CONCERTO Premium

CONCERTO Economic Monitoring Guide

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CONCERTO is co-funded by the European Commission under the Research Framework Programme

Foreword

The CONCERTO initiative launched in 2005 by the European Commission is part of the research framework programme of the Directorate-General for Energy. All over Europe projects in 58 communities have been initiated aiming at the encouragement of energy generation from renewable energy sources and the improvement of energy efficiency on neighbourhood level, and on district level, respectively. Furthermore, the ecological, economic and social effects of the associated measures are analysed.

CONCERTO Premium is a significant part of the CONCERTO initiative. On behalf of the European Commission CONCERTO Premium aggregates the different CONCERTO projects and contributes to the exchange of information between the projects and the communication of project results to the interested public. In this context, the objective of CONCERTO Premium is the setup of a robust data and information base which can be used by different stakeholders as decision support platform. The aim is the formulation and implementation of sustainable climate protection measures in the urban environment in Europe and its bordering states as well as the distribution and support of these measures.

In the work package "Interpretation and Assessment" a guideline for assessing the benefits of measures intended to enhance the energy efficiency and to increase the usage of renewable energy sources is developed. One aspect is the description and assessment of the economic benefits from a micro- and macroeconomic point of view. The aim of the developed and hereafter introduced guideline is supporting a conceptual preparation and subsequent implementation of a long-term monitoring for the gathering and assessment of economic data. For achieving this objective, an appropriate structure for gathering relevant types of costs is introduced. This is a prerequisite for the economic assessment of the respective measures. Furthermore, by providing a common cost structure, meaningful comparisons of assessment results of different projects are enabled.

This guideline is mainly intended for building owners, planners, occupiers, operators, monitoring experts as well as persons responsible for financial project accounting and provides assistance in the systematic acquisition of data for assessing the economic benefit of measures. However, it can also be used by the respective stakeholders for supporting the development of a permanent structure for collecting and assessing costs in the context of an operating cost monitoring.

This guideline is elaborated in a way that is not specifically tailored to the existing CONCERTO projects. It can also be applied in future initiatives and projects.

On the part of the authors it is recommended to observe and consult this guideline in the future for the preparation and implementation of follow-on projects. Furthermore, the collection, processing and delivery of corresponding data should be an obligatory part of the contract.

The following guideline is part of an overall guide covering altogether technical, economic and social monitoring aspects and showing type and extent of the data to be gathered. Table 1 gives an overview on the topics covered by the overall monitoring guide. The symbol X indicates which sub-topics are included, the symbol (X) however denotes that a sub-topic is indirectly mentioned in this guide.

Table 1 Overview on sub-topics in CONCERTO (Source: Illustration of the authors)

Sub-topics in CONCERTO		included in this guide
A	Object identification and general building data	**(X)**
B	Energy monitoring	
C.1	Determination of construction costs and costs in use - Buildings	**X**
C.2	Determination of construction costs and costs in use - Energy Transformation Units	**X**
D	Determination of environmental impacts	
E	Determination of user satisfaction	
F	Determination of reliability and durability of technologies	**(X)**
G	Determination of political instruments und their effectiveness	

CONCERTO Premium

Monitoring Guide – Part C.1

Economic Data - Buildings

(construction costs, costs in use)

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1. Introduction

The success and the acceptance of measures intended to enhance the energy efficiency and to increase the usage of renewable energy sources on neighbourhood level strongly depend on the willingness of the stakeholders to invest in such measures. By conducting economic research and by assessing the possible measures stakeholders get information and statements for supporting and justifying their decisions.

The aim of this guideline is to support the gathering and processing of data for a subsequent assessment of economic benefits of measures intended to enhance the energy efficiency and to increase the usage of renewable energy sources. Thus, the installation and implementation of a long-term monitoring of economic data is encouraged. In order to reach this objective an appropriate cost structure for the determination of construction costs and costs in use is introduced. This cost structure enables the systematic, transparent and consistent gathering of relevant costs in order to economically assess the measures taken.

The economic assessment which is based on the data to be gathered provides answers to, inter alia, the following questions:

- What are the investment costs of energy optimized buildings compared to those of conventional buildings?
- Does reducing the energy consumption really mean reducing the energy costs?
- Is it economically more reasonable to invest in thermal insulation of the building envelope or its improvement or in technical installations or its modernization, respectively?
- Do buildings with innovative technical installations possibly have higher maintenance costs than buildings with conventional technical installations?
- How do an improved energetic quality and the increased use of renewable energy sources affect life cycle costs of a building?
- To what extent are grants and subsidies needed to make investments in the energetic modernization of a building economically beneficial from the view of selected stakeholders?

- Are the planning costs of energy optimized buildings higher than those of conventional buildings?

This guideline is mainly intended for building owners, planners, occupiers, operators, monitoring experts as well as persons responsible for financial project accounting and provides assistance in the systematic acquisition of data for assessing the economic benefit of measures. However, it can also be used by the respective stakeholders for supporting the development of a permanent structure for collecting and assessing costs in the context of an operating cost monitoring.

It is recommended to keep on operating the economic monitoring after the end of the actual project duration and to convert it into a long-term monitoring. Especially the effect of measures intended to enhance the energy efficiency and to increase the use of renewable energy sources on maintenance costs can only be identified by a long-term monitoring.

Furthermore, it is recommended to extend the respective applied charts of accounts used for bookkeeping by the different stakeholders in a way that the needed cost information can be entered automatically and permanently in the desired level of detail. This entered cost information can then be used for economic analysis and assessments.

2. Fundamentals

2.1 Handling of cost key values

An essential requirement for the determination and interpretation of cost key values is assuring transparency and comparability. Therefore, at least the following information for cost data must be available:

- handling of VAT (not included, included with x %)
- reference year for the invoiced costs (price level) – e.g. II/2010
- type, extent, level of difficulty or quality standard of measures which cause the costs

Furthermore, it is preferable to specify in case of single measures

- the technical service life of components or systems.

2.2 Types of costs to be determined

The determination and interpretation of costs in the life cycle of a building are an approach for the assessment of the economic benefit of construction solutions. These costs can be analyzed both as a unity as well as partially and discussed from the perspective of different issues and stakeholders. For a subsequent assessment and interpretation of the economic benefit of energy-efficiency related measures especially their financial effort (in this context the non-recurring and current effort) as well as their financial benefit (e.g. reduction of energy costs) have to be determined. Thus, with regard to CONCERTO a special interest is to determine costs that are linked with energy-efficiency related measures. Those are especially the

- construction costs with costs for the structural and technical part (costs for structure and costs for technical equipment)
- planning costs as part of ancillary construction costs
- costs in use, in this context, especially energy costs and inspection and servicing costs as part of operating costs as well as maintenance costs including costs for replacement investments.

Costs for deconstruction and disposal are determined and assessed in the context of refurbishment measures as well as replacement investments (when necessary).

Construction costs, planning costs und costs in use as well as costs for deconstruction and

disposal are part of the life cycle costs. With life cycle costs in the narrow sense (Life-Cycle-Costs) all cash outflows that occur during the whole life cycle of a building are subsumed. If also cash inflows are considered the term life cycle costs in the broader sense (or Whole-Life-Costs) is used. For further information about life cycle costing in the narrow and broader sense it is referred to ISO 15686-5:2008.

Figure 1 gives an overview over the costs in the life cycle of buildings. For the assessments conducted in CONCERTO the non-recurring construction costs for the construction or the refurbishment of a building (in this context the focus is on the costs for the structure and the technical equipment as well as on selected costs for site and external works, additionally planning costs are to be determined) as well as the costs in use (inter alia energy, servicing and maintenance costs including replacement investments) are relevant. All types of costs that are relevant in the context of CONCERTO are highlighted red in Figure 1.

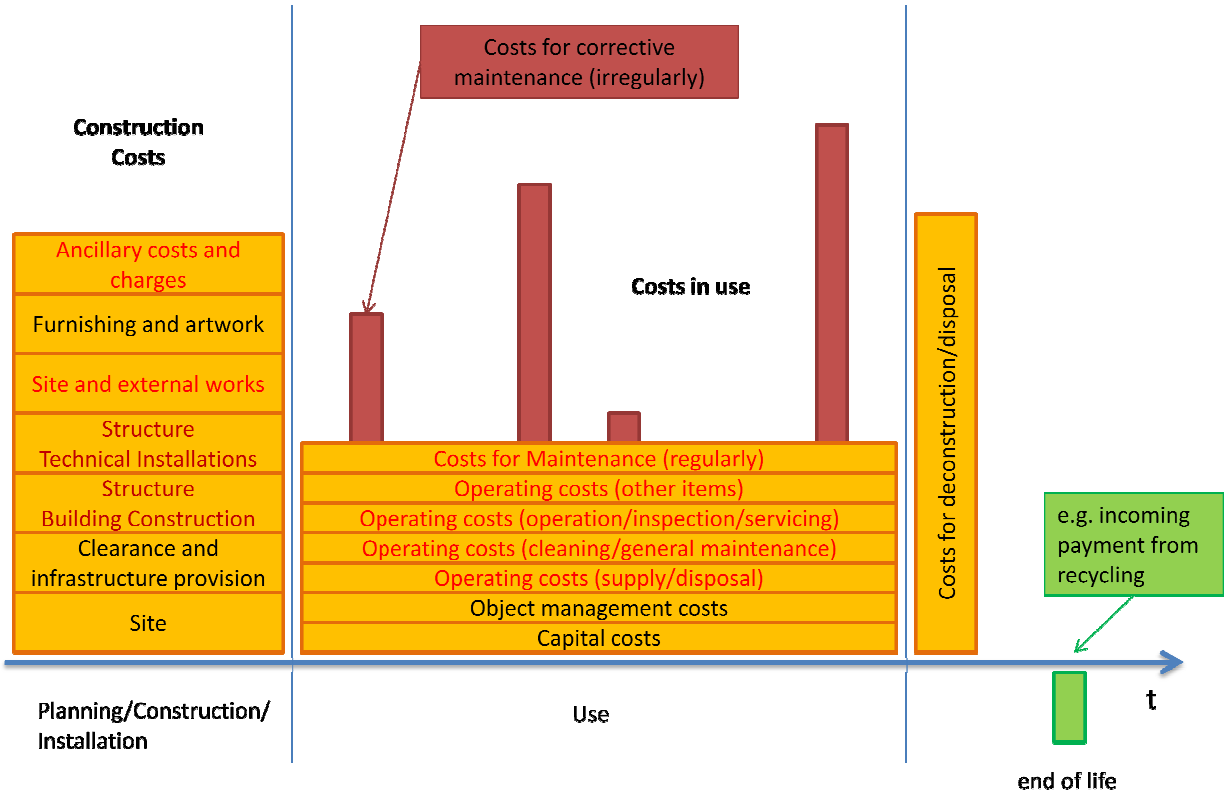


Figure 1 Overview on life cycle costs: Costs that are relevant for the determination and assessment in the context of this guide are highlighted in red (Source: Illustration of the authors)

During the utilization phase there are types of costs which occur either regularly or irregularly.

The determination and analysis of costs for maintenance and replacement investments at the end of the life of building components or systems require longer periods of monitoring, because they only occur after a number of years. Those costs are linked closely with the technical reliability and the technical service life of such building components and systems.

2.3 Structure of the costs to be determined

In order to assure the transparency and the comparability of the costs to be determined they have to be structured in a pragmatic way. In different countries there are different regulations and experiences concerning this structure. This is why, in the context of CONCERTO a common structure for the determination of costs has to be used. This possibly requires a restructuring or a reassignment of the types of costs.

The cost structure used in CONCERTO is based on the CEEC Code of Measurement for Cost Planning edited by the European Committee of Construction Economists (European Committee of Construction Economists, 2008). The result is a rather rough structure of the types of costs that occur in the life cycle. For the further approach a more detailed sub-division is necessary. It is proposed to use a sub-division which is based on the German codes for the determination of construction costs (DIN 276-1:2008-12, 2008) and costs in use (DIN 18960:2008-02, 2008) and the regulations of the ISO 15686-5:2008 (ISO 15686-5:2008, 2008). Table 2 shows the cost groups according to CEEC and the sub-division based on DIN 276. Here, only cost group A (Preliminaries) is sub-divided. An entire overview over the sub-divisions can be found in Annex B.

Table 2 Cost groups according to CEEC and exemplary sub-division based on DIN 276 and DIN 18960

Cost groups according to CEEC	detailed sub-division according to DIN 276
A Preliminaries	a1 Protective measures
	a2 Demolition work
	a3 Removal of residual pollution
	a4 Site surface clearance
	a5 Clearance, other items
	a6 Compensations
	a7 Site equipment
	a8 Scaffolding
	a9 Safety measures
	a10 Repair work
	a11 Recycling, interim disposal and final disposal
	a12 Provisions for working in bad weather
	a13 Additional measures
	a14 other construction-related activites, other items
B Substructure	b1 …
	b2 …
	b3 …
	b4 …
C External superstructure/envelope	
D Internal superstructure	
E Internal finishings	
F Service installations	
G Special equipment	
H Furniture and fittings	
I Site and external works	
J Construction contingencies	
L Design Team Fees	
M Ancillary costs and charges	
N Project budget contingencies	
P Maintenance	
Q Operation	
U Land costs	
V Finance	
X Taxes on Land	

2.4 Outline of monitoring

Three stages of economic monitoring can be distinguished from the perspective of the authors:

- stage I: stage of planning and realization of the construction project or the refurbishment measures
- stage II: intensive monitoring
- stage III: long-term monitoring

In the proper sense **stage I** is not part of the monitoring. However, it can be assumed that, inter alia, target and comparative figures for the subsequent monitoring of stage II and III are determined. It is recommended that during the planning process an estimation of construction costs and costs in use is carried out. The level of expected future energy costs as part of the costs in use is based on the projection of the expected energy consumption. Expected costs for servicing and maintenance must be either estimated or determined based on existing offers for service contracts. For the planning of maintenance costs in the context of the maintenance cycle, inter alia, information about technical service lives of structural elements and building components are required. Especially in the case of new and innovative systems this information should be addressed to the manufacturers.

Determined costs are intended, inter alia, for executing comparisons of variants, for the considerations of economic efficiency as well as the elaboration of target values for a subsequent energy consumption monitoring and operating cost controlling.

Stage II – the proper monitoring- begins with the determination of the actually incurred costs.

Especially in parallel to the energetic monitoring, in the context of the economic monitoring the energy costs (and on this basis the possible energy cost savings) have to be determined. Furthermore, the costs for inspection and servicing have to be gathered. It can be assumed that stage II must cover a period of at least two to three years.

With **stage III** the transition to a long-term monitoring takes place. Continuously, costs for energy, inspection and servicing have to be determined. Possibly, it is necessary to refer the cost values to a common reference year. As an alternative the present value of the cash outflows can be calculated.

Moreover, the determination of maintenance costs including costs for replacement investments in case of the replacement of building components and systems takes place in stage III. Stage III must cover a period of at least five years. A transition to a permanent energy consumption monitoring and operating cost controlling is strongly recommended.

Figure 2 gives an overview on the stages I to III and the embedded starting points for planning and monitoring.

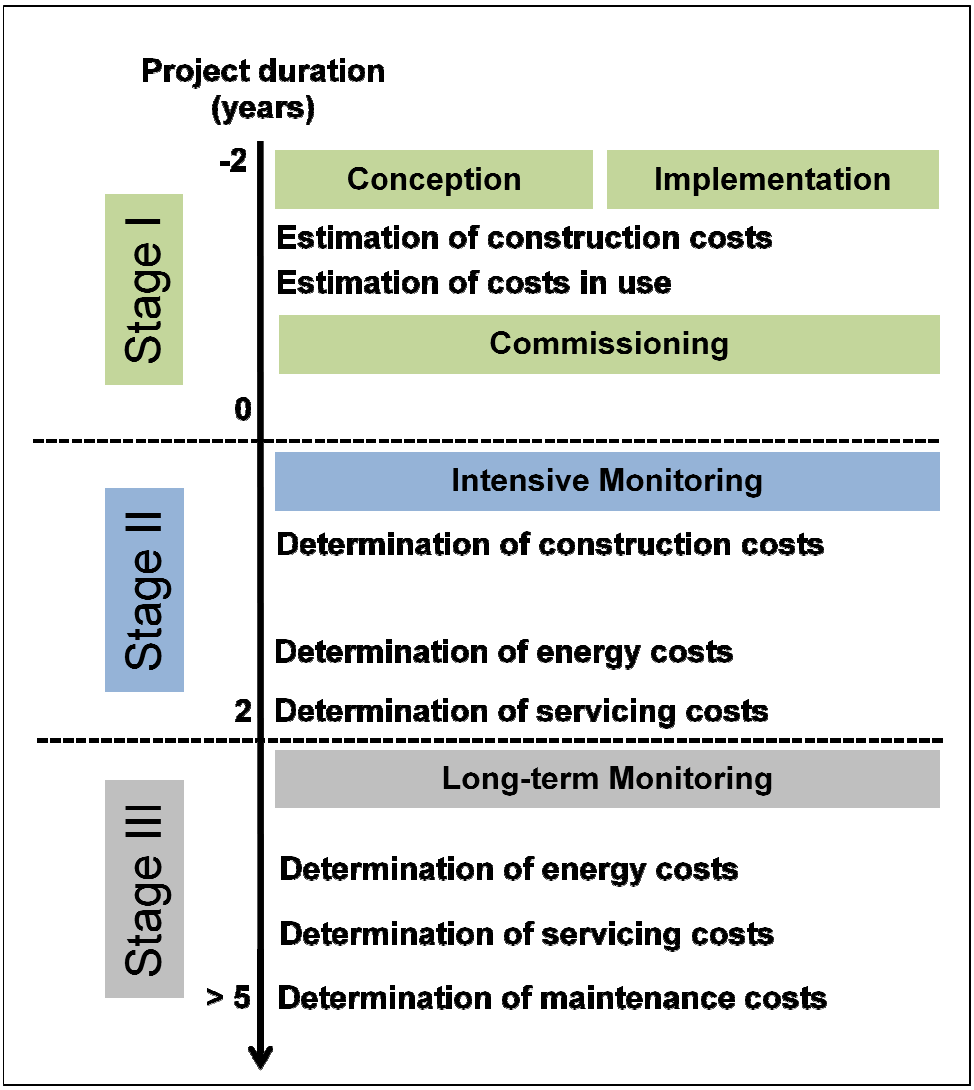


Figure 2 Stages of monitoring (Source: Illustration of authors)

2.5 Work with data collection sheets

For the determination of the necessary types of costs data collection sheets have been elaborated and are submitted together with this guide. Those data collection sheets support the determination of the relevant types of costs and complementary information for assuring transparency and comparability (see Annexes A to F). In the following chapters it is explained how to fill-in those data collection sheets depending on the respective project (new construction or refurbishment measure). The data collection sheets are sent to the responsible persons via e-mail. Furthermore they can be obtained upon request. Please contact CONCERTO Premium via the following e-mail address: concertopremium@steinbeis-europa.de.

3. Determination of construction costs

3.1 Foundations and aims

The determination of construction costs should preferably be based on already invoiced projects. Cost estimations can only be used under exceptional circumstances.

The objective of the determination of construction costs in case of new constructions and refurbishment projects is the comparison between planning and actually built variants as well as the elaboration of basics for economic efficiency calculations.
As far as it is necessary to refer to a basic variant in the context of the comparisons of variants and economic efficiency calculations the determination of construction costs for this basic variant is also essential. The necessity of consistent system boundaries, price levels and treatment of VAT has already been pointed out.

The basic variant can be either a reference building which corresponds to legal requirements and/or the state-of-the-art technology or a differing but clearly defined variant. This is necessary if e.g. not only cost differences between energy optimized buildings and the state-of-the art technology are of interest but also comparisons between different variants of energy optimized buildings (e.g. passive house vs. net-zero-energy house).

3.2 Possible cases in the context of new construction and refurbishment projects

The construction costs of both new construction and refurbishment projects can be determined either for entire projects (case A) or for selected measures or packages of measures (case B). In case of new construction projects measures can be interpreted as additional measures for a further improvement of the energetic quality compared to a basic variant. In case of refurbishment projects a measure is taken to improve the energetic quality of an initial variant (existing building). If neither the approach of case A nor of case B seems appropriate for the existing data cost information can be determined using the special strategy which is a combination of the described possibilities A and B. Figure 3 shows the resulting cases.

Determination of construction costs

	New Construction	Refurbishment
referring to the entire building	Construction costs in total (Description of the equipping standard necessary) Chapter 3.3 case A	Costs for refurbishment [1)] in total (description of the measures necessary) Chapter 3.4 case A
referring to measures or packages of measures	Additional costs for energy-related measures or packages of measures Chapter 3.3 case B	Costs for refurbishment[1)] for energy-related measures or packages of measures Chapter 3.4 case B
Special strategy: combination of approaches A and B	Special CONCERTO Strategy Chapter 3.3 case C	Special CONCERTO Strategy Chapter 3.4 case C

1) full/additional costs DCS = Data Collection Sheet preferred variant

Figure 3 Cases for the determination of construction costs (Source: Illustration

of the authors)

For the individual cases respective data collection sheets for the determination of construction costs and for assuring transparency and comparability have been elaborated and should be used. Figure 4 gives an overview on the assignment of data collection sheets to the individual cases. For each object a data collection sheet with general data (Annex A: location, areas, contact persons,...) is provided. The choice and handling of the data collection sheets for construction costs (Annexes B-D) and the assurance of transparency and comparability (Annex E) are described in the following sub-chapters.

