projects in terms of the optimal multidimensional performance of buildings. But to fully exploit this potential, both the building owner and the constructor must cooperate from the very beginning until the very end of the renovation project, not losing sight of all the important inner features of the investment.

In a multi service contract (MSC), the building owner signs a contract with a constructor – hereafter named the MSC supplier. The contract focuses on more parameters than just energy, including indoor climate, reducing the backlog of maintenance, and facility management. The contract also forces both parties to follow-up the performance of buildings after the buildings have been renovated. Extending the planning phase and involving an MSC supplier from the very beginning of the project increases the chance that the renovation will meet the building owners expectations, thanks to the supplier's support with resources and competences, and its taking responsibility for the performance of the project.

To understand the MSC model, one needs to note that the final design of the contract depends on the purpose and objectives of the project, since different types of services require different types of solutions.

Targeted at projects with renovation and retrofitting of a larger building portfolio in the existing building stock, the model derives from Energy Performance Contracting (EPC) and strategic partnerships, building on experiences from these two models. Although developed based on Danish regulations and practice, the model offers a generic frame for multi service contracting. When implemented in a project, it must be adjusted to both the project's scope and national regulations and practice.

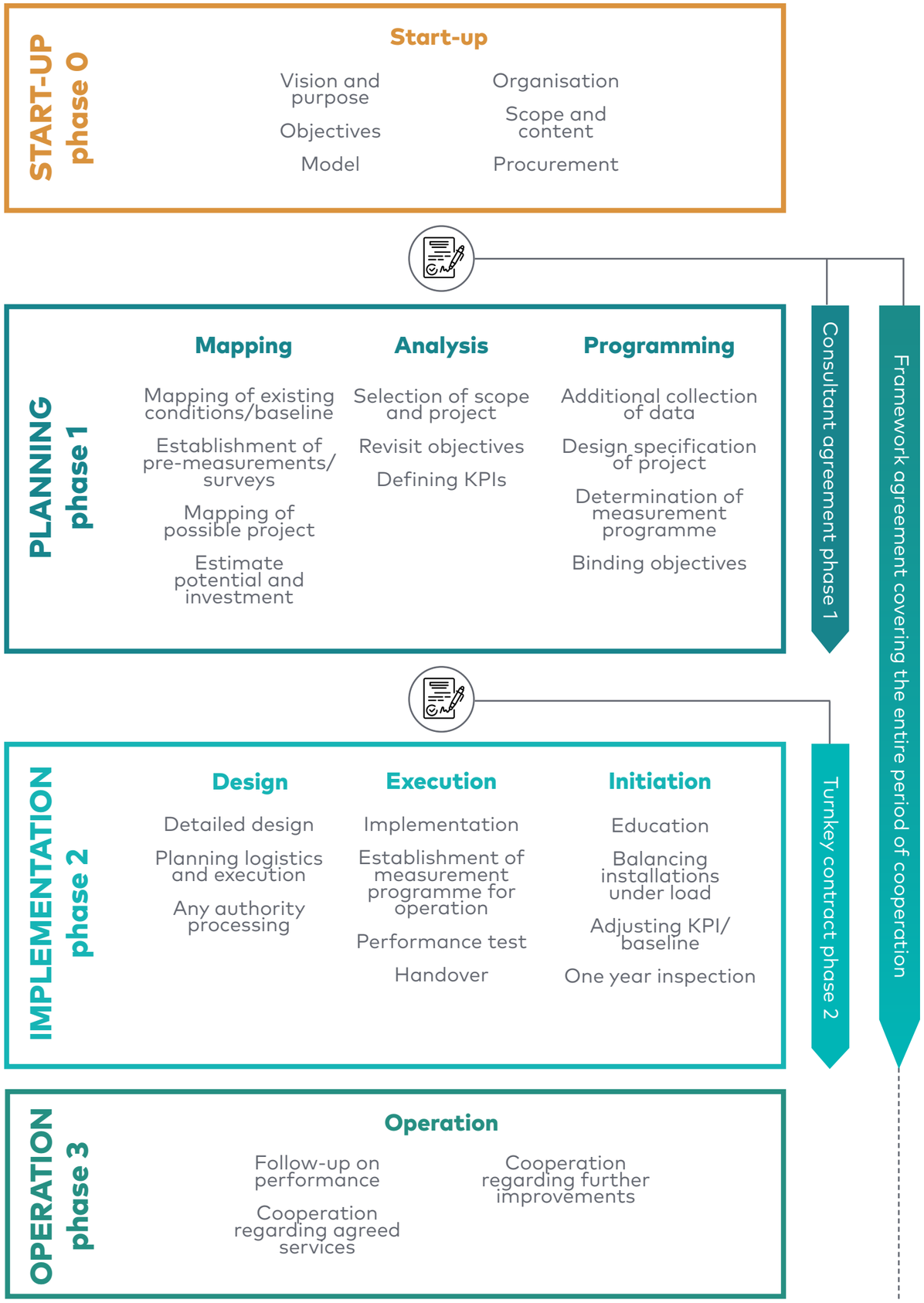

FIGURE 1. A STRATEGIC MODEL FOR MULTI-SERVICE CONTRACTING

The generic model has four primary phases and includes several different contracts.

In **Phase 0,** the building owner identifies a vision, a purpose, and main objectives of the project, which will constitute a basis for designing the project's scope. An MSC supplier, consisting of a full delivery team being able to execute the whole project, is found in a public procurement process.

A **framework agreement** signed with the MSC supplier covers all the three following phases. It regulates mutual objectives, form of cooperation, financial aspects, incentives, and remedies. Based on the open book principle, the agreement grants full access for the building owner to all calculations, real costs, and the like. If the conditions and objectives agreed in Phase 1 have not been met, the building owner is not obligated to proceed to phase 2 and sign a Phase 2 contract, which is a strong incentive for the MSC supplier to do a good job in Phase 1.