Determination of construction costs

	New Construction	Refurbishment
referring to the entire building	DCS general data (NB 1) DCS costs A-CEEC (NB 2) **AND** DCS costs B- measures (NB 3) **only part about grants** DCS quality standard (NB 4) Chapter 3.3 case A	DCS general data (RB 1) DCS costs A-CEEC (RB 2) **AND** DCS costs B- measures (RB 3) **only part about grants** DCS quality standard (RB 4) Chapter 3.4 case A
referring to measures or packages of measures	DCS general data (NB 1) DCS costs B-measures (NB 3) Chapter 3.3 case B	DCS general data (RB 1) DCS costs B-measures (RB 3) Chapter 3.4 case B
Special strategy: combination of approaches A and B	DCS general data (NB 1) DCS costs A-CEEC (NB 2) **AND** DCS costs B-measures (NB 3) DCS quality standard (NB 4) Chapter 3.3 case C	DCS general data (RB 1) DCS costs A-CEEC (RB 2) **AND** DCS costs B-measures (RB 3) DCS quality standard (RB 4) Chapter 3.4 case C

in brackets (): ID of corresponding data collection sheet

DCS = Data Collection Sheet

preferred variant

Figure 4 Assignment of respective data collection sheet to the cases for the determination of construction costs (Source: Illustration of the authors)

3.3 Advice for the determination of costs in case of new construction projects

Regarding type and extent of the determination of costs in case of new construction projects different cases can be distinguished. For the assessment in CONCERTO either

Case A: determination of costs for the entire building according to CEEC

or

Case B: determination of costs for energy-efficiency related additional measures

or

(special Case C: combination of approaches A and B)

should be applied. Case A is the preferred variant in case of new constructions. The approach for basic or reference buildings is analogous.

A statement of actually invoiced costs after the execution of construction work is aspired. In this context at least those cost groups influenced by the energy concept of the building should be determined.

Case A: determination of costs for the entire building according to CEEC

In case of the determination of costs for the entire building according to CEEC (case A) at least the costs for structural elements and technical equipment (cost groups A to J) must be determined. In those cost groups, inter alia, the costs for the building envelope, the technical equipment and the selected costs for site and external work are included. Additionally, at least planning costs (cost group L) are determined. Figure 5 gives an overview on the cost groups according to CEEC for the determination of construction costs.

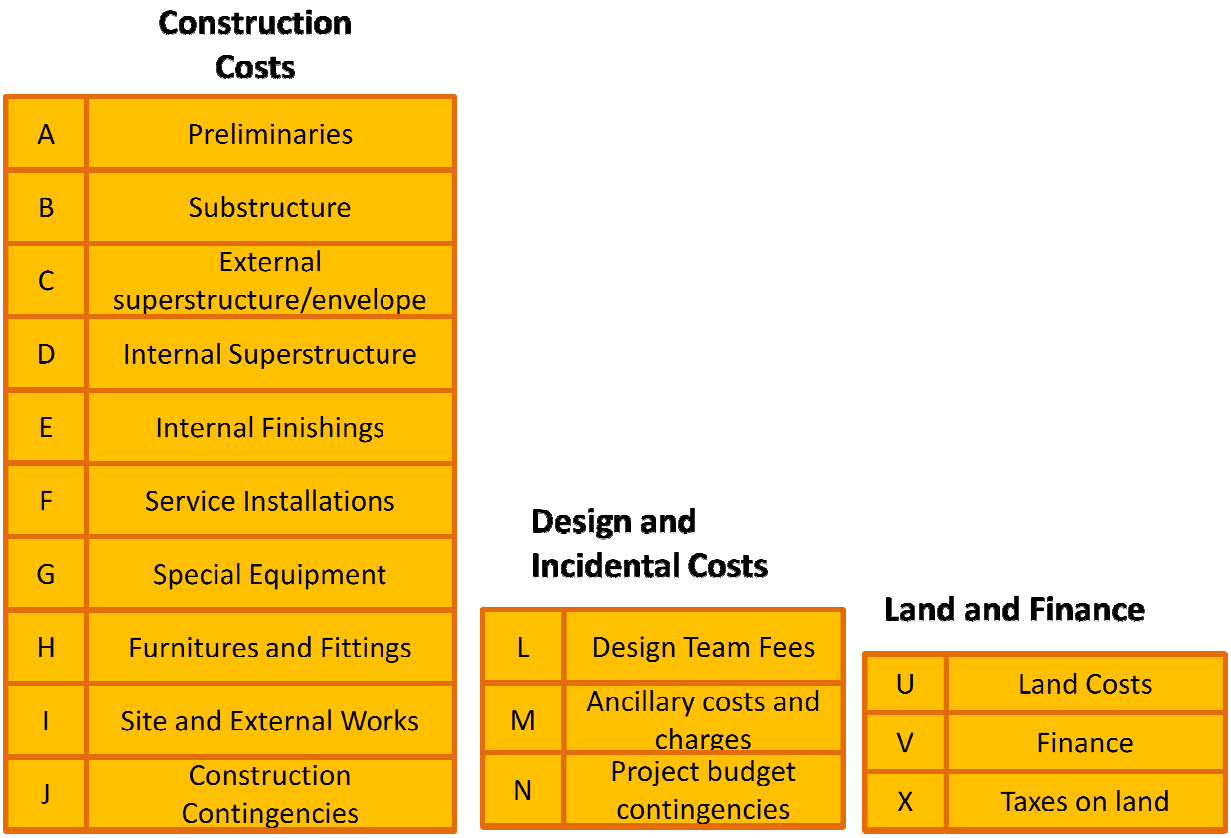
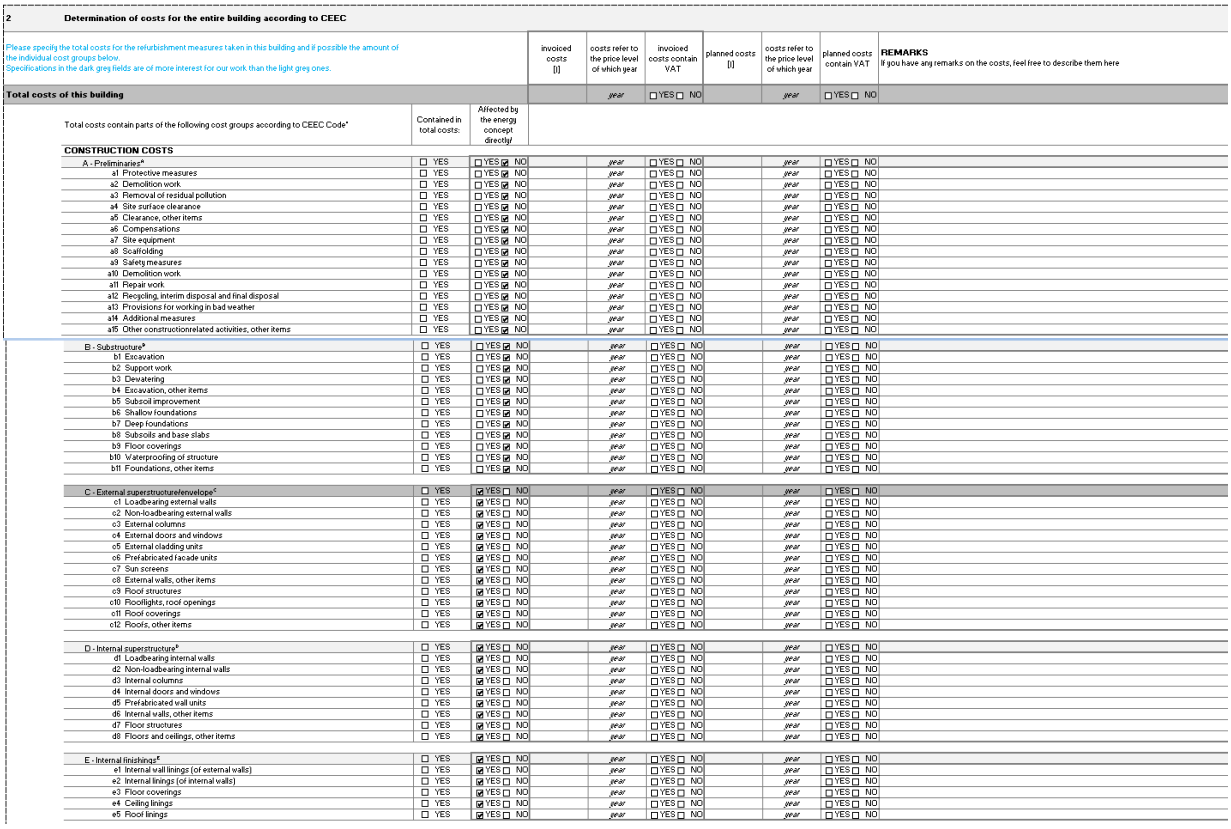


Figure 5 Relevant cost groups according to CEEC

Annex B (NB 2-costs A-CEEC) contains a detailed survey of relevant cost groups in form of a data collection sheet. During the gathering of cost data the price level has to be documented exactly, i.e. for the determination of costs the time of the settlement of the costs has to be specified. Furthermore, it has to be stated whether the cost information contains VAT and the amount of VAT (VAT included with x%).

The data collection sheet NB 2-costs A-CEEC is structured in a way that even in case of incomplete data, statements about the comparability of construction projects and propositions about the economic benefits of taken measures can be made. Therefore ticking boxes have been introduced which enable to specify if information about selected costs are included in the cost information of the superordinate cost group. Thus, at least partial assessments can be conducted if detailed cost information is not available for every cost group. Figure 6 introduces the respective data collection sheet. It is completely included in Annex B.



2	Determination of costs for the entire building according to CEEC									
Please specify the total costs for the refurbishment measures taken in this building and if possible the amount of the individual cost groups below. Specifications in the dark grey fields are of more interest for our work than the light grey ones.			invoiced costs [i]	costs refer to the price level of which year	invoiced costs contain VAT	planned costs [i]	costs refer to the price level of which year	planned costs contain VAT	REMARKS If you have any remarks on the costs, feel free to describe them here	
Total costs of this building				year	☐YES ☐ NO		year	☐YES ☐ NO		
Total costs contain parts of the following cost groups according to CEEC Code*	Contained in total costs:	Affected by the energy concept directly!								
CONSTRUCTION COSTS										
A - Preliminaries*	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
a1 Protective measures	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
a2 Demolition work	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
a3 Removal of residual pollution	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
a4 Site surface clearance	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
a5 Clearance, other items	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
a6 Compensations	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
a7 Site equipment	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
a8 Scaffolding	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
a9 Safety measures	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
a10 Demolition work	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
a11 Repair work	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
a12 Recycling, interim disposal and final disposal	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
a13 Provisions for working in bad weather	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
a14 Additional measures	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
a15 Other construction-related activities, other items	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
B - Substructure*	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
b1 Excavation	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
b2 Support work	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
b3 Dewatering	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
b4 Excavation, other items	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
b5 Subsoil improvement	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
b6 Shallow foundations	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
b7 Deep foundations	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
b8 Subsoils and base slabs	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
b9 Floor coverings	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
b10 Waterproofing of structure	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
b11 Foundations, other items	☐ YES	☐YES ☑ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
C - External superstructure/envelope*	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
c1 Loadbearing external walls	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
c2 Non-loadbearing external walls	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
c3 External columns	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
c4 External doors and windows	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
c5 External cladding units	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
c6 Prefabricated facade units	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
c7 Sun screens	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
c8 External walls, other items	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
c9 Roof structures	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
c10 Rooflights, roof openings	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
c11 Roof coverings	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
c12 Roofs, other items	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
D - Internal superstructure*	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
d1 Loadbearing internal walls	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
d2 Non-loadbearing internal walls	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
d3 Internal columns	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
d4 Internal doors and windows	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
d5 Prefabricated wall units	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
d6 Internal walls, other items	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
d7 Floor structures	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
d8 Floors and ceilings, other items	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
E - Internal finishings*	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
e1 Internal wall linings (of external walls)	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
e2 Internal linings (of internal walls)	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
e3 Floor coverings	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
e4 Ceiling linings	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		
e5 Roof linings	☐ YES	☑ YES ☐ NO		year	☐YES ☐ NO		year	☐YES ☐ NO		

Figure 6 Data collection sheet for the determination of costs for the entire building according to CEEC (section)

In addition to the cost information detailed information about grants are needed for the economic assessment. Therefore it is necessary to fill in parts of the data collection sheet NB 3-costs B-measures, too. Thereby it is sufficient to only fill in columns that are related to grants. Figure 7 shows the data collection sheet NB 3-costs-B-measures. Only the highlighted columns must be considered.

Building data - Costs and grants for new buildings

B Determination of costs for selected individual measures or packages of measures

													Eligible costs are based on					Specification of other grants							
																		Type of		Type of support programm					
Please specify the costs for the measures taken in this building and if possible the amount of the individual measures below. Specifications in the dark grey fields are of more interest for our work than the light grey ones.		please specify the quality standard of the measures taken	measure was realised	is included in **subtotals** of the different measure groups	**full costs for measures taken [1]**	**additional costs compared to the defined basic variant [2] [1]**	**CONCERTO eligible costs accepted by the European Commission [1]**	**CONCERTO grants [1]**	**other grants [1]**	costs or grants are:	costs or grants refer to the price level of which year	VAT contained	calculated **additional costs** compared to basic variant that have **not** been limited by the EC [2]	calculated **additional costs** compared to basic variant that have been limited by the EC [2]	flat rate financing in the form of scale of unit costs	calculated **full costs** and **not** limited by the EC	calculated **full costs** that have been limited by the EC	subsidised interest rate	non-repayable grant	EU	National	Regional	Municipal	Initiated by energy supplier	Initiated by banks
total: costs or grants for the measures taken										planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
energy-related measures [1]																									
energy efficiency measures																									
windows	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
thermal insulation of the outside walls	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
thermal insulation of the roof or upper slab	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
thermal insulation of the basement	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
heating system - if it does not use renewable energy sources	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
thermal bridge reducing construction	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
improvement of air tightness	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
building automation system aiming at reducing heating energy use	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
ventilation system with heat recovery	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
installation of shading devices	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
please specify further energy efficiency measures	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
please specify further energy efficiency measures	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
please specify further energy efficiency measures	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
subtotal: energy efficiency measures										planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
building-integrated renewable energy measures																									
heating system - if renewable energy sources are used	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
please specify further renewable energy measures	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
please specify further renewable energy measures	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
please specify further renewable energy measures	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
subtotal: renewable energy measures										planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES

Figure 7 Data collection sheet for the determination of the construction costs of additional measures of packages of measures for new constructions

Assuring the comparability of the determined costs of different projects (e.g. of the object to be analysed or of the reference or basic object) it must be additionally mentioned which special characteristics, levels of difficulties or equipping standards are realized or which special equipping features are implemented, respectively. In Annex E a table is given which offers a description of characteristics and equipping standards of the building. It can be stated e.g. if a low, middle or high equipping standard of an individual characteristic is realized. In case of some special elements, like e.g. excavation, the distinction is made referring to the respective level of difficulty. Figure 8 and Figure 9 introduce the related data collection sheets. The sheet is completely included in Annex E.

Quality standard for building elements								
			Qualitative description of the elements for comparability					
CEEC cost group	Elements	please indicate if the building has a special quality standard	indication refers to level of difficulty	indication refers to quality standard	low	medium	high	short description on the main characteristics, materials, realisation
Building construction								
b5 - b11	**Foundation**		YES		☐	☐	☐	
c1 - c8	**External walls**							
c1 - c3	**loadbearing, non-loadbearing external walls and columns**			YES	☐	☐	☐	
c4	External doors and windows			YES	☐	☐	☐	
c5	External cladding units	☐ YES ☐ NO		YES	☐	☐	☐	
c6	Prefabricated facade units	☐ YES ☐ NO		YES	☐	☐	☐	
c7	Sun screens	☐ YES ☐ NO		YES	☐	☐	☐	
c8	External walls, other items	☐ YES ☐ NO		YES	☐	☐	☐	
d1 - d7	**Internal walls**							
d1	Loadbearing internal walls			YES	☐	☐	☐	
d2	Non-loadbearing internal walls			YES	☐	☐	☐	
d3	Internal columns			YES	☐	☐	☐	
d4	Internal doors and windows			YES	☐	☐	☐	
d5	Prefabricated wall units	☐ YES ☐ NO		YES	☐	☐	☐	
d6	Internal walls, other items	☐ YES ☐ NO		YES	☐	☐	☐	
e3 - e7	**Ceilings**							
e3	Floor coverings				☐	☐	☐	
e4	Ceiling linings				☐	☐	☐	
c9 - c12	**Roofs**							
c9	Roof structures			YES	☐	☐	☐	
c10	Rooflights, roof openings	☐ YES ☐ NO		YES	☐	☐	☐	
c11	Roof coverings			YES	☐	☐	☐	
c12	Roofs, other items			YES	☐	☐	☐	
f1 - h3	**Fittings**							
h1	General-purpose fitments	☐ YES ☐ NO		YES	☐	☐	☐	
h2	Special-purpose fitments	☐ YES ☐ NO		YES	☐	☐	☐	
h3	Structural fitments, other items	☐ YES ☐ NO		YES	☐	☐	☐	
a7 - a15	**Other construction-related activities, other items**	☐ YES ☐ NO	YES		☐	☐	☐	

Figure 8 Data collection sheet for the description of levels of difficulty and equipping standards - Building Construction

Technical equipment								
f1 - f6	**Sewage, water and gas supply systems**			YES	☐	☐	☐	
f7 - f10	**Heat supply systems**							
f7	Heat generators			YES	☐	☐	☐	
f8	Heat distribution networks			YES	☐	☐	☐	
f9	Space heating			YES	☐	☐	☐	
f10	Heat supply systems			YES	☐	☐	☐	
f11 - f16	**Air treatment systems**							
f11	Ventilation systems	☐ YES ☐ NO		YES	☐	☐	☐	
f12	Partial air conditioning systems	☐ YES ☐ NO		YES	☐	☐	☐	
f13	Air conditioning systems	☐ YES ☐ NO		YES	☐	☐	☐	
f14	Process air treatment systems	☐ YES ☐ NO		YES	☐	☐	☐	
f15	Refrigerating plant	☐ YES ☐ NO		YES	☐	☐	☐	
f16	Air treatment systems, other items	☐ YES ☐ NO		YES	☐	☐	☐	
f17 - f23	**High and medium voltage plant**							
f20	Low voltage installation equipment			YES	☐	☐	☐	
f24	Telecommunications systems			YES	☐	☐	☐	
f25 - f26	**Service installations**							
f25	Lifts	☐ YES ☐ NO		YES	☐	☐	☐	
f26	Escalators, moving pavements	☐ YES ☐ NO		YES	☐	☐	☐	
g12 - g20	**Function-related equipment and fitments**	☐ YES ☐ NO		YES	☐	☐	☐	
f25 - f29	**Building automation**	☐ YES ☐ NO	YES	YES	☐	☐	☐	
f30 - f38	**Other technical equipment**	☐ YES ☐ NO		YES	☐	☐	☐	

Figure 9 Data collection sheet for the description of levels of difficulty and equipping standards - Technical Equipment

Case B: determination of costs for energy-efficiency related additional measures

As an alternative there is the possibility of specifying selected costs or cost compilations for energy-efficiency related additional measures or packages of measures. In this context the term additional measures refers to measures whose implementation leads to a substantial differentiation of the considered building from the defined basic variant.

Generally additional measures can be divided into:

- energetic additional measures and
- non-energetic additional measures.

Energetic or energy-efficiency related additional measures are measures that additionally improve the energetic quality of a building compared to a defined basic variant or which lead to the deployment of special technologies for the use of renewable energy sources. In the following selected examples for energetic additional measures for enhancing the energy efficiency and increasing the usage of renewable energy sources are given:

- installation of windows with improved energetic characteristics (e.g. u-value)
- thickness of insulation increased
- application of alternative insulation systems (e.g. VIP)
- application of heating systems with increased use of renewable energy sources.

It must be considered that sometimes an energy concept can also lead to an omission of costs for construction elements (e.g. omission of costs for heating installations in case of a transition on passive house level).

Non-energetic additional measures are measures that do not influence the energy concept of buildings. Examples for non-energetic additional measures are:

- modifications in the layout compared to the basic variant
- higher equipping standard of the bathrooms
- higher equipping standard of the floor covering
- reaction to complex subsoil conditions.

Additional measures can be described either as individual measures or packages of measures. In case of packages of measures the type and extent of the measures included in the package have to be specified. Furthermore, the benefit (in this context the reduced energy consumption) of each individual measure or of the package of measures has to be stated.

Figure 10 shows the corresponding data collection sheet for the determination of construction costs for individual measures or packages of measures (NB 3-costs B-measures). The sheet is completely included in Annex C.

Building data - Costs and grants for new buildings																	
1 Determination of costs for selected individual measures or packages of measures																	
													Eligible costs are based on				
Please specify the costs for the measures taken in this building and if possible the amount of the individual measures below. Specifications in the dark grey fields are of more interest for our work than the light grey ones.		please specify the quality standard of the measures taken	measure was realised	is included in **subtotals** of the different measure groups	**full costs for measures taken [1]**	**additional costs compared to the defined basic variant [2]**	**CONCERTO eligible costs accepted by the European Commission**	**CONCERTO grants [1]**	**other grants [1]**	costs or grants are:	costs or grants refer to the price level of which year	VAT contained	calculated **additional costs** compared to basic variant that have **not** been limited by the EC [2]	calculated **additional costs** compared to basic variant that have been limited by the EC [2]	flat rate financing in the form of scale of unit costs	calculated **full costs** and **not** limited by the EC	calculated **full costs** that have been limited by the EC
total: costs or grants for the measures taken										planned / invoiced		YES NO / YES NO					
energy-related measures [1]																	
energy efficiency measures																	
windows	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
thermal insulation of the outside walls	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
thermal insulation of the roof or upper slab	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
thermal insulation of the basement	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
heating system - if it does not use renewable energy sources	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
thermal bridge reducing construction	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
improvement of air tightness	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
building automation system aiming at reducing	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
ventilation system with heat recovery	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
installation of shading devices	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
please specify further energy efficiency measures	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
please specify further energy efficiency measures	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
please specify further energy efficiency measures	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
subtotal: energy efficiency measures										planned / invoiced		YES NO / YES NO					
building-integrated renewable energy measures																	
heating system - if renewable energy sources are	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
please specify further renewable energy measures	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
please specify further renewable energy measures	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
please specify further renewable energy measures	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO	YES	YES	YES	YES	YES
subtotal: renewable energy measures										planned / invoiced		YES NO / YES NO					
non-energy-related measures																	
modifications in the layout compared to the basic	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO					
higher quality standard of the bathrooms	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO					
higher quality standard of the floor covering	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO					
reaction to complex subsoil conditions	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO					
please specify further measures	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO					
please specify further measures	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO					
please specify further measures	*please describe the measure*	-	YES NO	YES NO						planned / invoiced		YES NO / YES NO					
subtotal: non-energetic measures										planned / invoiced		YES NO / YES NO					

If you have additional information on the development and the amount of the CONCERTO eligible costs, please specify it here:

[1] **Energy-related measures are all measures related to the energetic standard of the building** e.g. the installation of the boiler, windows or insulating the building. NOT part of the energy-related measures is e.g. a higher quality standard the bathrooms etc.

[2] The basic variant for **energy-related** additional costs are the costs of the measures according to the **national minimum requirements** and in case of **non-energy-related** measures the costs for the **usual standard**. For more detailed information please refer to the CONCERTO Premium Economic Monitoring Guide.

Figure 10 Data collection sheet for the determination of the construction costs of additional measures of packages of measures for new constructions

Special Case C: combination of approaches A and B

If neither the approach of case A nor of case B seems appropriate for the existing data cost information can be submitted using both data collection sheets NB 2-costs A-CEEC and NB 3-costs B-measures. Special case C is designed as a compromise and should only be applied if neither the approach of case A nor of case B can be consequently followed because appropriate cost information is not available. It is a pragmatic approach that aims at gathering as much cost information as possible in case that the information is not clearly structured or only incompletely available.

3.4 Advice for the determination of costs in case of refurbishment projects

Already existing buildings are renovated and modernized. Modernization measures are intended to adapt to new requirements and technical possibilities in contrast to measures that concentrate on the mere re-establishment of living conditions. Normally, renovation and modernization measures can be distinguished, if possible. In numerous cases modernization measures are realized in the context of renovation measures that have to be taken anyway.

Regarding type and extent of the determination of costs in case of refurbishment projects different cases are distinguished. For the assessment in CONCERTO either

Case A: determination of costs for the entire building according to CEEC

or

Case B: determination of costs for selected individual measures or packages of measures

or

(special Case C: combination of approaches A and B)

should be applied.

In the context of CONCERTO the analysis of the economic efficiency of measures is focused on the energetic modernization of existing buildings. The energetic modernization is intended to improve the thermal comfort, prevent and remove construction deficiencies and defects, save primary energy, not renewable as contribution to the protection of resources, reduce energy costs as well as reduce emissions as a contribution to the protection of the local and global environment.

During monitoring the task is to identify measures of energetic modernization, to separate them from the other renovation and modernization measures and to assign to them the resulting effects (benefits). Therefore, the objective of the gathering of cost data is to doubtlessly identify those costs that are directly connected to the measures for the improvement of the energetic quality. These are, inter alia:

- costs for measures for the energetic modernization of the building envelope, e.g. installation of a thermal insulation composite system or renewal of windows
- costs for measures for the modernization of the technical equipment, like e.g.

renewal of the heat generator or installation of systems for the use of renewable energy sources.

The costs for energetic modernization can either be determined as full or additional costs. The full cost approach is chosen if the energetic modernization measures are realized independently from renovation activities. In this case the full costs for the measures taken are assigned to the energetic modernization. Figure 11 illustrates this situation.

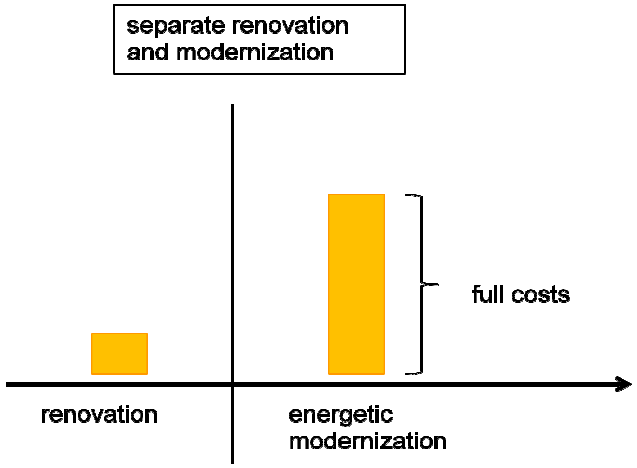


Figure 11 Full cost approach in case of modernization measures independent of renovation (Source: Illustration of the authors)

In case of an interlinking with a necessary renovation measure the full costs for the measures taken can be split into one part which is assigned to the renovation and the other which is assigned to the energetic modernization. The part which is assigned to the energetic modernization is called energy-related additional costs. In the context of CONCERTO the other part of the full costs is called "fictive costs for the renovation". Figure 12 gives an overview on full, additional and fictive renovation costs.

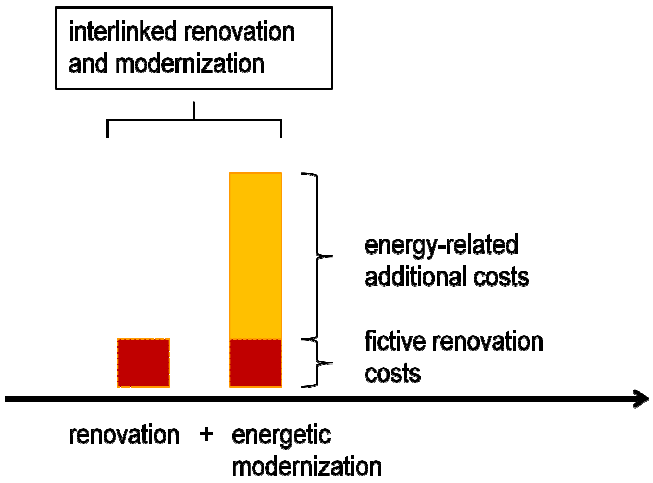


Figure 12 Additional cost approach in case of interlinked renovation and modernization measures (Source: Illustration of the authors)

(Example: If a thermal insulation composite system is installed costs for scaffolding, removal of the plaster, installation of the thermal insulation composite system, etc. are incurred. If the full cost approach is applied those costs are fully charged to the energetic modernization. If the installation of the thermal insulation composite system is interlinked with a renewal of the plaster which had to be done anyway the "fictive renovation costs" for scaffolding, the removal of the damaged plaster as well as the installation and coating of the new plaster can be subtracted from the full costs. The resulting costs are the energy-related additional costs.)

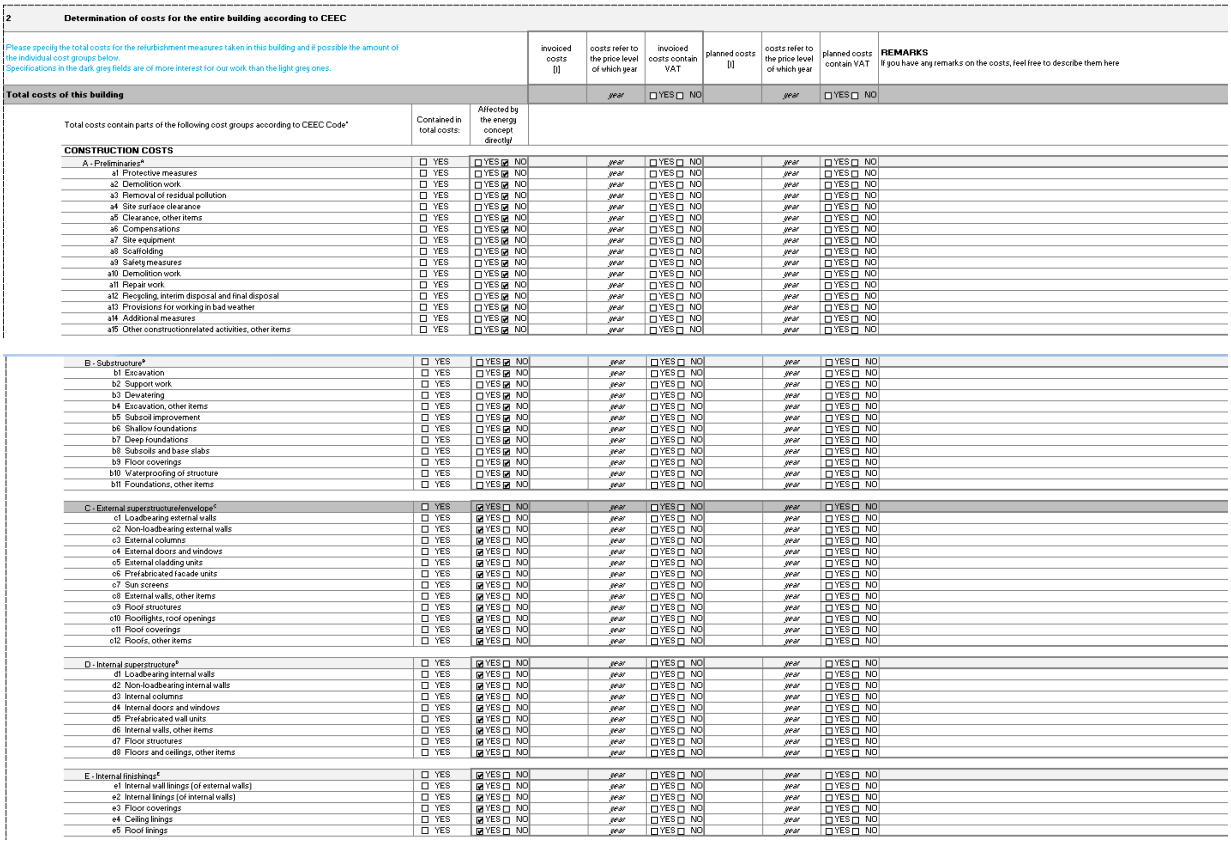
Additionally, it has to be clarified if and to what extent rents can be raised because of energetic modernizations.

Case A: determination of costs for the entire building according to CEEC

The determined measures (construction work) are assigned to the concerning cost groups of the CEEC analogous to the first approach for new constructions (new constructions case A). Annex B (RB 2-costs A-CEEC) contains a detailed survey of relevant cost groups in form of a data collection sheet. During the gathering of cost data the price level has to be documented exactly, i.e. for the determination of costs the time of the settlement of the costs has to be specified. Furthermore, it has to be stated whether the cost information contains VAT and the amount of VAT (VAT included with x%).

If the costs for the entire measures at the existing building are determined and described, the type and extent of the measures taken as well as the additionally incurred costs must be either specified quantitatively (partial costs) or at least qualitatively (ticking boxes). Especially it should be attempted to identify the type and extent of energy-efficiency related modernization measures.

Figure 13 introduces the respective data collection sheet. It is completely included in Annex B.

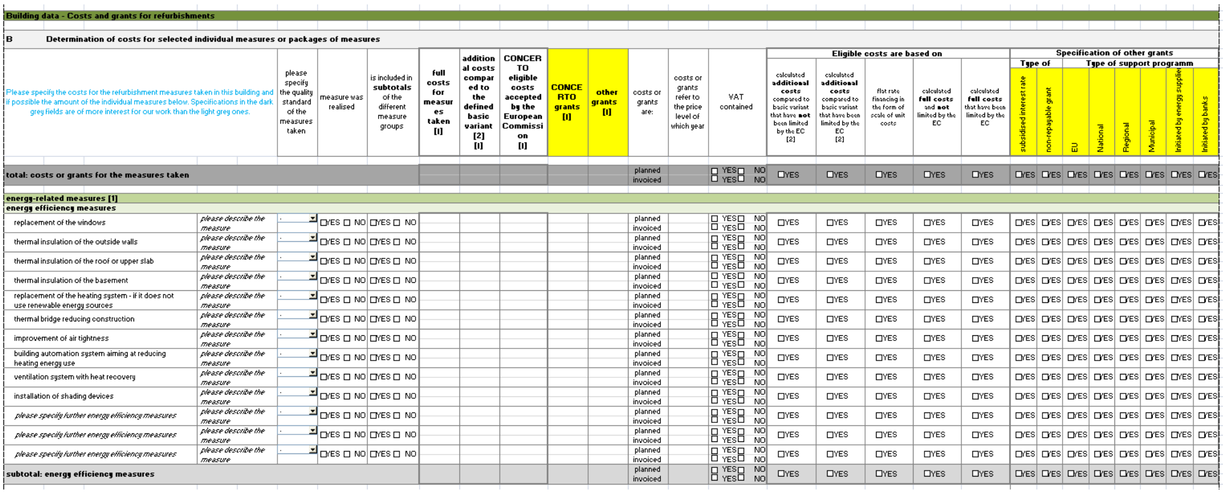


2	Determination of costs for the entire building according to CEEC									
Please specify the total costs for the refurbishment measures taken in this building and if possible the amount of the individual cost groups below. Specifications in the dark grey fields are of more interest for our work than the light grey ones.				invoiced costs [i]	costs refer to the price level of which year	invoiced costs contain VAT	planned costs [i]	costs refer to the price level of which year	planned costs contain VAT	REMARKS If you have any remarks on the costs, feel free to describe them here
Total costs of this building					year	☐ YES ☐ NO		year	☐ YES ☐ NO	
Total costs contain parts of the following cost groups according to CEEC Code*		Contained in total costs:	Affected by the energy concept directly!							
CONSTRUCTION COSTS										
A - Preliminaries*		☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	a1 Protective measures	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	a2 Demolition work	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	a3 Removal of residual pollution	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	a4 Site surface clearance	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	a5 Clearance, other items	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	a6 Compensations	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	a7 Site equipment	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	a8 Scaffolding	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	a9 Safety measures	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	a10 Demolition work	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	a11 Repair work	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	a12 Recycling, interim disposal and final disposal	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	a13 Provisions for working in bad weather	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	a14 Additional measures	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	a15 Other construction-related activities, other items	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
B - Substructure*		☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	b1 Excavation	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	b2 Support work	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	b3 Dewatering	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	b4 Excavation, other items	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	b5 Subsoil improvement	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	b6 Shallow foundations	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	b7 Deep foundations	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	b8 Subsoils and base slabs	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	b9 Floor coverings	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	b10 Waterproofing of structure	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	b11 Foundations, other items	☐ YES	☐ YES ☑ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
C - External superstructure/envelope*		☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	c1 Loadbearing external walls	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	c2 Non-loadbearing external walls	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	c3 External columns	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	c4 External doors and windows	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	c5 External cladding units	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	c6 Prefabricated facade units	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	c7 Sun screens	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	c8 External walls, other items	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	c9 Roof structures	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	c10 Rooflights, roof openings	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	c11 Roof coverings	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	c12 Roofs, other items	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
D - Internal superstructure*		☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	d1 Loadbearing internal walls	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	d2 Non-loadbearing internal walls	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	d3 Internal columns	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	d4 Internal doors and windows	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	d5 Prefabricated wall units	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	d6 Internal walls, other items	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	d7 Floor structures	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	d8 Floors and ceilings, other items	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
E - Internal finishings*		☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	e1 Internal wall linings (of external walls)	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	e2 Internal linings (of internal walls)	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	e3 Floor coverings	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	e4 Ceiling linings	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	
	e5 Roof linings	☐ YES	☑ YES ☐ NO		year	☐ YES ☐ NO		year	☐ YES ☐ NO	

Figure 13 Data collection sheet for the determination of costs for the entire building according to CEEC (section)

In addition to the cost information detailed information about grants are needed for the economic assessment. Therefore it is necessary to fill in parts of the data collection sheet RB 3-costs B-measures, too. Thereby it is sufficient to only fill in columns that are related to grants. Figure 14 shows the data collection sheet RB 3-costs-B-measures. Only the

highlighted columns must be considered.



Building data - Costs and grants for refurbishments																									
B	Determination of costs for selected individual measures or packages of measures																								
													Eligible costs are based on					Specification of other grants							
																		Type of		Type of support programm					
Please specify the costs for the refurbishment measures taken in this building and if possible the amount of the individual measures below. Specifications in the dark grey fields are of more interest for our work than the light grey ones.		please specify the quality standard of the measures taken	measure was realised	is included in subtotals of the different measure groups	full costs for measures taken [l]	additional costs compared to the defined basic variant [2] [l]	CONCERTO eligible costs accepted by the European Commission [l]	CONCERTO grants [l]	other grants [l]	costs or grants are:	costs or grants refer to the price level of which year	VAT contained	calculated **additional costs** compared to basic variant that have **not** been limited by the EC [2]	calculated **additional costs** compared to basic variant that have been limited by the EC [2]	flat rate financing in the form of scale of unit costs	calculated **full costs** and **not** limited by the EC	calculated **full costs** that have been limited by the EC	subsidised interest rate	non-repayable grant	EU	National	Regional	Municipal	Initiated by energy supplier	Initiated by banks
total: costs or grants for the measures taken										planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
energy-related measures [1]																									
energy efficiency measures																									
replacement of the windows	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
thermal insulation of the outside walls	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
thermal insulation of the roof or upper slab	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
thermal insulation of the basement	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
replacement of the heating system - if it does not use renewable energy sources	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
thermal bridge reducing construction	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
improvement of air tightness	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
building automation system aiming at reducing heating energy use	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
ventilation system with heat recovery	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
installation of shading devices	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
please specify further energy efficiency measures	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
please specify further energy efficiency measures	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
please specify further energy efficiency measures	*please describe the measure*	-	☐YES ☐ NO	☐YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES
subtotal: energy efficiency measures										planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES	☐YES

Figure 14 Data collection sheet for the determination of the construction costs of additional measures of packages of measures for new constructions

Assuring the comparability of the determined costs of different projects (e.g. of the object to be analysed or of the reference or basic object) it must be additionally mentioned which special characteristics, levels of difficulties or equipping standards are realized or which special equipping features are implemented, respectively. In Annex E a table is given which offers a description of characteristics and equipping standards of the building. It can be stated e.g. if a low, middle or high equipping standard of an individual characteristic is realized. In case of some special elements, like e.g. excavation, the distinction is made referring to the respective level of difficulty. Figure 15 and Figure 16 introduce the related data collection sheets. The sheet is completely included in Annex E.

Quality standard for building elements

CEEC cost group	Elements	please indicate if the building has a special quality standard	Qualitative description of the elements for comparability: indication refers to level of difficulty	indication refers to quality standard	low	medium	high	short description on the main characteristics, materials, realisation
Building construction								
b5 - b11	**Foundation**		YES		☐	☐	☐	
c1 - c8	**External walls**							
c1 - c3	**loadbearing, non-loadbearing external walls and columns**			YES	☐	☐	☐	
c4	External doors and windows			YES	☐	☐	☐	
c5	External cladding units	☐ YES ☐ NO		YES	☐	☐	☐	
c6	Prefabricated facade units	☐ YES ☐ NO		YES	☐	☐	☐	
c7	Sun screens	☐ YES ☐ NO		YES	☐	☐	☐	
c8	External walls, other items	☐ YES ☐ NO		YES	☐	☐	☐	
d1 - d7	**Internal walls**							
d1	Loadbearing internal walls			YES	☐	☐	☐	
d2	Non-loadbearing internal walls			YES	☐	☐	☐	
d3	Internal columns			YES	☐	☐	☐	
d4	Internal doors and windows			YES	☐	☐	☐	
d5	Prefabricated wall units	☐ YES ☐ NO		YES	☐	☐	☐	
d6	Internal walls, other items	☐ YES ☐ NO		YES	☐	☐	☐	
e3 - e7	**Ceilings**							
e3	Floor coverings				☐	☐	☐	
e4	Ceiling linings				☐	☐	☐	
c9 - c12	**Roofs**							
c9	Roof structures			YES	☐	☐	☐	
c10	Rooflights, roof openings	☐ YES ☐ NO		YES	☐	☐	☐	
c11	Roof coverings			YES	☐	☐	☐	
c12	Roofs, other items			YES	☐	☐	☐	
f1 - h3	**Fittings**							
h1	General-purpose fitments	☐ YES ☐ NO		YES	☐	☐	☐	
h2	Special-purpose fitments	☐ YES ☐ NO		YES	☐	☐	☐	
h3	Structural fitments, other items	☐ YES ☐ NO		YES	☐	☐	☐	
a7 - a15	**Other construction-related activities, other items**	☐ YES ☐ NO	YES		☐	☐	☐	

Figure 15 Data collection sheet for the description of levels of difficulty and equipping standards - Building Construction

Technical equipment

f1 - f6	**Sewage, water and gas supply systems**			YES	☐	☐	☐	
f7 - f10	**Heat supply systems**							
f7	Heat generators			YES	☐	☐	☐	
f8	Heat distribution networks			YES	☐	☐	☐	
f9	Space heating			YES	☐	☐	☐	
f10	Heat supply systems			YES	☐	☐	☐	
f11 - f16	**Air treatment systems**							
f11	Ventilation systems	☐ YES ☐ NO		YES	☐	☐	☐	
f12	Partial air conditioning systems	☐ YES ☐ NO		YES	☐	☐	☐	
f13	Air conditioning systems	☐ YES ☐ NO		YES	☐	☐	☐	
f14	Process air treatment systems	☐ YES ☐ NO		YES	☐	☐	☐	
f15	Refrigerating plant	☐ YES ☐ NO		YES	☐	☐	☐	
f16	Air treatment systems, other items	☐ YES ☐ NO		YES	☐	☐	☐	
f17 - f23	**High and medium voltage plant**							
f20	Low voltage installation equipment			YES	☐	☐	☐	
f24	Telecommunications systems			YES	☐	☐	☐	
f25 - f26	**Service installations**							
f25	Lifts	☐ YES ☐ NO		YES	☐	☐	☐	
f26	Escalators, moving pavements	☐ YES ☐ NO		YES	☐	☐	☐	
g12 - g20	**Function-related equipment and fitments**	☐ YES ☐ NO		YES	☐	☐	☐	
f25 - f29	**Building automation**	☐ YES ☐ NO	YES	YES	☐	☐	☐	
f30 - f38	**Other technical equipment**	☐ YES ☐ NO		YES	☐	☐	☐	

Figure 16 Data collection sheet for the description of levels of difficulty and equipping standards - Technical Equipment

Case B: determination of costs for selected individual measures or packages of measures

Costs for energy-efficiency related modernization measures or packages of measures are determined. Possibly, costs for deconstruction and disposal of building components and systems are added. It must be stated if the modernization measures are implemented in

the context of a renovation which had to be executed anyway or not. Depending on this fact it can be decided if a full or additional cost approach is applied. If the additional cost approach is applied the costs for deconstruction and disposal of removed building components and systems can be possibly assigned to the "fictive renovation costs".

Figure 17 shows the corresponding data collection sheet for the determination of construction costs for individual measures or packages of measures. The sheet is completely included in Annex D.