Together with the framework agreement, both parties sign a **consultant agreement** for Phase 1. It defines requirements for methods to be used and the whole process, such as mapping and calculation tools.

The framework and the consultant agreement can refer to one project or to many projects to be executed in cooperation between the building owner and an MSC supplier. In the latter case, every time a new project is launched in Phase 1 (e.g., an energy and indoor climate project in five schools), the parties sign an allonge to the consultant agreement, dealing with this particular project. The supplier is paid by hours spent, and the allonge specifies the **A**ctivities, **T**imeframe and **R**esources (called an ATR agreement).

In **Phase 1,** both the building owner and the MSC supplier closely cooperate to analyse the project's scope, based on which they are to decide on the final contents of the project. This entails revisiting objectives and defining a measurement programme based on the knowledge gained during Phase 1's subphases: mapping and analysis. In order to reduce risks related to unexpected costs and problems during the project, the supplier examines important technical risks, including hazardous substances and constructability.

When the project is shifting from Phase 1 to Phase 2, the parties sign a **turnkey contract**, which includes a fixed price for Phase 2. In **Phase 2**, the project is designed in detail, executed and initiated for operation by the MSC supplier. Such a turnkey contract must include clear requirements in terms of handover and commissioning2 with performance tests, and inspections (in Denmark, normally one- and five-year inspections are carried out). The supplier has to rectify all defects identified at the handover and the inspections.

Phase 3 is relevant if the contract includes contractual obligations on performance after Phase 2, or if it includes operation and maintenance services. The length of Phase 3 must be customized to the project, taking into account procurement regulations.

Where does MSC differ from EPC?

MSC is based on the same basic ideas as EPC. A model founded on early cooperation with a supplier, it focuses on future performance in a situation in which, at the time of signing the contract, the building owner does not know what work will be done and what technical solutions will be executed. Therefore, an MSC will largely resemble an Energy Performance Contract (EPC) (more about EPC can be found in the EFFECT4buildings EPC guide).