Building data - Costs and grants for refurbishments

1 Determination of costs for selected individual measures or packages of measures

Please specify the costs for the refurbishment measures taken in this building and if possible the amount of the individual measures below. Specifications in the dark grey fields are of more interest for our work than the light grey ones.		please specify the quality standard of the measures taken	measure was realised	is included in **subtotals** of the different measure groups	**full costs for measures taken [I]**	**additional costs compared to the defined basic variant**	**CONCERTO eligible costs accepted by the European Commissio**	**CONCERTO grants [I]**	**other grants [I]**	costs or grants are:	costs or grants refer to the price level of which year	VAT contained	**Eligible costs are based on** calculated **additional costs** compared to basic variant that have **not** been limited by the EC	calculated **additional costs** compared to basic variant that have been limited by the EC	flat rate financing in the form of scale of unit costs	calculated **full costs** and **not** limited by the EC	calculated **full costs** that have been limited by the EC
total: costs or grants for the measures taken										planned invoiced		☐ YES☐ NO ☐ YES☐ NO					
energy-related measures [1]																	
energy efficiency measures																	
replacement of the windows	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
thermal insulation of the outside walls	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
thermal insulation of the roof or upper slab	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
thermal insulation of the basement	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
replacement of the heating system - if it does not	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
thermal bridge reducing construction	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
improvement of air tightness	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
building automation system aiming at reducing	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
ventilation system with heat recovery	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
installation of shading devices	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further energy efficiency measures	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further energy efficiency measures	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further energy efficiency measures	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
subtotal: energy efficiency measures										planned invoiced		☐ YES☐ NO ☐ YES☐ NO					
building-integrated renewable energy measures																	
replacement of the heating system - if renewable	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further renewable energy measures	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further renewable energy measures	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further renewable energy measures	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
subtotal: renewable energy measures										planned invoiced		☐ YES☐ NO ☐ YES☐ NO					
non-energy-related measures																	
modifications in the layout and size of the flat	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO					
renewal of the roof covering	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO					
refurbishment of the bathrooms	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO					
drainage works	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO					
new render on the facade	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO					
please specify further refurbishment measures	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO					
please specify further refurbishment measures	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO					
please specify further refurbishment measures	*please describe the measure*	·	☐YES☐ NO	☐YES☐ NO						planned invoiced		☐ YES☐ NO ☐ YES☐ NO					
subtotal: non-energetic measures										planned invoiced		☐ YES☐ NO ☐ YES☐ NO					

If you have additional information on the development and the amount of the CONCERTO eligible costs, please specify it here:

[1] **Energy-related measures are all measures related to the energetic standard or improvement of the building** e.g. the installation of the boiler, windows or insulating the building. NOT part of the energy-related measures is e.g. a higher quality standard the bathrooms etc.

[2] **The full costs for the refurbishment measures taken can be split into a part assigned to the renovation and another part assigned to the energetic modernization. The part which can be assigned to the energetic modernization and exceeds the maintenance of the building is the energy-related additional costs.**
Example: If a thermal insulation is applied, besides the costs for the insulation, costs for scaffolding, removal of the render etc. ocur. In the full cost approach those costs are fully charged to the energetic modernization. If the thermal insulation is interlinked with a renewal of the render which had to be done anyway the costs for scaffolding, the removal of the damaged render as well as the application of the new render can be subtracted from the full costs. The resulting costs are the energy-efficiency related additional costs.

Figure 17 Data collection sheet for the determination of construction costs of additional measures or packages of measures for refurbishment

Special Case C: combination of approaches A and B

If neither the approach of case A nor of case B seems appropriate for the existing data cost information can be submitted using data collection sheets RB 2-costs A-CEEC and RB 3-costs-measures. Special case C is designed as a compromise and should only be applied if neither the approach of case A nor of case B can be consequently followed because appropriate cost information is not available. It is a pragmatic approach that aims at gathering as much cost information as possible in case that the information is not clearly structured or only incompletely available.

4. Determination of costs in use

4.1 Determination of energy costs

There are two methods for determining the energy costs:

- the consumption-based determination and calculation (method A)
- the determination based on bills (method B).

For the **consumption-based determination and calculation of energy costs** it must be possible to use the results of an adequate energy consumption monitoring (based on a metering concept). Thereby the energy consumptions must be determined separately both for each metering point and energy service and especially summarized for each energy carrier (e.g. domestic gas or electricity).

Depending on the metering concept in the building energy meters for properties, single buildings and parts of buildings or sub-meters for individual energy services (e.g. heating, water heating, lighting) must be evaluated.

For the subsequent calculation of energy costs tariffs of the energy suppliers must be available for the considered periods. Normally, tariffs consist of a base price (e.g. annually charged for each installation) and a demand charge (e.g. price per kWh). Since consumption data must be available anyway for the application of method A an adjustment for climatic and location-related conditions is possible.

Method A offers the possibility of generating further energy carrier-specific information, like e.g. direct or indirect CO_2-emissions or CO_2-emission equivalents. For the determination of those direct or indirect CO_2-emissions or CO_2-emission equivalents energy carrier-specific emission factors are needed.

The bills of the energy suppliers are the basis for **the determination of energy costs**

based on bills (method B). Normally, when using method B no information from an internal energy consumption monitoring is available. That is why an adjustment for climatic and location-related conditions is only possible if the consumption data is stated in the bills of the energy supplier. Figure 18 shows the interrelations.

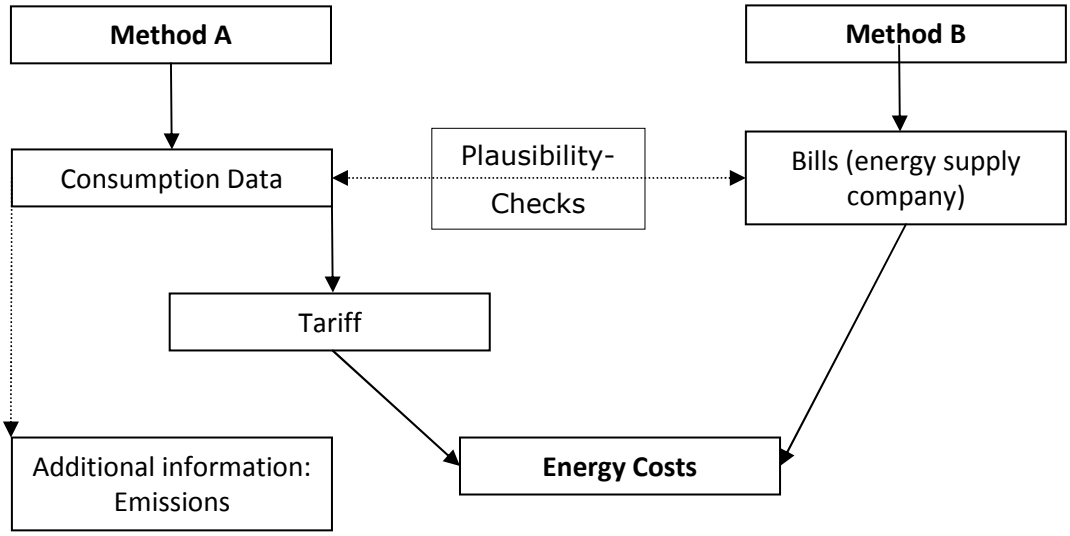


Figure 18 Methods for the determination and calculation of energy costs.

It is recommended to apply both methods and to report the corresponding figures. A plausibility check of the bills is then possible through internal metering.

Energy costs are subsumed under the cost group Q (Operation) according to CEEC. This cost group is assigned to the costs in use. For different energy carriers there should be, inter alia, the following sub-cost groups provided: costs for oil, gas, solid fuels, district heating or local heating, electricity.

When determining energy consumptions and/or energy costs it is necessary to ensure that the energy consumers are specified in detail in the data collection sheets so that the system boundaries are indicated clearly, examples:

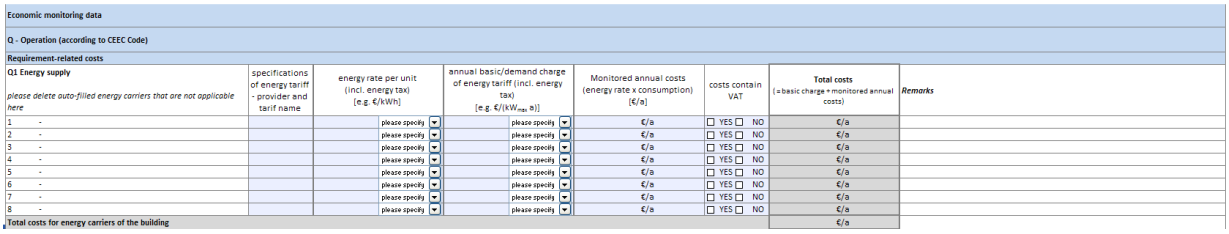
- heating energy consumption with energy for the domestic hot water supply
- heating energy consumption without energy for the domestic hot water supply
- electricity consumption only for common-area electricity (e.g. staircase illumination)

or

- electricity consumption in total including household appliances
- etc.

Figure 19 shows the corresponding part of the data collection sheet for the determination of energy costs. The data collection sheet that summarizes the relevant types of costs for energy is included in Annex F. In order to generate significant results the energy costs should be determined, if possible, for multiple periods (e.g. calendar years). **At least** three successional past periods based on the current period should be metered (at least stage II). The respective billing periods must be documented exactly. Furthermore, it must be stated if and how an adjustment for climatic and location-related conditions was calculated through relating the energy consumptions to an average climate condition at the specific location and possibly to an average location.

In case of refurbishment measures it is desirable that energy consumptions and energy costs are determined and stated before and after the energetic modernization. If possible there should also be information about energy consumptions so that the costs can be adjusted to a common price level.



Economic monitoring data							
Q - Operation (according to CEEC Code)							
Requirement-related costs							
Q1 Energy supply *please delete auto-filled energy carriers that are not applicable here*	specifications of energy tariff - provider and tarif name	energy rate per unit (incl. energy tax) [e.g. €/kWh]	annual basic/demand charge of energy tariff (incl. energy tax) [e.g. €/(kW$_{max}$ a)]	Monitored annual costs (energy rate x consumption) [€/a]	costs contain VAT	Total costs (= basic charge + monitored annual costs)	*Remarks*
1 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
2 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
3 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
4 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
5 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
6 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
7 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
8 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
Total costs for energy carriers of the building						€/a	

Figure 19 Data collection sheet for the determination of energy costs

4.2 Determination of costs for inspection and servicing

When analyzing servicing costs the costs for inspections are assigned to this type of cost as well. Inspection and servicing are intended for the control and upkeeping of the required or planned status of technical installations. In individual cases the costs for the operation of domestic technical installations arise as well. They are also determined in this context.

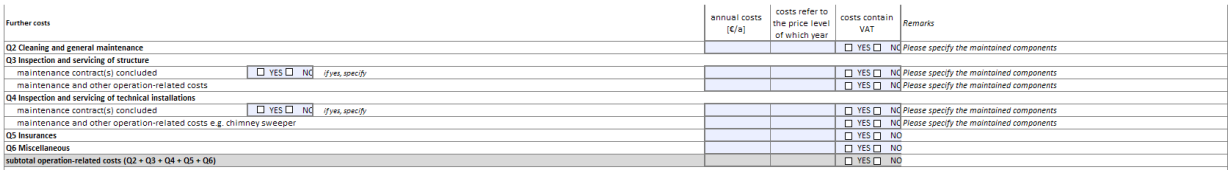
According to CEEC inspection, servicing and operation of domestic technical installations are assigned to operational costs (cost group Q). Those costs are incurred regularly on a yearly basis.

For the determination of the costs for inspection and servicing the analysis of invoiced costs is necessary. Alternatively, the analysis of service contracts is recommended. If there are no service contracts it should be examined whether it is possible to obtain offers from manufacturers. The exact scope of the services of the analyzed service contracts

should be examined, too. Often so-called service contracts only include inspection performances.

The costs for inspection and servicing can be determined as sum of the costs which arose during the year. In this case it has to be documented which building components and systems are included in the inspection and servicing. If possible the costs for inspection, servicing and operation should be directly assigned to the individual building components and systems.

Figure 20 shows the corresponding data collection sheet for the determination of energy costs. The data collection sheet that summarizes the relevant types of costs for energy is included in Annex F.



Further costs	annual costs [€/a]	costs refer to the price level of which year	costs contain VAT	Remarks
Q2 Cleaning and general maintenance			☐ YES ☐ NO	*Please specify the maintained components*
Q3 Inspection and servicing of structure				
maintenance contract(s) concluded ☐ YES ☐ NO *If yes, specify*			☐ YES ☐ NO	*Please specify the maintained components*
maintenance and other operation-related costs			☐ YES ☐ NO	*Please specify the maintained components*
Q4 Inspection and servicing of technical installations				
maintenance contract(s) concluded ☐ YES ☐ NO *If yes, specify*			☐ YES ☐ NO	*Please specify the maintained components*
maintenance and other operation-related costs e.g. chimney sweeper			☐ YES ☐ NO	*Please specify the maintained components*
Q5 Insurances			☐ YES ☐ NO	
Q6 Miscellaneous			☐ YES ☐ NO	
subtotal operation-related costs (Q2 + Q3 + Q4 + Q5 + Q6)			☐ YES ☐ NO	

Figure 20 Part of the data collection sheet for the determination of inspection and servicing costs

4.3 Determination of costs for maintenance and replacement investments

Maintenance is intended for the re-establishment of functionality which includes repairs. Normally, at the end of the planned service life replacement investments are necessary, which are also assigned to maintenance.

Maintenance costs are subsumed under the cost group costs in use according to CEEC. They form the separate cost group P (Maintenance).

For the determination of maintenance costs there are two possibilities:

- long-term analysis of maintenance costs according to bills (at least in the context of a long-term monitoring of stage III)
- analysis of full maintenance contracts.

The costs for maintenance and replacement investments can be determined as sum of the

costs which arose during the year. In this case it has to be documented which building components and systems are included in maintenance and replacement investments. If possible costs for maintenance and replacement investments should be directly assigned to the individual building components and systems. At least the technical service life of relevant building components and systems should be specified.

In practice, it is rather difficult to achieve a long-term analysis of maintenance costs. Experience shows that for new constructions maintenance costs are only incurred at the earliest after five years or that those costs are covered by guarantee and warranty obligations within this five-year period, respectively.

As an alternative strategy it is recommended to analyze full maintenance contracts or to obtain offers from manufactures if no full maintenance contracts have been concluded yet.

Full maintenance contracts normally include maintenance services and enable a transition of irregular maintenance costs into regular (yearly) payments. The exact scope of services of the analyzed full maintenance contracts should be examined. Contracts which are called full maintenance contracts can also include services like small spare parts to the point of replacement of complete components or plant components.

Figure 21 shows the corresponding part of the data collection sheet for the determination of energy costs. The data collection sheet that summarizes the relevant types of costs for energy is included in Annex F.

Further costs		annual costs [€/a]	costs refer to the price level of which year	costs contain VAT	Remarks
Q2 Cleaning and general maintenance				☐ YES ☐ NO	*Please specify the maintained components*
Q3 Inspection and servicing of structure					
maintenance contract(s) concluded	☐ YES ☐ NO *If yes, specify*			☐ YES ☐ NO	*Please specify the maintained components*
maintenance and other operation-related costs				☐ YES ☐ NO	*Please specify the maintained components*
Q4 Inspection and servicing of technical installations					
maintenance contract(s) concluded	☐ YES ☐ NO *If yes, specify*			☐ YES ☐ NO	*Please specify the maintained components*
maintenance and other operation-related costs e.g. chimney sweeper				☐ YES ☐ NO	*Please specify the maintained components*
Q5 Insurances				☐ YES ☐ NO	
Q6 Miscellaneous				☐ YES ☐ NO	
subtotal operation-related costs (Q2 + Q3 + Q4 + Q5 + Q6)				☐ YES ☐ NO	

Figure 21 Part of the data collection sheet for the determination of maintenance costs

5. Approach in case of groups of buildings and communities

The authors would like to point out, that this guide describes the approach in case of the determination of construction costs and costs in use for individual buildings. Analogously, the approach can also be applied in case of groups of buildings or it can be up-scaled to community level. For this an appropriate typology of buildings must be established and for each representative of a type the determination of construction costs and costs in use must be accomplished.

6. Concluding remark

Experiences from different research projects show that a systematic and significant analysis of construction costs and costs in use of energy-optimized buildings (and with this a contribution to the calculation of the life cycle costs of a building) is only possible if the advice given in this guide is followed consequently. Because of the increased future need for reliable data for planning and budgeting reasons in the facility management and for external reporting the authors recommend to integrate the described cost structure in the bookkeeping systems, i.e. to provide the existing chart of accounts with the needed cost groups.

List of Literature

DIN 18960:2008-02. (2008). Code DIN 18960:2008-02 User Costs of buildings.

DIN 276-1:2008-12. (2008). Code DIN 276-1:2008-12 Building Costs - Part 1 Building Construction.

European Committee of Construction Economists. (2008). *CEEC Code of Measurement for Cost Planning.*

ISO 15686-5:2008. (2008). ISO 15686-5:2008 Buildings and constructed assets - Service-life planning - Part 5: Life-cycle costing.

Annex A Data collection sheet for the determination of general data (ID: NB and RB 1-general data)

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Generation	CONCERTO Project Acronym	Country	City / Municipality	Area	ID	Date	Contact Person: data sheet	
					NB - C		Name	E-Mail
							Pre-filled by: (CP contact)	
							Name	E-Mail

Building data - NEW building

1 General building data

name of the building			
location - address or GPS coordinates			
demonstration activity scheme			
building is:			
number of (identical) buildings represented by this building in the CONCERTO area			
start date of construction works	month/year		
completion date of the building	month/year		
name of applied building code			
year of publication of applied building code	year		
this building refers to which reference building	id of reference building		
if this building is connected to the district heating or district cooling network, please specify the id/name of the network(s)			

Energy Performance Certificate

availability of an energy performance certificate for the building	☐ YES ☐ NO		
name of certificate			
main characteristics of the certificate			
energy performance indicator used in the certificate refers to			if *other*, please specify here
unit and value of indicator (including all relevant appliances for the certificate)	specify unit	value	
energy performance indicator used in the certificate contains the following appliances:			
☐ space heating	specify unit	value	
☐ domestic hot water production	specify unit	value	
☐ cooling	specify unit	value	
☐ ventilation			
☐ lighting	specify unit	value	
applicable threshold value according to the certificate	specify unit	value	

contracting information

Does a contracting agreement exist for this building?	☐ YES ☐ NO	*Remarks*

2 Building typology characteristics, dimensions and HTC

building type		
position to neighboring buildings		
basement type		
attic type		

occupants

number of apartments in the building - for residential building		
number of inhabitants of the whole building - for residential buildings		
number of occupants of the whole building - for non-residential buildings		

horizontal building surfaces

total gross floor area (external)	m²		
total heated net room area (internal)	m²		
total cooled net room area (internal)	m²		
rentable area	m²		*please give a definition of your rentable area - does it include construction space of walls, commonuse space, car park etc.?*
floor area according to local definition	m²		*please specify the local definition of floor area*

volumes

total gross building volume (external)	m³	
total net heated volume (internal)	m³	
total net cooled volume (internal)	m³	

heat transfer coefficients (HTC, u-value) of the building		HTC according to national requirements	HTC realised in this CONCERTO building	building envelope surfaces	
overall average HTC of the building envelope surfaces	W/(m²K)			m²	
average HTC roof	W/(m²K)			m²	
average HTC facade/external walls	W/(m²K)			m²	
average HTC ground floor	W/(m²K)			m²	
average HTC windows (frame and pane)	W/(m²K)			m²	
average energy transmittance of windows (g-value)	%			-	

3 Reference final energy demand of this building [1]

Please specify the final energy demand as reference for this building	heating		domestic hot water preparation		cooling		lighting and all other electricity [kWh/a]
	electricity [kWh/a]	non-electricity [kWh/a]	electricity [kWh/a]	non-electricity [kWh/a]	electricity [kWh/a]	non-electricity [kWh/a]	
calculated final energy demand data of reference building according to national regulation							
calculated final energy demand data of reference building according to CONCERTO regulations							

4 Applied energy services in this building

technology used to supply this building	energy carrier 1 (not auxiliary energy)		energy carrier 2 (not auxiliary energy)		is used for: heating	domestic hot water preparation	cooling	electricity generation
		if other, specify		*if other, specify*	☐	☐	☐	☐
		if other, specify		*if other, specify*	☐	☐	☐	☐
		if other, specify		*if other, specify*	☐	☐	☐	☐
		if other, specify		*if other, specify*	☐	☐	☐	☐
		if other, specify		*if other, specify*	☐	☐	☐	☐

If domestic gas is consumed in this building for **cooking**, is it included in the total domestic gas consumption specified in the monitoring section? ☐ YES ☐ NO

energy storage

Is a storage for heating energy, cooling energy, domestic hot water or electricity used in this building?				
	☐ thermal	*specify capacity*		Remarks
	☐ space heating	*specify capacity*		Remarks
	☐ DHW	*specify capacity*		Remarks
	☐ cooling	*specify capacity*		Remarks
	☐ electrical	*specify capacity*		Remarks

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5 Characterisation of applied building features

	Please specify if the following building features were used in this building	Please specify which components are included in the ELIGIBLE COSTS	Remarks
improved thermal insulation			
improved thermal insulation of the roof	☐ YES	☐ YES	
improved thermal insulation of the facade/external walls	☐ YES	☐ YES	
improved thermal insulation of the floor to unheated ground/cellar etc.	☐ YES	☐ YES	
improved thermal insulation of the windows (frame and pane)	☐ YES	☐ YES	*specify*
other - please specify	☐ YES	☐ YES	
other - please specify	☐ YES	☐ YES	
thermal bridges			
thermal bridge reducing construction	☐ YES	☐ YES	
special treatment of thermal bridges	☐ YES	☐ YES	
other - please specify	☐ YES	☐ YES	
other - please specify	☐ YES	☐ YES	
improvement of air tightness			
blower door test realised	☐ YES	☐ YES	
n50 air change rate	h^{-1}		
heat recovery of ventilation system	☐ YES	☐ YES	
other - please specify	☐ YES	☐ YES	
other - please specify	☐ YES	☐ YES	
building materials			
use of Phase Change Materials (PCM)	☐ YES	☐ YES	
use of Vacuum Isolation Panels (VIP)	☐ YES	☐ YES	
use of transparent insulation technology	☐ YES	☐ YES	
use of renewable building materials	☐ YES	☐ YES	
use of thermal activation of building elements	☐ YES	☐ YES	
other - please specify	☐ YES	☐ YES	
other - please specify	☐ YES	☐ YES	
energy saving measures			
optimized lighting / daylight systems	☐ YES	☐ YES	
passive cooling concept	☐ YES	☐ YES	
use of low energy appliances	☐ YES	☐ YES	
measures aiming at reducing electricity use	☐ YES	☐ YES	
reduction of distribution losses	☐ YES	☐ YES	
use of a building automation system aiming at reducing heating energy use	☐ YES	☐ YES	
other - please specify	☐ YES	☐ YES	
other - please specify	☐ YES	☐ YES	
shading			
availability of external shading device	☐ YES	☐ YES	
type of shading device			
control of shading device			
other - please specify	☐ YES	☐ YES	
other - please specify	☐ YES	☐ YES	
ventilation			
mechanical ventilation with heat recovery	☐ YES	☐ YES	
average mechanical ventilation rate	h^{-1}		
other - please specify	☐ YES	☐ YES	
other - please specify	☐ YES	☐ YES	
other			
use of user feedback system	☐ YES	☐ YES	
use of soft awareness measures	☐ YES	☐ YES	
special quality control strategy	☐ YES	☐ YES	
special contract and tendering models	☐ YES	☐ YES	
special financing models (PPP, Leasing etc.)	☐ YES	☐ YES	
other - please specify	☐ YES	☐ YES	
other - please specify	☐ YES	☐ YES	

Please give a description of the monitoring strategy: ☐ metering in detail or ☐ only delivered energy figures

General comments:

What is the temporal resolution of the available data? Since when are consumption data available?

What are the technical components of the monitoring system and where are the monitoring data points in the system?

[1] Final energy demand of the reference building that was used as a baseline for calculating energy demand reductions and or emission reductions.

Generation	CONCERTO Project Acronym	Country	City / Municipality	Area	ID	Date	Contact Person: data sheet	
					RB		*Name*	*E-Mail*
							Pre-filled by: (CP contact)	
							Name	*E-Mail*

Building data - REFURBISHMENT

1	**General data**					
	name of the building					
	location - address or GPS coordinates					
	demonstration activity scheme					
	this building is:					
	number of (identical) buildings represented by this building in the CONCERTO area					
	year of latest refurbishment before CONCERTO refurbishment measures for					
	ROOF	*year*				
	EXTERIOR WALLS	*year*				
	FLOOR TO UNHEATED AREA	*year*				
	WINDOWS	*year*				
	HEATING/COOLING SYSTEM	*year*				
	year of construction	*year*				
	completion date of CONCERTO refurbishment measures	*month/year*				
	name of applied building code for the refurbishment					
	year of publication of applied building code	*year*				
	if this building is connected to the district heating or district cooling network, please specify the id/name of the network(s)	*id/name of district heating and/or district cooling network*				
Energy Performance Certificate						
	availability of an energy performance certificate for the building	☐ YES ☐ NO				
	name of certificate					
	main characteristics of the certificate	-				
		-				
	energy performance indicator used in the certificate refers to	-		if *other* , please specify here		
	unit and value of indicator (including all relevant appliances for the certificate)	*specify unit*	*value*			
	energy performance indicator used in the certificate contains the following appliances:	after CONCERTO refurbishment				
	☐ space heating	*specify unit*	*value*			
	☐ domestic hot water production	*specify unit*	*value*			
	☐ cooling	*specify unit*	*value*			
	☐ ventilation					
	☐ lighting	*specify unit*	*value*			
	applicable threshold value according to the certificate	*specify unit*	*value*			
real estate value		before CONCERTO refurbishment		after CONCERTO refurbishment		
	did you do valuation survey of the building	☐ YES ☐ NO		☐ YES ☐ NO	*Remarks*	
contracting		before CONCERTO refurbishment		after CONCERTO refurbishment		
	Did / does a contracting agreement exist for this building?	☐ YES ☐ NO		☐ YES ☐ NO	*Remarks*	
2	**Building typology characteristics, dimensions and HTC**					
	building condition	-				
	building type	municipal				
		before CONCERTO refurbishment		after CONCERTO refurbishment		
	position to neighboring buildings	-				
	basement type	-		-		
	attic type	-		-		
occupants		before CONCERTO refurbishment		after CONCERTO refurbishment		
	number of apartments in the building - for residential building					
	number of inhabitants of the whole building - for residential buildings					
	number of occupants of the whole building - for non-residential buildings					

horizontal building surfaces		before CONCERTO refurbishment	after CONCERTO refurbishment		
	total gross floor area (external)	m²			
	total heated net room area (internal)	m²			
	total cooled net room area (internal)	m²			
	rentable area	m²			*please give a definition of your rentable area*
	floor area according to local definition	m²			*please specify the local definition of floor area*
volumes					
	total gross building volume (external)	m³			
	total net heated volume (internal)	m³			
	total net cooled volume (internal)	m³			
building envelope surfaces					
	roof	m²			
	exterior walls	m²			
	ground floor	m²			
	windows (frame and pane)	m²			
	total envelope surface of the building [1]	m²			
	heat transfer surface of the building [2]	m²			

heat transfer coefficients (HTC, u-value) of the building		HTC before CONCERTO refurbishment	HTC according to national requirements for new construction	HTC after CONCERTO refurbishment	
	overall average HTC of the building envelope surfaces	W/(m²K)			
	average HTC roof	W/(m²K)			
	average HTC exterior walls	W/(m²K)			
	average HTC ground floor	W/(m²K)			
	average HTC windows (frame and pane)	W/(m²K)			
	average energy transmittance of windows (g-value)	%			

3	**Reference final energy demand of this building [1]**						
Please specify the final energy demand as reference for this building	**heating**		**domestic hot water preparation**		**cooling**		**lighting and all other electricity** [kWh/a]
	electricity [kWh/a]	non-electricity [kWh/a]	electricity [kWh/a]	non-electricity [kWh/a]	electricity [kWh/a]	non-electricity [kWh/a]	
calculated final energy demand data **BEFORE** the refurbishment							
calculated final energy demand data of reference building **AFTER** the refurbishment according to CONCERTO regulations							
calculated energy demand according to national regulations for new construction							

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4 Applied energy services in this building

technology used **BEFORE** the CONCERTO refurbishment	energy carrier 1 (not auxiliary energy)	energy carrier 2 (not auxiliary energy)	is used for: heating	domestic hot water	cooling	electricity generation
-	- / *if other, specify*	- / *if other, specify*	☐	☐	☐	☐
-	- / *if other, specify*	- / *if other, specify*	☐	☐	☐	☐
-	- / *if other, specify*	- / *if other, specify*	☐	☐	☐	☐
-	- / *if other, specify*	- / *if other, specify*	☐	☐	☐	☐

if domestic gas was consumed for **cooking before the refurbishment**, is it included in the total domestic gas consumption specified in the monitoring section? ☐ YES ☐ NO

energy storage

Was a storage for heating energy, cooling energy, domestic hot water or electricity used in this building BEFORE the CONCERTO refurbishment?

☐ thermal	*specify capacity*	*Remarks*
☐ space heating	*specify capacity*	*Remarks*
☐ DHW	*specify capacity*	*Remarks*
☐ cooling	*specify capacity*	*Remarks*
☐ electrical	*specify capacity*	*Remarks*

technology used **AFTER** the CONCERTO refurbishment	energy carrier 1 (not auxiliary energy)	energy carrier 2 (not auxiliary energy)	is used for: heating	domestic hot water	cooling	electricity generation
-	- / *if other, specify*	- / *if other, specify*	☐	☐	☐	☐
-	- / *if other, specify*	- / *if other, specify*	☐	☐	☐	☐
-	- / *if other, specify*	- / *if other, specify*	☐	☐	☐	☐
-	- / *if other, specify*	- / *if other, specify*	☐	☐	☐	☐

if domestic gas was consumed for **cooking after the refurbishment**, is it included in the total domestic gas consumption specified in the monitoring section? ☐ YES ☐ NO

energy storage

Is a storage for heating energy, cooling energy, domestic hot water or electricity used in this building AFTER the CONCERTO refurbishment?

☐ thermal	*specify capacity*	*Remarks*
☐ space heating	*specify capacity*	*Remarks*
☐ DHW	*specify capacity*	*Remarks*
☐ cooling	*specify capacity*	*Remarks*
☐ electrical	*specify capacity*	*Remarks*

5 Characterisation of applied building features

Please specify if the building features and measures that were/are used	features before CONCERTO refurbishment		measures of the CONCERTO refurbishment or features after the CONCERTO refurbishment	
thermal bridges				
thermal bridge reducing construction	☐ YES	remarks	☐ YES	remarks
special treatment of thermal bridges	☐ YES	remarks	☐ YES	remarks
other - please specify	☐ YES	remarks	☐ YES	remarks
other - please specify	☐ YES	remarks	☐ YES	remarks
improvement of air tightness				
blower door test realised	☐ YES	remarks	☐ YES	remarks
n50 air change rate	h^{-1}		h^{-1}	
heat recovery of ventilation system	☐ YES	remarks	☐ YES	remarks
other - please specify	☐ YES	remarks	☐ YES	remarks
other - please specify	☐ YES	remarks	☐ YES	remarks
building materials				
use of Phase Change Materials (PCM)	☐ YES	remarks	☐ YES	remarks
use of Vacuum Isolation Panels (VIP)	☐ YES	remarks	☐ YES	remarks
use of transparent insulation technology	☐ YES	remarks	☐ YES	remarks
use of renewable building materials	☐ YES	remarks	☐ YES	remarks
use of thermal activation of building elements	☐ YES	remarks	☐ YES	remarks
other - please specify	☐ YES	remarks	☐ YES	remarks
other - please specify	☐ YES	remarks	☐ YES	remarks
energy saving measures				
insulation	☐ YES	remarks	☐ YES	remarks
thermal insulation of outside walls	☐ YES	remarks	☐ YES	remarks
thermal insulation of roof or upper slab	☐ YES	remarks	☐ YES	remarks
thermal insulation of basement	☐ YES	remarks	☐ YES	remarks
replacement of windows			☐ YES	remarks
replacement of the heating system			☐ YES	remarks
replacement of the direct electrical heating system			☐ YES	remarks
optimized lighting / daylight systems	☐ YES	remarks	☐ YES	remarks
passive cooling concept	☐ YES	remarks	☐ YES	remarks
use of low energy appliances	☐ YES	remarks	☐ YES	remarks
measures aiming at reducing electricity use	☐ YES	remarks	☐ YES	remarks
reduction of distribution losses	☐ YES	remarks	☐ YES	remarks
use of a building automation system aiming at reducing heating ene	☐ YES	remarks	☐ YES	remarks
other - please specify	☐ YES	remarks	☐ YES	remarks
other - please specify	☐ YES	remarks	☐ YES	remarks
shading				
availability of external shading device	☐ YES	remarks	☐ YES	remarks
type of shading device				
control of shading device				
other - please specify	☐ YES	remarks	☐ YES	remarks
other - please specify	☐ YES	remarks	☐ YES	remarks
ventilation				
mechanical ventilation with heat recovery	☐ YES	remarks	☐ YES	remarks
average mechanical ventilation rate	h^{-1}		h^{-1}	
other - please specify	☐ YES	remarks	☐ YES	remarks
other - please specify	☐ YES	remarks	☐ YES	remarks
general refurbishment measures				
modifications in the layout and size of the flat			☐ YES	remarks
renewal of the roof covering			☐ YES	remarks
refurbishment of the bathrooms			☐ YES	remarks
drainage works			☐ YES	remarks
new render			☐ YES	remarks
other - please specify	☐ YES	remarks	☐ YES	remarks
other - please specify	☐ YES	remarks	☐ YES	remarks
other				
use of user feed back system	☐ YES	remarks	☐ YES	remarks
use of soft awareness measures	☐ YES	remarks	☐ YES	remarks
special quality control strategy	☐ YES	remarks	☐ YES	remarks
special contract and tendering models	☐ YES	remarks	☐ YES	remarks
special financing models (PPP, Leasing etc.)	☐ YES	remarks	☐ YES	remarks
other - please specify	☐ YES	remarks	☐ YES	remarks
other - please specify	☐ YES	remarks	☐ YES	remarks

Please give a description of the monitoring strategy: ☐ metering in detail or ☐ only delivered energy figures

Are energy bills available for this building: before the refurbishment ☐ YES ☐ NO *if yes, please specify the type of bills*; after the refurbishment ☐ YES ☐ NO *if yes, please specify the type of bills*

General comments:

What is the temporal resolution of the available data? Since when are consumption data available?

What are the technical components of the monitoring system and where are the monitoring data points in the system?

[1] Final energy demand of the reference building that was used as a baseline for calculating energy demand reductions and or emission reductions.

Annex B Data collection sheet for the determination of construction costs according to CEEC (ID: NB und RB 2-costs A-CEEC)

CONCERTO is co-funded by the European Commission under the Research Framework Programme

Generation	CONCERTO Project Acronym	Country	City / Municipality	Area	ID	Date
					NB - C	

Contact Person: data sheet

Name	E-Mail

Pre-filled by: (CP contact)

Name	E-Mail

Building data - Costs and grants for new buildings

A Determination of costs for the entire building according to CEEC

Please specify the total costs of this building and if possible the amount of the individual cost groups below.
Specifications in the dark grey fields are of more interest for our work than the light grey ones.

			invoiced costs [€]	costs refer to the price level of which year	invoiced costs contain VAT	planned costs [€]	costs refer to the price level of which year	planned costs contain VAT	REMARKS If you have any remarks on the costs, feel free to describe them here
Total costs of this building				*year*	☐YES ☐NO		*year*	☐YES ☐NO	
Total costs contain parts of the following cost groups according to CEEC Code*	Contained in total costs:	Affected by the energy concept directly/ indirectly							
CONSTRUCTION COSTS									
A - Preliminaries[A]	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
a1 Protective measures	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
a2 Demolition work	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
a3 Removal of residual pollution	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
a4 Site surface clearance	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
a5 Clearance, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
a6 Compensations	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
a7 Site equipment	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
a8 Scaffolding	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
a9 Safety measures	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
a10 Demolition work	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
a11 Repair work	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
a12 Recycling, interim disposal and final disposal	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
a13 Provisions for working in bad weather	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
a14 Additional measures	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
a15 Other constructionrelated activities, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
B - Substructure[B]	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
b1 Excavation	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
b2 Support work	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
b3 Dewatering	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
b4 Excavation, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
b5 Subsoil improvement	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
b6 Shallow foundations	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
b7 Deep foundations	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
b8 Subsoils and base slabs	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
b9 Floor coverings	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
b10 Waterproofing of structure	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
b11 Foundations, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
C - External superstructure/envelope[C]	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
c1 Loadbearing external walls	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
c2 Non-loadbearing external walls	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
c3 External columns	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
c4 External doors and windows	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
c5 External cladding units	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
c6 Prefabricated facade units	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
c7 Sun screens	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
c8 External walls, other items	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
c9 Roof structures	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
c10 Rooflights, roof openings	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
c11 Roof coverings	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
c12 Roofs, other items	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
D - Internal superstructure[D]	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
d1 Loadbearing internal walls	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
d2 Non-loadbearing internal walls	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
d3 Internal columns	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
d4 Internal doors and windows	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
d5 Prefabricated wall units	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
d6 Internal walls, other items	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
d7 Floor structures	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	
d8 Floors and ceilings, other items	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO	

E - Internal finishings[E]	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
e1 Internal wall linings (of external walls)	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
e2 Internal linings (of internal walls)	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
e3 Floor coverings	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
e4 Ceiling linings	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
e5 Roof linings	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
F - Services installations[F]	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f1 Drainage	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f2 Sewerage systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f3 Water supply systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f4 Gas supply systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f5 Fire-fighting installations	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f6 Sewerage, water, and gas systems, other items	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f7 Heat generators	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f8 Heat distribution networks	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f9 Space heating	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f10 Heat supply systems, other items	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f11 Ventilation systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f12 Partial air conditioning systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f13 Air conditioning systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f14 Process air treatment systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f15 Refrigerating plant	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f16 Air treatment systems, other items	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f17 High and medium voltage plant	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f18 Independent power supply installations	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f19 Low voltage switch gear	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f20 Low voltage installation equipment	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f21 Lighting systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f22 Lightning protection and earthing systems	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f23 Power installations, other items	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f24 Telecommunications systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f25 Lifts	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f26 Escalators, moving pavements	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f27 Automated systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f28 Power components	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f29 Central facilities	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f30 Building automation, other items	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f31 Site equipment	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f32 Scaffolding	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f33 Safety measures	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f34 Demolition work	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f35 Repair work	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f36 Recycling, interim disposal and final disposal	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f37 Provisions for working in bad weather	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f38 Additional measures	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
f39 Other services-related measures, other items	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
G - Special equipment[G]	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g1 Search and signalling equipment	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g2 Time metering systems	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g3 Electroacoustic equipment	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g4 Television and aerial systems	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g5 Security systems	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g6 Transmission networks	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g7 Telecommunications and other communications systems, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g8 Inspection and maintenance conveyors	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g9 Conveying plant	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g10 Cranes	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g11 Transport systems, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g12 Kitchen fitments	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g13 Laundry and dry cleaning equipment	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g14 Media supply systems	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g15 Medical apparatus	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g16 Laboratory equipment	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g17 Swimming baths equipment	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g18 Refrigerating plant	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g19 Disposal facilities	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
g20 Function-related equipment and fitments, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
H - Furniture and fitting[H]	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
h1 General-purpose fitments	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
h2 Special-purpose fitments	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
h3 Structural fitments, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
h4 General furnishings	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
h5 Special furnishings	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		
h6 Furnishings, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO		

h7 Works of art	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
h8 Ornamental features	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
I - Site and external works[j]	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i1 Drainage and sewerage systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i2 Water supply	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i3 Gas supply	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i4 District heating supply	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i4a connection costs to the **district heating/cooling network or gas grid**	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i4b contribution towards **district heating/ cooling network** or gas grid costs	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
is the transfer station for the district heating/cooling included in the costs	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i5 Electricity supply	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i6 Telecommunications	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i7 Traffic installations	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i8 Public development, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i9 Private development	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i10 Preparation of ground surfaces	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i11 Preparation of soil for planting	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i12 Soil stabilization	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i13 Planting	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i14 Lawns	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i15 Grassing over buried structures	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i16 Water areas	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i17 Ground surfaces, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i18 Paths	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i19 Roads	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i20 Squares, courtyards	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i21 Parking spaces	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i22 Sports grounds	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i23 Playgrounds	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i24 Track systems	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i25 Hard surfaces, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i26 Enclosures	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i27 Protective structures	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i28 Walling	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i29 Ramps, stairs, stands	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i30 Roof coverings	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i31 Bridges, footbridges	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i32 Conduit and shaft systems	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i33 Hydraulic installations	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i34 Outdoor construction works, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i35 Sewerage systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i36 Water supply systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i37 Gas supply systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i38 Heat supply systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i39 Air treatment systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i40 Power installations	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i41 Transmission networks	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i42 Function-related equipment and fitments	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i43 External services, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i44 General-purpose fitments	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i45 Special-purpose fitments	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i46 External fitments, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i47 Site equipment	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i48 Scaffolding	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i49 Safety measures	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i50 Demolition work	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i51 Repair work	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i52 Recycling, interim disposal and final disposal	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i53 Provisions for working in bad weather	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i53 Additional measures	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
i54 Other external works measures, other items	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
J - Construction contingencies[j]	☐ YES	☐YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
DESIGN AND INCIDENTAL COSTS								
L - Design Team Fees[j]	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
l1 Project administration	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
l2 Project management	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
l3 Buildings	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
l4 Open areas	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
l5 Configuration of interiors	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
l6 Civil engineering works and traffic systems	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
l7 Planning of loadbearing frame	☐ YES	☐YES ☑NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
l8 Supply and disposal systems	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
l9 Services of architects and engineers, other items	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
l10 Thermal physics of structures	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO
l11 Noise control and acoustics	☐ YES	☑YES ☐NO		*year*	☐YES ☐NO		*year*	☐YES ☐NO

I12 Soil mechanics, earth-moving and foundation engineering	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
I13 Surveying	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
I14 Lighting and daylight engineering	☐ YES	☑YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
I15 Assessments and consultations, other items	☐ YES	☑YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
M - Ancillary costs and charges[M]	☐ YES	☑YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m1 Operational and organizational consultation services	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m2 Client's responsibilities, other items	☐ YES	☐YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m3 Investigations	☐ YES	☐YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m4 Valuations	☐ YES	☐YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m5 Urban development services	☐ YES	☐YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m6 Landscape planning	☐ YES	☐YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m7 Competitions	☐ YES	☑YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m8 Preliminary project planning, other items	☐ YES	☑YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m9 Art competitions	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m10 Fees	☐ YES	☑YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m11 Art, other items	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m12 Tests, approvals, acceptance inspections	☐ YES	☑YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m13 Site management costs	☐ YES	☑YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m14 Sample costs	☐ YES	☑YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m15 Running costs during construction period	☐ YES	☑YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m16 General incidental building costs, other items	☐ YES	☑YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
m17 Other incidental building costs	☐ YES	☑YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
N - Project budget contingencies[N]	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
LAND AND FINANCE												
U - Land costs[U]	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
Surveying charges	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
Court fees	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
Notary's fees	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
Estate agent's commissions	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
Valuations and site inspections	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
Licence fees	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
Soil regulation and boundary settlement	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
Incidental site costs, other items	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
Compensations	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
Redemption for real rights	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
Disencumbrance, other items	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
V - Finance[V]	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
Financing costs	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
Interest prior to commissioning of structure	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
Financing costs, other items	☐ YES	☐YES	☑NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
X - Taxes on land[X]	☐ YES	☐YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	
Property transfer tax	☐ YES	☐YES	☐NO		*year*	☐YES	☐NO		*year*	☐YES	☐NO	

* Categorisation according to the CEEC Code of Measurement for Cost Planning Version 1.2: January 2008

A	General site installations, preliminaries and temporary works which is not incorporated in the appropriate Cost Groups including cranes, temporary site accomodation, scaffolding, measuring, setting out, drying out, cleaning work, site security, temporary enclosures, contractors' on site management and contractors' risk.
B	All building work up to the structural upper surface of the lowest floor slab including basement excavation and filling, pumping, supports to sides of excavation, foundations, walls below lowest floor slab, excluding drainage (see cost groups F and I).
C	All external building work above the substructure including roofs (together with associated beams, balustrades and the like), external walls (together with associated columns and beams), external windows (with external sun protection), external doors and external finishes but excluding internal finishes. Where the costs of suspended or cantilevered balconies, or frames members to external structures cannot be identified separately they should be included in group D).
D	All remaining superstructure including suspended floors and balconies (together with any associated columns and beams, topping concrete and the like), stairs, internal walls and partitions, internal columns and beams, internal windows and doors, internal screens, balustrades and handrails but excluding internal finishes. Where the costs of suspended or cantilevered balconies, or frame members to external structures cannot be identified separately they should be included here.
E	Internal floor, wall and ceiling finishes including screeds, raised floors, internal panelling and cladding, suspended ceilings, decoration and finishes to balconies.
F	Mechanical, electrical and public health installations including heating, ventilation and sanitary installations, lifts, power, lighting, energy production systems, telecommunication installations, fire and security systems, building management systems and the appropriate control systems and commisioning.
G	Special mechanical and electrical equipment in relation to the use of the building including fixed and mobile equipment, IT-Systems, production installations, professional kitchen equipment, cold stores and refrigeration, and the appropriate commissioning.
H	Fixed and mobile furniture and fittings including cupboards, gymnasium equipment, signage, curtains, loose carpets, consumable stores and artwork.
I	General Building work to site outside of buildings including site preparation, demolitions, external services supplies, drainage, external lighting, paving, gardening, fencing and minor buildings or civil engineering works.
J	The total of any general provision for construction contingencies:
K	Value added tax and any other taxes on construction costs.
L	Fees for consultants to the client including those for architect, structural, mechanical and electrical engineers, construction economists, quantity surveyors, town and country planners, surveyors, site managers, contract managers, planning supervision (health and safety) and specialist planners, but excluding the costs of documentation, copies of drawings etc. and excluding legal fees (cost group M)
M	General incidental costs to the client including the costs of models, documentation, copies of drawings etc., laying of foundation stone, topping out, inaugeration, competitions, permits, planning charges, connection charges for utilities, insurances, third party compensation, client's involvement, legal fees in association with construction, compensation payments due to statuary requirements.
N	Contingency allowances included in the budget for risk items such as inflation (excluding contractors inflation risk), client changes and the like.
O	Value added tax and any other taxes on design and incidental costs.