Both EPC and MSC require necessary competences and experience in cooperation models, and both make the building owner work closely with the supplier. In both models, the final design depends on the purpose and objectives of a specific project, and demands close attention to the creation of a valuable cooperation.

Despite this resemblance, traditional EPC and MSC differ, mainly in terms of the following aspects:

- An MSC takes several parameters into account, and therefore the work on establishing the resulting framework and preparing the procurement is more comprehensive because objectives and technical knowledge on more parameters must be included.
- In the generic model for MSC, Phase 1 is not based on a fixed price, and it goes further in developing the project before entering Phase 2 than does EPC. In MSC, more parameters can affect the final scope of the project, key performance indicators, and, as a consequence, the overall project. Therefore, the MSC model more focuses on analysing and designing the final scope, and on reducing risks for all the involved parties, in this aspect somewhat resembling strategic partnerships.
- In Phase 2 of an MSC project, the building owner should ensure in the handover that the requirements on performance are met.
- In Phase 3, unlike an EPC, an MSC is not based on performance guarantee in terms of indoor climate parameters, energy savings, or other parameters over a longer period. Instead, it stresses a follow-up and the evaluation of key performance indicators, to keep attention to maintaining the project's effects. The contract can impose different legal obligations on the supplier in case of not meeting performance expectations, but it can also use certain incentives to help avoid such situations.
- MSC is not a funding model. Some elements, like energy savings, can be included in it in the same way as they would be in EPC or a shared saving model.
- An MSC is a framework agreement, meaning that the building owner can split the building portfolio into more projects and plans; the proje-

cts would then be executed in parts, depending on the available resources and other circumstances. In this way, the building owner can use one public procurement to execute many projects with different objectives, which would likely make him or her benefit from working with the same supplier on several projects, instead of starting each one from scratch.

Performance management employs both the purpose and the objectives

In MSC, in all the phases of the project, the objectives constitute the basis for decisions as well as the design and quality of technical solutions. Therefore, the building owner must invest time and involve key stakeholders, to determine a purpose and objectives, and to break down the objectives into to sub-objectives. For each sub-objective, they formulate a key performance indicator (KPI) and its acceptance criteria, indicating whether the sub-objective has been reached.

A set of these sub-objectives describes the indicators used to assess performance, with their acceptance criteria representing the minimum performance for reaching the objective.
Since multi service contracting includes several parameters and related sub-objectives, it is important to ensure that no conflict exists among them. This can be done by creating an objective hierarchy with the purpose, objectives, sub-objectives and KPIs.

For example, reaching energy savings and obtaining a better indoor climate can create a conflict if the latter objective can be achieved only by increasing energy use. With such conflicting objectives, the building owner must define their priorities in the objective hierarchy.

Moving from one phase to the next requires the objective hierarchy and the KPIs to be revisited, which should be done by both parties, taking into account the current situation and the knowledge gained in the previous phases. For example, the early-planning phase can provide new knowledge on the state of the building maintenance and the potential for improvement and savings; this knowledge, unknown before, can be used to redefine more precise objectives in the subsequent phases.