U	Cost of land including all cost assosiated with the aquisition, purchase or lease of the site and legal fees.
V	The cost to the Client of finance including interest on loans, capital and site lease, bank charges and mortgage costs.
W	Any financial grants and contributions payable to the project.
X	All taxes in association with Land and finance

Annex C Data collection sheet for the determination of construction costs for individual measures or packages of measures in case of new construction (ID: NB 3-costs B-measures)

CONCERTO is co-funded by the European Commission under the Research Framework Programme

Generation	CONCERTO Project Acronym	Country	City / Municipa Area	ID	Date
				NB - C	

Contact Person: data sheet	
Name	*E-Mail*
Pre-filled by: (CP contact)	
Name	*E-Mail*

Building data - Costs and grants for new buildings

B Determination of costs for selected individual measures or packages of measures

Please specify the costs for the measures taken in this building and if possible the amount of the individual measures below. Specifications in the dark grey fields are of more interest for our work than the light grey ones.		please specify the quality standard of the measures taken	measure was realised	is included in **subtotals** of the different measure groups	**full costs for measures taken [€]**	**additional costs compared to the defined basic variant [2] [€]**	**CONCERTO eligible costs accepted by the European Commission [€]**	**CONCERTO grants [€]**	**other grants [€]**	costs or grants are:	costs or grants refer to the price level of which year	VAT contained	**Eligible costs are based on**					**Specification of other grants**							
																		Type of grant		**Type of support programm**					
													calculated **additional costs** compared to basic variant that have **not** been limited by the EC [2]	calculated **additional costs** compared to basic variant that have been limited by the EC [2]	flat rate financing in the form of scale of unit costs	calculated **full costs** and **not** limited by the EC	calculated **full costs** that have been limited by the EC	subsidised interest rate	non-repayable grant	EU	National	Regional	Municipal	Initiated by energy supplier	Initiated by banks
total: costs or grants for the measures taken										planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
energy-related measures [1]																									
energy efficiency measures																									
windows	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
thermal insulation of the outside walls	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
thermal insulation of the roof or upper slab	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
thermal insulation of the basement	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
heating system - if it does not use renewable energy sources	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
thermal bridge reducing construction	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
improvement of air tightness	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
building automation system aiming at reducing heating energy use	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
ventilation system with heat recovery	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
installation of shading devices	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further energy efficiency measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further energy efficiency measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further energy efficiency measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
subtotal: energy efficiency measures										planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
building-integrated renewable energy measures																									
heating system - if renewable energy sources are used	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further renewable energy measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further renewable energy measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further renewable energy measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
subtotal: renewable energy measures										planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES

non-energy-related measures																					
modifications in the layout compared to the basic variant	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO		☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
higher quality standard of the bathrooms	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO		☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
higher quality standard of the floor covering	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO		☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
reaction to complex subsoil conditions	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO		☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO		☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO		☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO		☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
subtotal: non-energetic measures										planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO		☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES

If you have additional information on the development and the amount of the CONCERTO eligible costs, please specify it here:

[1] **Energy-related measures are all measures related to the energetic standard of the building** e.g. the installation of the boiler, windows or insulating the building. NOT part of the energy-related measures is e.g. a higher quality standard the bathrooms etc.

[2] The basic variant for **energy-related** additional costs are the costs of the measures according to the **national minimum requirements** and in case of **non-energy-related** measures the costs for the **usual standard**. For more detailed information please refer to the CONCERTO Premium Economic Monitoring Guide.

Annex D Data collection sheet for the determination of construction costs for individual measures or packages of measures in case of refurbishment (ID: RB 3-costs B-measures)

CONCERTO is co-funded by the European Commission under the Research Framework Programme

Generation	CONCERTO Project Acronym	Country	City / Municip; Area	ID	Date
				RB - C	

Contact Person: data sheet	
Name	*E-Mail*
Pre-filled by: (CP contact)	
Name	*E-Mail*

Building data - Costs and grants for refurbishments

B Determination of costs for selected individual measures or packages of measures

Please specify the costs for the refurbishment measures taken in this building and if possible the amount of the individual measures below. Specifications in the dark grey fields are of more interest for our work than the light grey ones.		please specify the quality standard of the measures taken	measure was realised	is included in **subtotals** of the different measure groups	**full costs for measures taken [€]**	**additional costs compared to the defined basic variant [2] [€]**	**CONCERTO eligible costs accepted by the European Commission [€]**	**CONCERTO grants [€]**	**other grants [€]**	costs or grants are:	costs or grants refer to the price level of which year	VAT contained	Eligible costs are based on					Specification of other grants							
													calculated **additional costs** compared to basic variant that have **not** been limited by the EC [2]	calculated **additional costs** compared to basic variant that have been limited by the EC [2]	flat rate financing in the form of scale of unit costs	calculated **full costs** and **not** limited by the EC	calculated **full** costs that have been limited by the EC	Type of grant: subsidised interest rate	Type of grant: non-repayable grant	Type of support programm: EU	National	Regional	Municipal	initiated by energy supplier	initiated by banks
total: costs or grants for the measures taken										planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
energy-related measures [1]																									
energy efficiency measures																									
replacement of the windows	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
thermal insulation of the outside walls	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
thermal insulation of the roof or upper slab	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
thermal insulation of the basement	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
replacement of the heating system - if it does not use renewable energy sources	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
thermal bridge reducing construction	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
improvement of air tightness	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
building automation system aiming at reducing heating energy use	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
ventilation system with heat recovery	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
installation of shading devices	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further energy efficiency measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further energy efficiency measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further energy efficiency measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
subtotal: energy efficiency measures										planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES

building-integrated renewable energy measures																									
replacement of the heating system - if renewable energy sources are used	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further renewable energy measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further renewable energy measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further renewable energy measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
subtotal: renewable energy measures										planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
non-energy-related measures																									
modifications in the layout and size of the flat	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO						☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
renewal of the roof covering	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO						☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
refurbishment of the bathrooms	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO						☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
drainage works	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO						☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
new render on the facade	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO						☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further refurbishment measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO						☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further refurbishment measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO						☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
please specify further refurbishment measures	*please describe the measure*	-	☐ YES ☐ NO	☐ YES ☐ NO						planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO						☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES
subtotal: non-energetic measures										planned invoiced		☐ YES ☐ NO ☐ YES ☐ NO						☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES	☐ YES

If you have additional information on the development and the amount of the CONCERTO eligible costs, please specify it here:

[1] **Energy-related measures are all measures related to the energetic standard or improvement of the building** e.g. the installation of the boiler, windows or insulating the building. NOT part of the energy-related measures is e.g. a higher quality standard the bathrooms etc.

[2] **The full costs for the refurbishment measures taken can be split into a part assigned to the renovation and another part assigned to the energetic modernization. The part which can be assigned to the energetic modernization and exceeds the maintenance of the building is the energy-related additional costs.**

Annex E Data collection sheet for the description of levels of difficulty and equipping standards (ID: NB und RB 4-quality standard)

CONCERTO is co-funded by the European Commission under the Research Framework Programme

Generation	CONCERTO Project Acronym	Country	City / Municipality	Area	ID	Date	Contact Person: data sheet	
					NB - C		*Name*	*E-Mail*
							Pre-filled by: (CP contact)	
							Name	*E-Mail*

Building data - Quality standard for building elements - NEWLY CONSTRUCTED BUILDING

Quality standard for building elements

CEEC cost group	Elements	please indicate if the building has a special quality standard	Qualitative description of the elements for comparability					
			indication refers to level of difficulty	indication refers to quality standard	low	medium	high	short description on the main characteristics, materials, realisation
Building construction								
b5 - b11	**Foundation**		YES		☐	☐	☐	
c1 - c8	**External walls**							
c1 - c3	**loadbearing, non-loadbearing external walls and columns**			YES	☐	☐	☐	
c4	External doors and windows			YES	☐	☐	☐	
c5	External cladding units	☐ YES ☐ NO		YES	☐	☐	☐	
c6	Prefabricated facade units	☐ YES ☐ NO		YES	☐	☐	☐	
c7	Sun screens	☐ YES ☐ NO		YES	☐	☐	☐	
c8	External walls, other items	☐ YES ☐ NO		YES	☐	☐	☐	
d1 - d7	**Internal walls**							
d1	Loadbearing internal walls			YES	☐	☐	☐	
d2	Non-loadbearing internal walls			YES	☐	☐	☐	
d3	Internal columns			YES	☐	☐	☐	
d4	Internal doors and windows			YES	☐	☐	☐	
d5	Prefabricated wall units	☐ YES ☐ NO		YES	☐	☐	☐	
d6	Internal walls, other items	☐ YES ☐ NO		YES	☐	☐	☐	
e3 - e7	**Ceilings**							
e3	Floor coverings				☐	☐	☐	
e4	Ceiling linings				☐	☐	☐	
c9 - c12	**Roofs**							
c9	Roof structures			YES	☐	☐	☐	
c10	Rooflights, roof openings	☐ YES ☐ NO		YES	☐	☐	☐	
c11	Roof coverings			YES	☐	☐	☐	
c12	Roofs, other items			YES	☐	☐	☐	
f1 - h3	**Fittings**							
h1	General-purpose fitments	☐ YES ☐ NO		YES	☐	☐	☐	
h2	Special-purpose fitments	☐ YES ☐ NO		YES	☐	☐	☐	
h3	Structural fitments, other items	☐ YES ☐ NO		YES	☐	☐	☐	
a7 - a15	**Other construction-related activities, other items**	☐ YES ☐ NO	YES		☐	☐	☐	
Technical equipment								
f1 - f6	**Sewage, water and gas supply systems**			YES	☐	☐	☐	
f7 - f10	**Heat supply systems**							
f7	Heat generators			YES	☐	☐	☐	
f8	Heat distribution networks			YES	☐	☐	☐	
f9	Space heating			YES	☐	☐	☐	
f10	Heat supply systems			YES	☐	☐	☐	
f11 - f16	**Air treatment systems**							
f11	Ventilation systems	☐ YES ☐ NO		YES	☐	☐	☐	
f12	Partial air conditioning systems	☐ YES ☐ NO		YES	☐	☐	☐	
f13	Air conditioning systems	☐ YES ☐ NO		YES	☐	☐	☐	
f14	Process air treatment systems	☐ YES ☐ NO		YES	☐	☐	☐	
f15	Refrigerating plant	☐ YES ☐ NO		YES	☐	☐	☐	
f16	Air treatment systems, other items	☐ YES ☐ NO		YES	☐	☐	☐	
f17 - f23	**High and medium voltage plant**							
f20	Low voltage installation equipment			YES	☐	☐	☐	
f24	Telecommunications systems			YES	☐	☐	☐	
f25 - f26	**Service installations**							
f25	Lifts	☐ YES ☐ NO		YES	☐	☐	☐	
f26	Escalators, moving pavements	☐ YES ☐ NO		YES	☐	☐	☐	
g12 - g20	**Function-related equipment and fitments**	☐ YES ☐ NO		YES	☐	☐	☐	
f25 - f29	**Building automation**	☐ YES ☐ NO	YES	YES	☐	☐	☐	
f30 - f38	**Other technical equipment**	☐ YES ☐ NO		YES	☐	☐	☐	

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Annex F Data collection sheet for the determination of costs in use (ID: NB 5-monitoring und RB 5/6-Monitoring before and after refurbishment)

CONCERTO is co-funded by the European Commission under the Research Framework Programme

Generation	CONCERTO Project Acronym	Country	City / Municipality	Area	ID	Date

Contact Person: data sheet

Name	*E-Mail*

Pre-filled by: (CP contact)

Name	*E-Mail*

Building - Monitoring data

Technical monitoring data - 1st year total

METERED ENERGY DATA - building energy supply

start date of monitoring period	dd/mm/yy	Comments:
end date of monitoring of period	dd/mm/yy	

technology used to supply the building if an energy carrier is used in several technologies and the amount of energy carrier input e.g. on an energy bill cannot be allocated to the different technologies, it is sufficient to specify the total amount of the energy carrier in one of the fields for the amount of this energy carrier and to leave the others empty.	**Final energy [1] INPUT to supply the building for heating, domestic hot water, cooling and electricity generation**							**Useful energy [2] consumption for heating, domestic hot water and cooling**					**generated electricity** [kWh/a]
	energy carrier 1 that is not auxiliary energy	amount of energy carrier 1 used per year	unit of energy carrier 1	energy carrier 2 that is not auxiliary energy	amount of energy carrier 2 used per year	unit of energy carrier 2	auxiliary energy used per year	Total metered **useful energy consumption** [kWh/a]	energy is consumed for these applications - please specify below	**heating** [% of total metered useful energy consumption for heating]	**domestic hot water** [% of total metered useful energy consumption for DHW]	**cooling** [% of total metered useful energy consumption for cooling]	
-	-		please specify	-	please specify		kWh/a		-				
-	-		please specify	-	please specify		kWh/a		-				
-	-		please specify	-	please specify		kWh/a		-				
-	-		please specify	-	please specify		kWh/a		-				
-	-		please specify	-	please specify		kWh/a		-				

Specifications of electricity generation and consumption

if you generate electricity in your building, do you consume it yourself	-
if you consume the generated electricity **partially**, please specify the share of self-consumption	%

	meter 1	**meter 2**	**meter 3**	**meter 4**	**meter 5**
total annual electricity consumption per meter [kWh/a]					
Please specify which meter contains these subcategories:					
space heating (direct)	☐	☐	☐	☐	☐
domestic hot water	☐	☐	☐	☐	☐
cooling + dehumification	☐	☐	☐	☐	☐
ventilation + humification	☐	☐	☐	☐	☐
HVAC total	☐	☐	☐	☐	☐
lighting	☐	☐	☐	☐	☐
auxiliary energy	☐	☐	☐	☐	☐
user-specific & other applications (cooking, office/ domestic appliances etc.)	☐	☐	☐	☐	☐

Comments on the technical monitoring data

[1] Final energy is defined to be the energy supplied to the final consumer's door, e.g. oil, domestic gas, district heating. Final energy comprises the useful energy and system losses.

[2] Useful energy is defined to be the portion of final energy which is actually available for the consumer for the respective use after final conversion . In the final conversion, oil is for example burned to heat for space heating or the preparation of domestic hot water.

Generation	CONCERTO Project Acronym	Country	City / Municipality	Area	ID	Date

Contact Person: data sheet

Name	E-Mail

Pre-filled by: (CP contact)

Name	E-Mail

Building - Monitoring data

Economic monitoring data -1st year

Q - Operation (according to CEEC Code)

Requirement-related costs

Q1 Energy supply *please delete auto-filled energy carriers that are not applicable here*	specifications of energy tariff - provider and tarif name	energy rate per unit (incl. energy tax) [e.g. €/kWh]	annual basic/demand charge of energy tariff (incl. energy tax) [e.g. €/(kW$_{max}$ a)]	Monitored annual costs (energy rate x consumption) [€/a]	costs contain VAT	**Total costs** (= basic charge + monitored annual costs)	***Remarks***
1 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
2 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
3 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
4 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
5 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
6 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
7 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
8 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
9 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
10 -		please specify	please specify	€/a	☐ YES ☐ NO	€/a	
total costs for energy carriers of the building						€/a	

further costs	annual costs [€/a]	costs refer to the price level of which year	costs contain VAT	*Remarks*
Q2 Cleaning and general maintenance			☐ YES ☐ NO	*Please specify the maintained components*
Q3 Inspection and servicing of structure				
maintenance contract(s) concluded ☐ YES ☐ NO *if yes, specify*			☐ YES ☐ NO	*Please specify the maintained components*
maintenance and other operation-related costs			☐ YES ☐ NO	*Please specify the maintained components*
Q4 Inspection and servicing of technical installations				
maintenance contract(s) concluded ☐ YES ☐ NO *if yes, specify*			☐ YES ☐ NO	*Please specify the maintained components*
maintenance and other operation-related costs e.g. chimney sweeper			☐ YES ☐ NO	*Please specify the maintained components*
Q5 Insurances			☐ YES ☐ NO	
Q6 Miscellaneous			☐ YES ☐ NO	
subtotal operation-related costs (Q2 + Q3 + Q4 + Q5 + Q6)			☐ YES ☐ NO	

Revenues

revenues from energy production and feed-in	price per kWh electricity fed into the grid (excluding grants)	grants for electricity feed-in	grants for self-used electricity	revenues contain VAT	**total revenues**	*Remarks*
electricity	€/kWh	€/kWh	€/kWh	☐ YES ☐ NO	€/a	

rental income - point of view of building owner	total annual payment of tenants [€/a]	payments contain VAT	*Remarks*
base rents excluding heating and operating costs		☐ YES ☐ NO	
final rents including heating and operation costs		☐ YES ☐ NO	

lease contracts are agreed upon base rents or final rents :

- ☐ base rents excluding heating and operating costs
- ☐ final rents including heating and operating costs
- ☐ other, please specify

Comments on the economic monitoring data

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CONCERTO Premium

Monitoring Guide – Part C.2

Economic Data for Large-Scale Energy Transformation Units

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1. Introduction

With the integration of energy transformation units into the municipal energy supply system a tradeoff between investments in demand side and supply side measures arises. Building owners are not only confronted with the decision to which extent they invest in energy saving measures of their buildings, but additional which type of energy they want to use. In return, utilities have to decide which energy carriers and energy systems they provide.

This part of the economic monitoring guide assists in answering possible questions of stakeholders involved in energy supply systems. These are mainly energy supply companies, utilities, network operators for large-scale energy transformation units, legislators, grant providers, but also building owners or households that have joined an owner/operator association in order to run a plant and/or a distribution network.

Some possible questions are:

- If not only investments but total costs of the energy supply system are decisive, which technologies are most adequate for energy supply?
- Are central energy supply systems more cost-effective than distributed ones?
- What is the adequate balance between investments in demand-side and supply-side measures? Where is the economic trade-off between these measures?
- Is it economically reasonable to develop a district heating/cooling network in a given district?
- Is a grid-bound energy supply system still profitable for the network operator when the insulation standard increases?
- Is it economically reasonable to invest in an energy storage unit?
- At which level of grants does the investment in renewable energy facilities become economic?

The motivation for the monitoring guide for large-scale energy transformation units is the provision of support for a reasonable economic data collection concept. The collected data serve as a basis for a meaningful assessment and finally help in the stakeholders' decision-making process. This part of the economic monitoring guide is structured as follows: In Chapter 2, firstly the scope of this guide is defined. Secondly, business-relevant terms are explained and adapted to the requirements of the economic monitoring process. This

theoretical framework serves as a basis for the economic monitoring and the analysis of the collected data. In addition, the issue of the ownership structure of the facilities and the question of how the payments break down is examined. Cost typologies are defined, the handling of key cost values is described, and the work with data collection sheets is explained. Chapter 3 is devoted particularly to the collection of the data. Monitoring data are gathered by means of the data collection sheets and divided into one-time payments and annual payments.

2. Fundamentals

2.1 Scope

The economic monitoring of large-scale energy transformation units is essential in order to assess their economic advantage. Besides the energy supply units (e.g. heating plants, combined heat and power plants), large-scale energy transformation units encompass large-scale spatial transformation units (e.g. district heating/cooling networks, electricity/gas grids) and large-scale temporal transformation units (e.g. thermal storages). This section of the economic monitoring guide exclusively considers non-building integrated facilities. Small-scale energy supply systems inside a building are counted as building equipment and are therefore included in Part C.1 of this guide.

2.2 Terms and definitions

As large-scale energy transformation units are mainly operated by companies rather than households, it is recommended to view the economic monitoring from the business' perspective. From this point of view, the terminology of the accounting system helps in specifying financial transactions more precisely and enhances transparency and clarity of all payments within CONCERTO. Even if the detailed differentiation of financial transactions in the CONCERTO monitoring process is too ambitious and not practicable in reality, it is meaningful to specify all relevant flow variables at least in a theoretical way to create an understanding for the economic terms. The applied version which becomes relevant for the CONCERTO monitoring will be explained in section 2.3.
The entire differentiation of the economic terms is provided in Table 1.

Table 1: Basic concept of the accounting system [based on Wöhe, 2010]

No.	Stock figure	Definition	Term		Relevant e.g. for
			Positive change	Negative change	
1	Stock of instruments of payment	Cash, Liquid assets	Incoming payments (I)	Outgoing payments (I)	Capital budgeting and economic efficiency
2	Monetary assets	Stock of instruments of payment + Receivables ./. Liabilities	Incoming payments (II)	Outgoing payments (II)	

3	Total assets	Monetary assets + Tangible assets	Revenues (I)	Costs (II)	Taxation (at least in given countries e.g. Germany)
4	Operating assets	Total assets ./. Non-operating assets	Revenues (II)	Costs (II)	Optimization of operating results and internal control

The relevant flow variables of monetary transactions are defined in the following:

- **Incoming payments (I)** are the effective cash inflows of a company. They induce an increase of the liquid asset stock. (Example: Receipt of a payment on the bank account)
- **Incoming payments (II)** are the effective cash inflows corrected by the receivables and liabilities. (Example: Advance payment for heat delivery)
- **Revenue (I)** is an effective net increase in value of the company due to commodities produced or services provided within the accounting period. (Example: Sale of fixed assets)
- **Revenues (II)** are the equivalent value of produced goods and services of a company. (Example: Sales revenues for heat delivery)

- **Outgoing payments (I)** are the effective cash outflows of a company in a certain period. Outgoing payments only have an impact on the stock of liquid assets. (Example: Cash payment for energy carriers)
- **Outgoing payments (II)** are the effective cash outflows of a company corrected by receivables and liabilities. (Example: Purchase of energy carriers)
- **Costs (I)** are the total wear and tear of commodities and services in the accounting period. (Example: Consumption of energy carriers for heat production, donations, losses due to stock market transactions)
- **Costs (II)** are the wear and tear of production factors due to operating effort. (Example: Consumption of energy carriers for heat production)

2.3 Economic monitoring as a basis for an economic analysis

The economic assessment of energy transformation units is reliant on a detailed and consistent monitoring concept. For an economic analysis of large-scale energy transformation units two approaches can be distinguished. The first option –**dynamic capital budgeting**

– is based on payments for several periods. This approach is used for the assessment of the economic efficiency of an investment that is represented by the payments over several periods. These payments correspond to incoming/outgoing payments type I and type II (cf. Table 1). The capital budgeting is often used in order to decide whether an investment should be carried out or not. Thus, the correct differentiation between payments type I and II is a very difficult or nearly impossible task. After the realization of the investment, the economic monitoring data is usually neither specified in very much detail nor available in a high resolution. Therefore, the following is assumed for CONCERTO:

- All incoming payments, type I as well as type II, will not be differentiated and the term **incoming payment** will be used in the following for both terms.
- All outgoing payments, type I as well as type II, will not be differentiated and the term **outgoing payment** will be used in the following for both terms.

Example: The outgoing payments (II) for an energy carrier might only be metered on the basis of the invoices. Under the assumption that the entire fuel bought in one period is paid for in the same period, outgoing payments (I) and (II) are identical.

The second option (detailed analysis) – the **profit and loss account or cost and activity accounting** – is based on revenues type I and II as well as costs type I and II (cf. Table 1). The revenues (I) and costs (I) are required for the e.g. taxation, whereas the revenues (II) and costs (II) are used for the internal control and optimization of a company. E.g., the cost and activity accounting can be used for a dynamical optimization of the payment series used for the investment decision. Again, the correct differentiation of revenues (I) and (II) as well as costs (I) and (II) is a very difficult or nearly impossible task regarding several projects in different countries. Therefore, the following is assumed for CONCERTO:

- Both types of revenues, type I and II, will not be differentiated and the word **revenue** is used for both terms in the following.
- Both types of costs, type I and II, will not be differentiated and the word **cost** is used for both terms in the following.

For further simplification, the following is assumed for CONCERTO:

- Apart from one-time payments (investments/grants), incoming/outgoing payments correspond to revenues/costs.

The CONCERTO Premium data collection sheets are developed in such a flexible manner

that both approaches – a payment based analysis as well as a detailed analysis – can be realized. For the capital budgeting typically payments are the relevant input.
For the purposes of CONCERTO Premium a payment based approach is recommended.

2.4 Ownership structure of large-scale energy transformation units

Differences in costs/revenues and the economic assessment occur due to different possible ownership structures. Figure 1 illustrates possibilities of the ownership structure along the energy (heat) supply system. In case A, the biomass heating plant and the district heating network are owned by different organizations. The district heating network operator is faced with a price for heat fed into the district heating network at delivery point 1 (DP1). The district heating network operator also sells the heat to the customer for a certain price. The household, which is supplied with heat from the biomass heating plant using the district heating network, is confronted with price margins of both companies (simplified: price=cost+margin). In case B, only one margin of the company owning both units has to be paid. At DP1 the district heating network operator is only faced with costs for the heat generation. At DP2, however, the customer has to buy the heat, which is delivered to his/her building. If several households own a district heating network and a biomass heating plant (case C), they have to pay neither the price margin of the biomass plant owner nor of the district heating owner. In this case, only costs for heat generation and distribution are relevant.

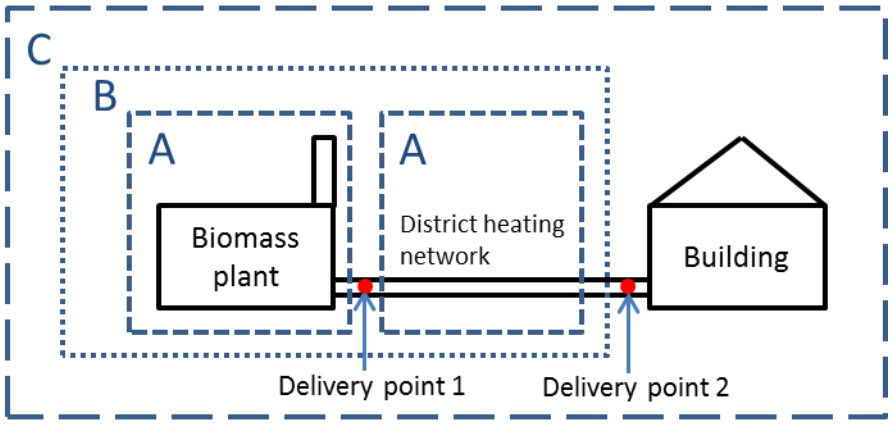

Figure 1: Schematic illustration of different ownership structures along the energy (heat) supply system

The costs therefore depend on the ownership structure of the energy supply companies.

Examples for major costs and revenues in case of different ownership structures from different points of view are provided in Table 2.

Table 2: Examples for major costs and revenues in case of different ownership structures

Case	Ownership of biomass heating plant	Ownership of district heating network	Ownership of buildings	Comments	Major costs	Major revenues
A	Company 1	Company 2	Residents	District heating network owner has a contract with the final customer	Company 1	
					Capital-related costs, biomass costs	Sales revenues (basic and kilowatt hour rates)
					Company 2	
					Capital-related costs, costs for heat (basic and kilowatt hour rates)	Sales revenues (basic and kilowatt hour rates)
B	Company 3	Company 3	Residents	-	Company 3	
					Capital-related costs, biomass costs	Sales revenues (basic and kilowatt hour rates)
C	Residents	Residents	Residents	-	Residents	
					Capital-related costs, biomass costs	-

Analogously to the data collection sheets for buildings, which have been presented in Part C.1 of this monitoring guide, data collection sheets for large-scale energy transformation units have been elaborated, too (cf. section 3.1). The data collection sheets try to deal with these heterogeneous situations by splitting the costs if possible (cf. Figure 4). A similar statement holds in case of electricity production, but in this case the electricity is not sold directly to the residents (although, strictly speaking, this is possible, in order to avoid network fees).

2.5 Structure of the payments/revenues/costs to be determined

Large-scale energy transformation units are diverse in terms of their pay-

ment/revenue/cost structure. A solar park comprises other cost economic components than a biomass power plant. A heat storage tank has other cost economic characteristics than a district heating network. Each facility encompasses a set of heterogeneous economic elements. There is no unified payment/revenue/cost typology for those facilities available. This monitoring guide pursues two typologies for the economic data: On the one hand, a classification of the general VDI cost structure by the Association of German Engineers is adequate for an in-depth analysis and used for large-scale energy transformation units (cf. VDI, 2000). On the other hand, a classification according to the frequency of payments is required, especially with respect to data collection. Here, a differentiation between one-time and annual due dates is made. The two typologies are illustrated in Table 3. In case of capital-related costs/revenues, the one-time payments are distributed over the expected lifetime under consideration of an interest rate. In case of annual payments, the costs/revenues are assumed to be equal to payments as mentioned before.

Table 3: General scheme for the economic monitoring of large-scale energy transformation units [adapted from VDI 2067]

Costs/Revenues	Payments	
	One-time payments	Annual payments
Capital-related	Investments	Repairs
	Grants	-
Requirement–related	-	Power costs (basic and kilowatt hour rates), auxiliary power costs, fuel costs (lubricants, additives, chemical etc.)
	-	Requirement-related grants, sales-revenues (e.g. kilowatt hour rates, basic rates)
Operation-related	-	Operation, cleaning, servicing, inspection
Other	-	Insurance, taxes, general effort, shared administration costs, profit and loss

2.6 Handling of payment/revenue/cost key values

As discussed in Part C.1, a comparable and transparent assessment of large-scale energy transformation units can only be ensured in case of a clear specification of the cost structure. At least the following information should be provided:

- handling of VAT (not included, included with x %)
- handling of energy tax (not included, included with x %)
- handling of grants (not excluded but specified separately)
- reference year for the invoiced payments/revenues/costs (price level) – e.g. in-

vestment in II/2010 for a biomass combustion chamber.

- payment which corresponds to a price (margin included) or to costs (margin not included) (cf. section 2.4).

As already mentioned in section 2.3, the data collection sheets for large-scale energy systems are developed in such a flexible manner that different data formats and contents can be considered. These aspects will be examined in more detail in section 3.2.

3. Determination of payments, costs and revenues

3.1 Data collection sheets

Data requirements to determine costs/outgoing payments and revenues/incoming payments for each type of energy transformation unit are defined in separate data collection sheets. In the CONCERTO initiative only energy supply systems using renewable energy sources or cogeneration are supported. Therefore, the differentiation for **large-scale energy transformation units** in Figure 2 is proposed:

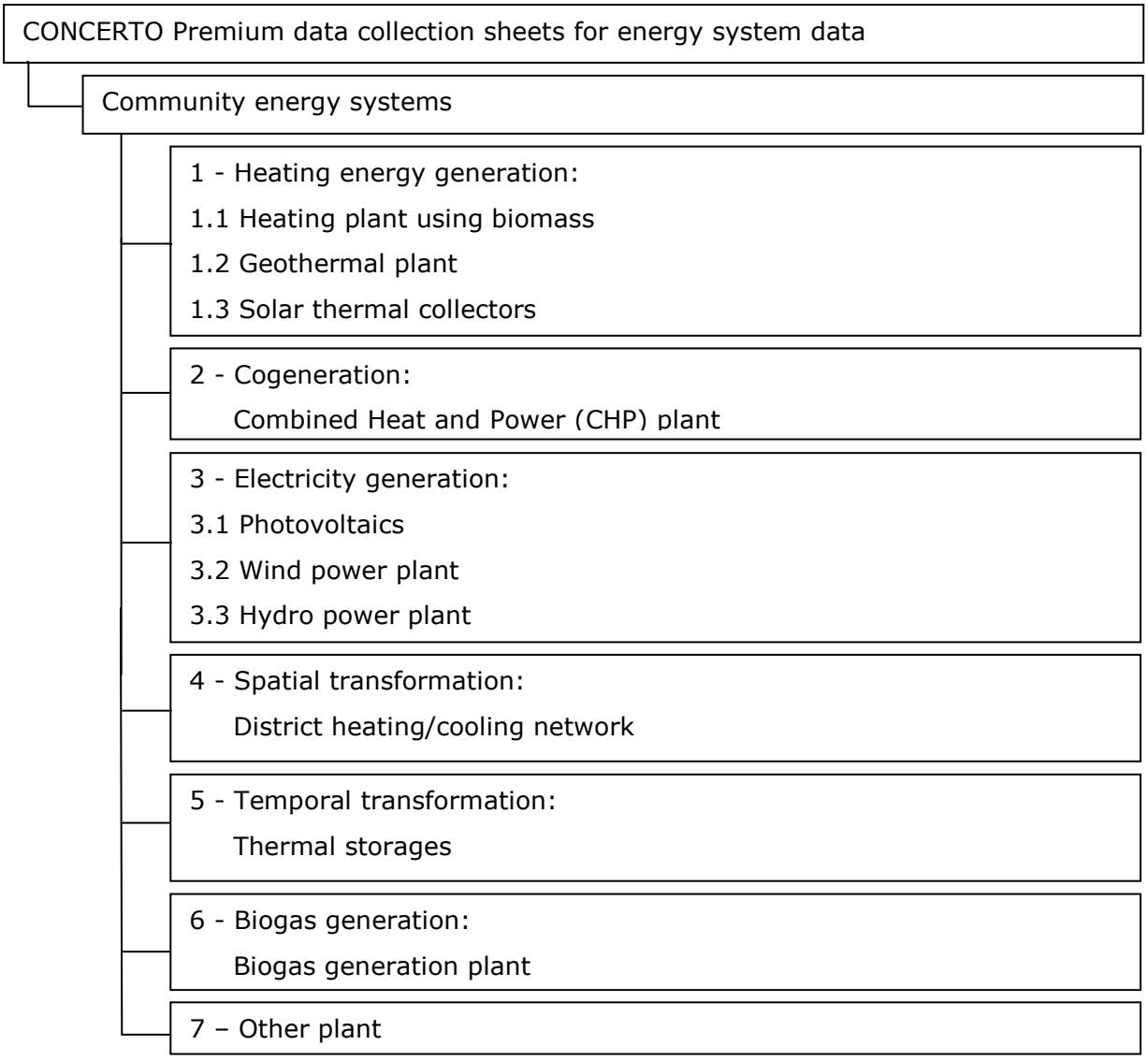

Figure 2: CONCERTO Premium data collection sheets

Data for energy supply units are collected on the data collection sheets 1-3 and 6-7. The economic data of **large-scale spatial transformation units** are collected on the district heating/cooling network data sheet 4 and information about **large-scale temporal transformation units** on the electrical/thermal storage data sheet 5.

The data collection sheets for large-scale energy transformation units proposed by CONCERTO Premium aim at dealing with this heterogeneity of data availability. With respect to economic monitoring they encompass

- **one-time payments:** Investments (cf. Figure 3, the term cost is used in the data collection sheets as it is widely-used [although wrong]) and investment-related grants, and
- **annual payments:** Requirement-related, operation-related and other costs/revenues (cf. Figure 4).

Examples of different large-scale energy transformation unit data sheets are attached in the Annex. In addition, they can be requested via e-mail under concertopremium@steinbeis-europa.de.

3.2 Determination of one-time payments

Investments are the main category of one-time payments of energy transformation units. The investment is defined as cumulated payments until the initial operation of the energy supply unit. The components included in the investment are of major importance. It has to be considered that all components included have to be known to allow for comparability. Therefore in the data collection sheets it is asked in detail which components are included in the specified amount of investment. In addition, the information about the component of the investment is eligible for financial support, the investment-related grants from CONCERTO as well as the other investment-related grants are part of the data collection sheets. Furthermore, it is of high importance to specify whether monitored data, especially investment data, are planned or invoiced data.

As an example for large-scale energy supply units, the data sheet for combined heat and power plants are partly depicted in Figure 3.

B	Investment					
			[€]	costs are	costs refer to price level of which year	incl. VAT
Total investment of CHP plant				planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
	Please specify which components are included in the TOTAL INVESTMENT	**Please specify which components are included in the ELIGIBLE COSTS**				
Construction costs for						
building including foundation of CHP plant	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
energy carrier storage	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for combined heating power station (incl. delivery and fitting)	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for peak load boiler (incl. delivery and fitting)	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for monitoring equipment and control systems (e.g. meters, incl. delivery and fitting)	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for electrical grid connection	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for connection to district heating network	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for planning, engineering and consulting	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for approval procedure	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for custom duties and licence fees	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for construction interest	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Contingencies	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for plot of land	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Other costs *please specify costs contained in 'other costs'*	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Other costs *please specify costs contained in 'other costs'*	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Other costs *please specify costs contained in 'other costs'*	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Other costs *please specify costs contained in 'other costs'*	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Total eligible costs				planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Investment-related grants from CONCERTO				planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Other investment-related grants				planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
How have the CONCERTO eligible costs been determined? Please specify information on the **development** and the **amount** of the **CONCERTO eligible costs** here:						

Figure 3: Investments and investment-related grants included in the data collection sheet of a combined heat and power plant proposed by CONCERTO Premium

Data collection sheets for large-scale spatial transformation units and large-scale temporal transformation units are developed analogously. The entire data collection sheets of se-

lected large-scale energy transformation units are attached in the Annex.

3.3 Determination of annual payments

The second part of the economic data collection comprises the gathering of data on annual payments (or the corresponding costs/revenues) (cf. Figure 4). The specification of the invoiced data can be entered for three periods.

The annual costs encompass energy carrier costs and further costs for energy supply units. The annual revenues are net energy sales revenues/grant revenues for

1) electricity fed into the grid and/or
2) delivered heating energy and/or
3) other additional revenues e.g. revenues from the sale of residual materials.

The capital-related costs, e.g. depreciation and interest, are determined based on the one-time payments and the expected lifetime of the energy transformation units. These data can be found under section 3.2. As mentioned in section 2.4, the issue of the ownership structure of energy transformation units is considered. Assuming the case where a heating plant and the corresponding district heating network are owned by different companies. However, if the separation of net revenues and network usage charges is impossible, in the data collection sheets it is possible to specify the amount which contains net revenues AND network usage charges.

The part of the annual costs and revenues of the data collection sheet for combined heat and power plants as an example of energy supply system is illustrated in Figure 4.

4 Economic monitoring

Revenues / Grants		Design data [2]	Monitored data Year 1	Monitored data Year 2	Monitored data Year 3
Electricity					
Net energy sales revenues for electricity fed into the grid [10]	[€/a]				
If the separation of net revenues and grid usage charges is impossible, please indicate it here: ☐ The specified amount contains net revenues **AND** grid usage charges.					
Grants for electricity fed into the grid [11]	[€/a]				
Total revenues for electricity [12]	[€/a]				
Heating energy					
Net energy sales revenues for delivered heating energy [13]	[€/a]				
If the separation of net revenues and network usage charges is impossible, please indicate it here: ☐ The specified amount contains net revenues **AND** network usage charges.					
Grants for delivered heating energy [14]	[€/a]				
Total revenues for heating energy [12]	[€/a]				
Other revenues					
Net other requirement-related revenues e.g. gypsum sales [15]	[€/a]				
Other revenues - *please specify*	[€/a]				
Total other revenues	[€/a]				

Comments:

Costs		Design data [2]	Monitored data Year 1	Monitored data Year 2	Monitored data Year 3
Energy costs					
Net energy costs for energy carrier 1 [16]	[€/a]				
Net energy costs for energy carrier 2 [16]	[€/a]				
Net energy costs for peak load energy carrier [16]	[€/a]				
Net energy costs for auxiliary energy [16]	[€/a]				
Further costs					
Net non-energy requirement-related costs [17]	[€/a]				
Net operation-related costs [18]	[€/a]				
Net other costs [19] *please specify*	[€/a]				

Comments:

[1] In case that the heat source is process heat or waste heat from industry, please specify the input heat temperature.
[2] Design data are meant to be the **calculated** generation data for the period of 1 year.
[3] If biomass is collected in different places, consider the average distance between the CHP plant and the different collection places.
[4] Final energy is defined to be the energy supplied to the final consumer's door, e.g. oil or domestic gas delivered to the CHP plant.
[5] Specify the unit of the energy carrier used (t/a, m^3/a...).
[6] Specify the quantity of electricity used to drive the system e.g. energy for pumps etc..
[7] Please specify the **total** amount of electricity that has been generated, **NOT** only the remaining amount after substracting the electricity used for energy generation.
[8] Please specify the **total** amount of heating energy that has been generated and fed into the district heating network.
[9] The direct CO_2 emission factor of an energy carrier is depending on the carbon content of the energy carrier and is independent from the technology used for combustion.
[10] Please specify the revenues **excluding** grants, ALL consumption taxes like value added tax (VAT) or energy tax and **excluding** grid usage charges of the customers.
[11] Grants should be specified **excluding** ALL consumption taxes like value added tax (VAT) or energy tax and **excluding** grid usage charges of the customers.
[12] If a destinction between revenues and grants is not possible, please specify the total amount containing the net revenues AND grants.
[13] Please specify the revenues **excluding** grants, ALL consumption taxes like value added tax (VAT) or energy tax and **excluding** charges for the district heating network.
[14] Grants should be specified **excluding** ALL consumption taxes like value added tax (VAT) or energy tax and **excluding** charges of the district heating network.
[15] Please specify the revenues **excluding** ALL consumption taxes like value added tax (VAT).
[16] Energy costs should be specified **including** the costs for delivery and/or connection and **including** energy tax but **excluding** value added tax (VAT).
[17] Non-energy requirement-related costs are e.g. costs for operating resources. Please specify these costs **excluding** energy costs and **excluding** value added tax (VAT).
[18] Operation-related costs are e.g. costs for staff or maintenance. Please specify these costs **excluding** energy costs and **excluding** value added tax (VAT).
[19] Other costs are e.g. costs for insurance or administration. Please specify these costs **excluding** energy costs and **excluding** value added tax (VAT).