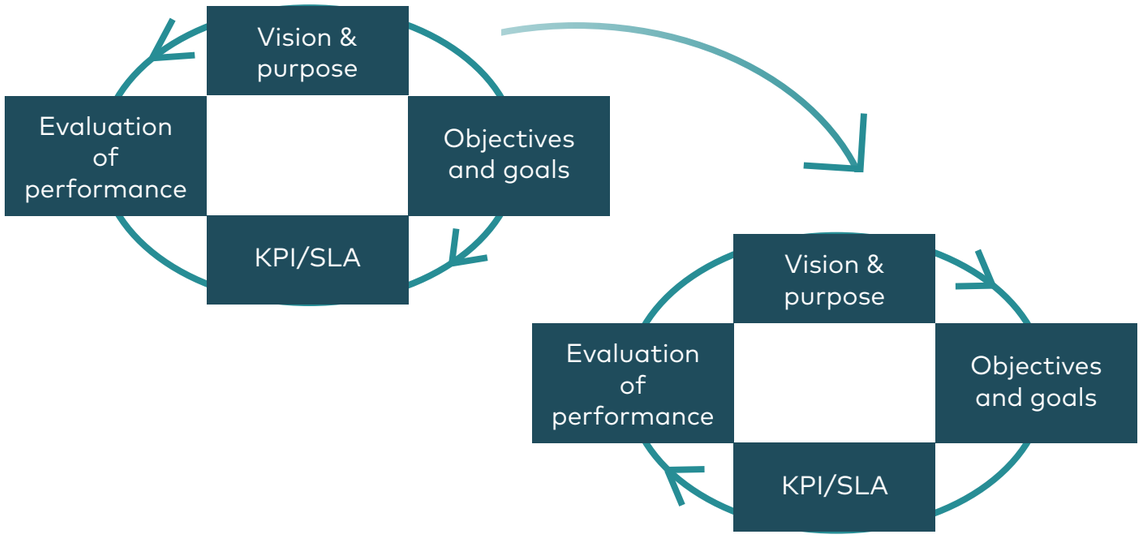

FIGURE 2. AN ITERATIVE PROCESS THROUGHOUT THE PROJECT, WHERE YOU USE KNOWLEDGE GAINED IN THE SUBSEQUENT PHASES TO CLARIFY AND REVISIT THE PROJECT'S PURPOSE, OBJECTIVES, KPIS AND EVALUATION METHOD.

Performance management employs both the purpose and the objectives

To ensure that performance is followed up during the whole project, the planning phase should produce evaluation methods for each KPI, for example, methods of validation, measurements, or other forms of documentation. Table 1 shows examples of KPIs and their corresponding methods.

This approach is an integrated part of performance management, it is not new: it is used, for example, in certifications on sustainability as DGNB. In the MSC model, performance management does not cover a single objective, such as sustainability, but all services, which makes it the main management tool in the contract and the main guide in designing the project's contents and the follow-up on performance.

MSC elements in a traditional renovation project

This guide describes a strategic generic MSC model. If a building owner, however, is carrying out a traditional renovation project, he or she does not have to fully stick to the tradition: the MSC methodology offers hints on how to enhance such a project.

Examples of such actions include the following:
- maximize chances to meet expectations of your organization, be specific when shaping the project's objectives, and take care to balance conflicting ones. Consultants and constructors should make every effort to understand these expectations.
- Be ready to redefine the objectives during the project when new knowledge emerges.
- From the beginning, think of which key performance indicators to use and design how to evaluate them. Define who will be responsible for evaluating performance, but also consequences of not meeting the expectations.

	ENERGY/CLIMATE	INDOOR CLIMATE	MAINTENANCE	OPERATION
EXAMPLE KPI	MWh, CO2 emission, Flow, COP, alarms	Temperature, ppm, humidity, noise, sickness absence	Condition level, level of emergency maintenance	Complaints, alarms, reaction time, plant failures
EXAMPLE OF METHOD OF PERFORMANCE VERIFICATION	Energy monitoring with a performance budget, CTS monitoring of key factors with alarms	Monitoring indoor measurements from sensors, yearly interviews, time registration	Average condition level, calculation of reduction in backlog and budget for emergency maintenance	Alarms in CTS, helpdesk system, number of inquiries and complaints from users, measurement of reaction time

TABLE 1. EXAMPLES OF KPIS AND THEIR CORRESPONDING METHODS FOR MONITORING AND EVALUATING PERFORMANCE.

Combination with other tools

Multi service contracting (MSC) is like EPC but has a more holistic approach. It is based on the same underlying idea but takes into account more parameters than just energy savings. All other tools can be part of a Multi Service Contract, either to support the process, to be included as a goal or to be used when designing the project. This tool works well with supportive tools like convincing decision makers to support the process and bundling. EPC or financial calculation can support the financing of MSC.

Experience from testing and recommendations

Multi service contracting is a new concept building on experiences and best practice from EPC, strategic partnerships, and traditional methods of renovation and maintenance projects.

Like any project, multi service contracting requires necessary specific professional expertise to make the public procurement process and cooperate with the supplier. The building owner must organize the project in phases and, if necessary, supplement its organization with external consultants. Specific knowledge is required from the start, especially to design functional requirements for services (indoor climate, energy, commissioning, maintenance etc.), contract conditions, and the frame for cooperation.

It is important that the contract clearly divide responsibility and state legal requirements for the supplier to achieve the objectives and KPIs. An MSC supplier can only take legal responsibility for work and parts it has full control over, like the design of the project, but not for the use and behaviour of the building.

Therefore, the generic model cannot guarantee performance in Phase 3 if the performance either depends on behaviour or cannot be evaluated in an objective or quantitative way. Other types of incentives are proposed instead, and it is recommended that the contract focus on performance management in terms of the technical and quantitative objectives. Certainly, for the cooperation to be effective, the contract must clearly describe responsibilities, contract conditions, and roles of both involved parties.

The model requires particularly close cooperation with the MSC supplier in the designing phase (Phase 1), handing it much influence on the design and final objectives. The building owner is not obligated to proceed with this particular supplier to Phase 2 but can choose another one, which constitutes a great motivator for the MSC supplier to deliver an attractive project that would live up to the expectations in price, quality and time. What is more, when the supplier has been involved in formulating KPIs and success criteria, it is more willing to take responsibility for the performance.

Among the main barriers for implementing a multi-service concept, two key ones are a lack of time, hindering in-depth work on shaping both the contract and the project itself; and a lack of knowledge of the benefits that following up and evaluating the performance can offer. The latter correlates with a long tradition in building projects that neither performance nor its follow-up during the subsequent phases gains much attention.

Overly disregarded during the project, the follow-up on performance is often left to facility management – but it is rarely accomplished. What is more, traditional contracts do not impose on the supplier any precise obligations and requirements on performance, neither during nor after the project. MSC was developed, among others, to break this tradition and, hopefully, begin a new one. It will do so by enriching contracts and the corresponding projects themselves, by imposing relevant activities on the suppliers, in order to ensure that the necessary attention be paid to the monitoring and evaluation of performance.

Conclusions

Multi service contracting exploits EPC's essence, i.e., cooperating with a professional supplier, shaping clear objectives, and focusing on expected performance. But it also enables the contract to include other important services helping to increase energy efficiency, satisfy the users, and optimize building operation. The model ensures a holistic view, thanks to evaluating performance indicators for each service and allocating responsibility for the performance between the parties.

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7. Standard for commissioning:
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8. Collection of relevant links to commissioning guidelines and standards. Is in Danish but refers to guidelines and standards in English:
   https://cxwiki.dk/p/generelt/standarder-og-vejledninger

TOOLS

1. Guideline for MSC phases and toolbox
2. Guideline for MSC decision process
3. Content in an MSC procurement and performance requirements

4.1 Financial benefits of improved indoor environmental quality

4.2a Introduction to mapping and evaluation of building performance

4.2b Mapping and evaluation of building performance. Excel tool.

4.3 Questionnaire for users on energy and indoor climate. Template example.

4.4 Mapping of indoor environmental quality in schools by students. Template example.

5. Guideline for planning of indoor climate in schools
6. God inomhus i skola och förskola (Swedish)
7. Introduction to measurement and verification
8. Introduction to performance verification during implementation
9. Performance operation test
10. MSC Training material
11. MSC Presentation

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