Figure 4: Annual costs and revenues included in the data collection sheet of a combined heat and power plant proposed by CONCERTO Premium

List of Literature

Wöhe, Günter; Döring, Ulrich. (2010). Einführung in die allgemeine Betriebswirtschaftslehre. 24. Aufl. München: Vahlen.

VDI (2000): Economic efficiency of building installations - Fundamentals and economic calculation. No. 2067.

Annex A Data collection sheet for a heating plant using biomass

Generation	CONCERTO Project Acronym	Country	City	Area	ID	Date
					DCS-E_CES1_1/1	

Contact Person for data collection sheet		Pre-filled by: (CONCERTO Premium contact	
Name	*E-Mail*	*Name*	*E-Mail*

CES 1_1 Heating energy generation - Heating plant using biomass

A General Data

1 Characteristics

name of plant			
location - address or GPS coordinates (longitude and latitude in Dec: DD.DDDDDD°)			
name of technology used			
description of technology used			
Heating plant product name(s) of main components			
manufacturer of main components			
peak load supply - what technology is used to cover peak loads			
operator of the heating plant			
owner of the heating plant			
% of plant owned by public institutions	[%]		
construction period	start [month/year]		end [month/year]
date of commissioning	[month/year]		
status of the heating plant		-	*if other, please specify here*

Comments and descriptions on delays, unforeseen challenges and other specific characteristics of the plant:

2 Technical specifications

thermal output of the plant

maximum thermal output of plant **excluding** peak load boiler	[kW_{th}]	
maximum thermal output of plant **including** peak load boiler	[kW_{th}]	
thermal output of plant **excluding** peak load boiler in the preferred operation range	[kW_{th}]	
maximum thermal capacity of network connection	[kW_{th}]	
set temperature of heating energy input into district heating network	[°C]	
set input heat temperature [1]	[°C]	

Comments:

energy carrier 1	-
if you chose '**other**', please specify the energy carrier here:	please specify
energy carrier 2	-
if you chose '**other**', please specify the energy carrier here:	please specify
energy carrier for peak load supply	-
if you chose '**other**', please specify the energy carrier here:	please specify
energy carrier - auxiliary energy	electricity
if you chose '**other**', please specify the energy carrier here:	please specify

Comments:

B	**Investment**					
			[€]	costs are	costs refer to price level of which year	incl. VAT
Total investment of heating plant				planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
	Please specify which components are included in the TOTAL INVESTMENT	**Please specify which components are included in the ELIGIBLE COSTS**				
Construction costs for						
building including foundation of heating plant	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
energy carrier storage	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for biomass or biogas combustion chamber (incl. delivery and fitting)	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for peak load boiler (incl. delivery and fitting)	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for monitoring equipment and control systems (e.g. meters, incl. delivery and fitting)	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for connection to district heating network	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for planning, engineering and consulting	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for approval procedure	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for custom duties and licence fees	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for construction interest	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Contingencies	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for plot of land	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Other costs *please specify costs contained in 'other costs'*	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Other costs *please specify costs contained in 'other costs'*	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Other costs *please specify costs contained in 'other costs'*	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Other costs *please specify costs contained in 'other costs'*	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Total eligible costs				planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Investment-related grants from CONCERTO				planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Other investment-related grants				planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO

How have the CONCERTO eligible costs been determined? Please specify information on the **development** and the **amount** of the **CONCERTO eligible costs** here:

4 Economic monitoring

Revenues / Grants		Design data [2]	Monitored data Year 1	Monitored data Year 2	Monitored data Year 3
Heating energy					
Net energy sales revenues for delivered heating energy [9]	[€/a]				
If the separation of net revenues and network usage charges is impossible, please indicate it here: ☐ The specified amount contains net revenues **AND** network usage charges.					
Grants for delivered heating energy [10]	[€/a]				
Total revenues for heating energy [11]	[€/a]				
Other revenues					
Net other requirement-related revenues e.g. gypsum sales [12]	[€/a]				
Other revenues - *please specify*	[€/a]				
Total other revenues	[€/a]				

Comments:

Costs		Design data [2]	Monitored data Year 1	Monitored data Year 2	Monitored data Year 3
Energy costs					
Net energy costs for energy carrier 1 [13]	[€/a]				
Net energy costs for energy carrier 2 [13]	[€/a]				
Net energy costs for peak load energy carrier [13]	[€/a]				
Net energy costs for auxiliary energy [13]	[€/a]				
Further costs					
Net non-energy requirement-related costs [14]	[€/a]				
Net operation-related costs [15]	[€/a]				
Net other costs [16] *please specify*	[€/a]				

Comments:

[1] In case that the heat source is process heat or waste heat from industry, please specify the input heat temperature.
[2] Design data are meant to be the **calculated** generation data for the period of 1 year.
[3] If biomass is collected in different places, consider the average distance between the heating plant and the different collection places.
[4] Final energy is defined to be the energy supplied to the final consumer's door, e.g. oil or domestic gas delivered to the heating plant.
[5] Specify the unit of the energy carrier used (t/a, m^3/a...).
[6] Specify the quantity of electricity used to drive the system e.g. energy for pumps etc..
[7] Please specify the **total** amount of heating energy that has been generated and fed into the district heating network.
[8] The direct CO_2 emission factor of an energy carrier is depending on the carbon content of the energy carrier and is independent from the technology used for combustion.
[9] Please specify the revenues **excluding** grants, ALL consumption taxes like value added tax (VAT) or energy tax and **excluding** charges for the district heating network.
[10] Grants should be specified **excluding** ALL consumption taxes like value added tax (VAT) or energy tax and **excluding** charges of the district heating network.
[11] If a destinction between revenues and grants is not possible, please specify the total amount containing the net revenues AND grants.
[12] Please specify the revenues **excluding** ALL consumption taxes like value added tax (VAT).
[13] Energy costs should be specified **including** the costs for delivery and/or connection and **including** energy tax but **excluding** value added tax (VAT).
[14] Non-energy requirement-related costs are e.g. costs for operating resources. Please specify these costs **excluding** energy costs and **excluding** value added tax (VAT).
[15] Operation-related costs are e.g. costs for staff or maintenance. Please specify these costs **excluding** energy costs and **excluding** value added tax (VAT).
[16] Other costs are e.g. costs for insurance or administration. Please specify these costs **excluding** energy costs and **excluding** value added tax (VAT).

Generation	CONCERTO Project Acronym	Country	City	Area

CES 1_1 Heating energy generation - Heating plant using biomass						
Aggregated Monitoring Data - 1st year						
Monitoring data		Monitored data month 1	...	Monitored data month 12	**Monitored data total year 1**
	start [dd/mm/yy]	dd/mm/yy		dd/mm/yy	dd/mm/yy
	end [dd/mm/yy]	dd/mm/yy		dd/mm/yy	dd/mm/yy
1 General data on the biomass used in the heating plant					
place(s) where biomass is collected		please specify		please specify	please specify
average distance between collection places and power plant [3]	[km]				
transportation type, e.g. truck, rail etc.		-		-	-
primary energy factor of biomass or biogas used	[$kWh_{primary}/kWh_{final\ [4]}$]				
2 Technical monitoring					
Energy demand [input]		Monitored data month 1		Monitored data month 12	**Monitored data total year 1**
Energy carrier 1					
total quantity of energy carrier 1 consumed in the specified period	please specify				0,00
if energy carrier 1 is biomass or biogas, please specify:					
lower heating value per specified unit of energy carrier 1 - if biogas or biomass	please specify				0,00
content of moisture of energy carrier 1 - if biomass	[% moisture]				0,00
density of energy carrier 1 - if biomass	[kg/m^3]				0,00
Energy carrier 2					
total quantity of energy carrier 2 consumed in the specified period	please specify				0,00
if energy carrier 2 is biomass, please specify:					
lower heating value per specified unit of energy carrier 2 - if biogas or biomass	please specify				0,00
content of moisture of energy carrier 2 - if biomass	[% moisture]				0,00
density of energy carrier 2 - if biomass	[kg/m^3]				0,00
Energy carrier for peak load supply					
total quantity of energy carrier used for peak load supply in the specified pe	please specify				0,00
Auxiliary energy used for heating energy generation [6]	[kWh/month]				0,00
Energy generation [output]		Monitored data month 1		Monitored data month 12	**Monitored data total year 1**
Total heating energy generation - metered on the output of the heating plant (= input into district heating network) [7]	[MWh_{th}/month]				0,00

Aggregated Monitoring Data - 2nd year					
Monitoring data		Monitored data month 1		Monitored data month 12	**Monitored data total year 2**
	start [dd/mm/yy]	dd/mm/yy		dd/mm/yy	dd/mm/yy
	end [dd/mm/yy]	dd/mm/yy		dd/mm/yy	dd/mm/yy
1 General data on the biomass used in the heating plant					
place(s) where biomass is collected		please specify		please specify	please specify
average distance between collection places and power plant [3]	[km]				
transportation type, e.g. truck, rail etc.		-	-	-	-
primary energy factor of biomass or biogas used	[$kWh_{primary}/kWh_{final}$ [4]]				
2 Technical monitoring					
Energy demand [input]		Monitored data month 1		Monitored data month 12	**Monitored data total year 2**
Energy carrier 1					
total quantity of energy carrier 1 consumed in the specified period	please specify				0,00
if energy carrier 1 is biomass or biogas, please specify:					
lower heating value per specified unit of energy carrier 1 - if biogas or biomass	please specify				0,00
content of moisture of energy carrier 1 - if biomass	[% moisture]				0,00
density of energy carrier 1 - if biomass	[kg/m³]				0,00
Energy carrier 2					
total quantity of energy carrier 2 consumed in the specified period	please specify				0,00
if energy carrier 2 is biomass, please specify:					
lower heating value per specified unit of energy carrier 2 - if biogas or biomass	please specify				0,00
content of moisture of energy carrier 2 - if biomass	[% moisture]				0,00
density of energy carrier 2 - if biomass	[kg/m³]				0,00
Energy carrier for peak load supply					
total quantity of energy carrier used for peak load supply in the specified pe	please specify				0,00
Auxiliary energy used for heating energy generation [6]	[kWh/month]				0,00
Energy generation [output]		Monitored data month 1		Monitored data month 12	**Monitored data total year 2**
Total heating energy generation - metered on the output of the heating plant (= input into district heating network) [7]	[MWh_{th}/month]				0,00

Aggregated Monitoring Data - 3rd year					
Monitoring data		Monitored data month 1		Monitored data month 12	**Monitored data total year 3**
	start [dd/mm/yy]	dd/mm/yy		dd/mm/yy	dd/mm/yy
	end [dd/mm/yy]	dd/mm/yy		dd/mm/yy	dd/mm/yy
1 General data on the biomass used in the heating plant					
place(s) where biomass is collected		please specify		please specify	please specify
average distance between collection places and power plant [3]	[km]				
transportation type, e.g. truck, rail etc.		-	-	-	-
primary energy factor of biomass or biogas used	[$kWh_{primary}/kWh_{final\ [4]}$]				
2 Technical monitoring					
Energy demand [input]		Monitored data month 1		Monitored data month 12	**Monitored data total year 3**
Energy carrier 1					
total quantity of energy carrier 1 consumed in the specified period	please specify				0,00
if energy carrier 1 is biomass or biogas, please specify:					
lower heating value per specified unit of energy carrier 1 - if biogas or biomass	please specify				0,00
content of moisture of energy carrier 1 - if biomass	[% moisture]				0,00
density of energy carrier 1 - if biomass	[kg/m³]				0,00
Energy carrier 2					
total quantity of energy carrier 2 consumed in the specified period	please specify				0,00
if energy carrier 2 is biomass, please specify:					
lower heating value per specified unit of energy carrier 2 - if biogas or biomass	please specify				0,00
content of moisture of energy carrier 2 - if biomass	[% moisture]				0,00
density of energy carrier 2 - if biomass	[kg/m³]				0,00
Energy carrier for peak load supply					
total quantity of energy carrier used for peak load supply in the specified pe	please specify				0,00
Auxiliary energy used for heating energy generation [6]	[kWh/month]				0,00
Energy generation [output]		Monitored data month 1		Monitored data month 12	**Monitored data total year 3**
Total heating energy generation - metered on the output of the heating plant (= input into district heating network) [7]	[MWh_{th}/month]				0,00

[3] If biomass is collected in different places, consider the average distance between the heating plant and the different collection places.
[4] Final energy is defined to be the energy supplied to the final consumer's door, e.g. oil or domestic gas delivered to the heating plant.
[6] Specify the quantity of electricity used to drive the system e.g. energy for pumps etc..
[7] Please specify the **total** amount of heating energy that has been generated and fed into the district heating network.

Annex B Data collection sheet for a combined heat and power plant

Generation	CONCERTO Project Acronym	Country	City	Area	ID	Date
-					DCS-E_CES2/1	

Contact Person for data collection sheet		Pre-filled by: (CONCERTO Premium contact	
Name	*E-Mail*	*Name*	*E-Mail*

CES 2 Cogeneration - Combined heat and power (CHP) plant

A General Data

1 Characteristics

name of plant			
location - address or GPS coordinates (longitude and latitude in Dec: DD.DDDDDD°)			
name of technology used			-
			if other, please specify here
description of technology used			
CHP plant product name(s) of main components			
manufacturer of main components			
peak load supply - please specify the technology used			
operator of the CHP plant			
owner of the CHP plant			
% of plant owned by public institutions	[%]		
construction period	start [month/year]		end [month/year]
date of commissioning	[month/year]		
status of the CHP plant			- *if other, please specify here*

Comments and descriptions on delays, unforeseen challenges and other specific characteristics of the plant:

2 Technical specifications

thermal output of the plant		
maximum thermal output of plant **excluding** peak load boiler	[kW_{th}]	
maximum thermal output of plant **including** peak load boiler	[kW_{th}]	
thermal output of plant **excluding** peak load boiler in the preferred operation point	[kW_{th}]	
electrical output of the plant		
maximum electrical output of plant **excluding** peak load boiler	[kW_{el}]	
maximum electrical output of plant **including** peak load boiler	[kW_{el}]	
electrical output of plant **excluding** peak load boiler in the preferred operation point	[kW_{el}]	
maximum thermal network connection	[kW_{th}]	
design power to heat ratio	[kW_{el}/kW_{th}]	
set temperature of heating energy input into district heating network	[°C]	
set input heat temperature [1]	[°C]	

Comments:

energy carrier 1	-
if you chose '**other**', please specify the energy carrier here:	please specify
energy carrier 2	-
if you chose '**other**', please specify the energy carrier here:	please specify
energy carrier for peak load supply	-
if you chose '**other**', please specify the energy carrier here:	please specify
energy carrier - auxiliary energy	electricity
if you chose '**other**', please specify the energy carrier here:	please specify

Comments:

B Investment

			[€]	costs are	costs refer to price level of which year	incl. VAT
Total investment of CHP plant				planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO

	Please specify which components are included in the TOTAL INVESTMENT	Please specify which components are included in the ELIGIBLE COSTS	[€]	costs are	costs refer to price level of which year	incl. VAT
Construction costs for						
building including foundation of CHP plant	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
energy carrier storage	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for combined heating power station (incl. delivery and fitting)	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for peak load boiler (incl. delivery and fitting)	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for monitoring equipment and control systems (e.g. meters, incl. delivery and fitting)	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for electrical grid connection	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for connection to district heating network	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for planning, engineering and consulting	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for approval procedure	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for custom duties and licence fees	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for construction interest	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Contingencies	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Costs for plot of land	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Other costs *please specify costs contained in 'other costs'*	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Other costs *please specify costs contained in 'other costs'*	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Other costs *please specify costs contained in 'other costs'*	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO
Other costs *please specify costs contained in 'other costs'*	☐ YES ☐ NO	☐ YES ☐ NO		planned		☐ YES ☐ NO
				invoiced		☐ YES ☐ NO

	[€]	costs are	costs refer to price level of which year	incl. VAT
Total eligible costs		planned		☐ YES ☐ NO
		invoiced		☐ YES ☐ NO
Investment-related grants from CONCERTO		planned		☐ YES ☐ NO
		invoiced		☐ YES ☐ NO
Other investment-related grants		planned		☐ YES ☐ NO
		invoiced		☐ YES ☐ NO

How have the CONCERTO eligible costs been determined? Please specify information on the **development** and the **amount** of the **CONCERTO eligible costs** here:

C Aggregated Monitoring Data

Monitoring data		Design data [2]	Monitored data Year 1	Monitored data Year 2	Monitored data Year 3
	start [dd/mm/yy]	-	dd/mm/yy	dd/mm/yy	dd/mm/yy
	end [dd/mm/yy]	-	dd/mm/yy	dd/mm/yy	dd/mm/yy

1 General data - if biomass is used in the CHP

place(s) where biomass is collected		please specify	please specify	please specify	please specify
average distance between collection places and power plant [3]	[km]				
transportation type, e.g. truck, rail etc.		-	-	-	-
primary energy factor of biomass or biogas used	[$kWh_{primary}/kWh_{final\ [4]}$]				

Please give a short description of how the primary energy factor of the biomass or biogas used was determined:

Further comments:

2 Technical monitoring

Energy demand [input]		Design data [2]	Monitored data Year 1	Monitored data Year 2	Monitored data Year 3
Energy carrier 1					
annual total quantity of energy carrier 1 consumed [5]	please specify				
if energy carrier 1 is biomass, please specify:					
lower heating value per specified unit of energy carrier 1	please specify				
content of moisture of energy carrier 1	[% moisture]				
density of energy carrier 1	[kg/m^3]				
Energy carrier 2					
annual total quantity of energy carrier 2 consumed [5]	please specify				
if energy carrier 2 is biomass, please specify:					
lower heating value per specified unit of energy carrier 2	please specify				
content of moisture of energy carrier 2	[% moisture]				
density of energy carrier 2	[kg/m^3]				
Energy carrier for peak load supply					
annual total quantity of energy carrier used for peak load supply	please specify				
Auxiliary energy used for energy generation [6]	[MWh/a]				

Energy generation [output]		Design data [2]	Monitored data Year 1	Monitored data Year 2	Monitored data Year 3
Total electricity generation [7]	[MWh_{el}/a]				
Total heating energy generation - metered on the output of the CHP plant (= input into district heating network) [8]	[MWh_{th}/a]				

Comments:

3 Environmental monitoring

Emissions of the CHP plant [output]		Design data [2]	Monitored data Year 1	Monitored data Year 2	Monitored data Year 3
direct CO_2 emission factor for energy carrier 1 - if biomass or biogas [9]	[g CO_2/ $kWh_{lower\ heating\ value}$]				
direct CO_2 emission factor for energy carrier 2 - if biomass or biogas [9]	[g CO_2/ $kWh_{lower\ heating\ value}$]				
SO_2	[kg SO_2/ monitoring period]				
NO_x - SO_2 equivalent	[kg SO_2e/ monitoring period]				
NO_x - total No_x	[kg NO_x/ monitoring period]				
PM_{10}	[kg PM_{10}/ monitoring period]				
$PM_{2,5}$	[kg $PM_{2,5}$/ monitoring period]				

Comments:

4 Economic monitoring

Revenues / Grants		Design data [2]	Monitored data Year 1	Monitored data Year 2	Monitored data Year 3
Electricity					
Net energy sales revenues for electricity fed into the grid [10]	[€/a]				
If the separation of net revenues and grid usage charges is impossible, please indicate it here: ☐ The specified amount contains net revenues **AND** grid usage charges.					
Grants for electricity fed into the grid [11]	[€/a]				
Total revenues for electricity [12]	[€/a]				
Heating energy					
Net energy sales revenues for delivered heating energy [13]	[€/a]				
If the separation of net revenues and network usage charges is impossible, please indicate it here: ☐ The specified amount contains net revenues **AND** network usage charges.					
Grants for delivered heating energy [14]	[€/a]				
Total revenues for heating energy [12]	[€/a]				
Other revenues					
Net other requirement-related revenues e.g. gypsum sales [15]	[€/a]				
Other revenues - *please specify*	[€/a]				
Total other revenues	[€/a]				

Comments:

Costs		Design data [2]	Monitored data Year 1	Monitored data Year 2	Monitored data Year 3
Energy costs					
Net energy costs for energy carrier 1 [16]	[€/a]				
Net energy costs for energy carrier 2 [16]	[€/a]				
Net energy costs for peak load energy carrier [16]	[€/a]				
Net energy costs for auxiliary energy [16]	[€/a]				
Further costs					
Net non-energy requirement-related costs [17]	[€/a]				
Net operation-related costs [18]	[€/a]				
Net other costs [19] *please specify*	[€/a]				

Comments:

[1] In case that the heat source is process heat or waste heat from industry, please specify the input heat temperature.
[2] Design data are meant to be the **calculated** generation data for the period of 1 year.
[3] If biomass is collected in different places, consider the average distance between the CHP plant and the different collection places.
[4] Final energy is defined to be the energy supplied to the final consumer's door, e.g. oil or domestic gas delivered to the CHP plant.
[5] Specify the unit of the energy carrier used (t/a, m^3/a...).
[6] Specify the quantity of electricity used to drive the system e.g. energy for pumps etc..
[7] Please specify the **total** amount of electricity that has been generated, **NOT** only the remaining amount after substracting the electricity used for energy generation.
[8] Please specify the **total** amount of heating energy that has been generated and fed into the district heating network.
[9] The direct CO_2 emission factor of an energy carrier is depending on the carbon content of the energy carrier and is independent from the technology used for combustion.
[10] Please specify the revenues **excluding** grants, ALL consumption taxes like value added tax (VAT) or energy tax and **excluding** grid usage charges of the customers.
[11] Grants should be specified **excluding** ALL consumption taxes like value added tax (VAT) or energy tax and **excluding** grid usage charges of the customers.
[12] If a destinction between revenues and grants is not possible, please specify the total amount containing the net revenues AND grants.
[13] Please specify the revenues **excluding** grants, ALL consumption taxes like value added tax (VAT) or energy tax and **excluding** charges for the district heating network.
[14] Grants should be specified **excluding** ALL consumption taxes like value added tax (VAT) or energy tax and **excluding** charges of the district heating network.
[15] Please specify the revenues **excluding** ALL consumption taxes like value added tax (VAT).
[16] Energy costs should be specified **including** the costs for delivery and/or connection and **including** energy tax but **excluding** value added tax (VAT).
[17] Non-energy requirement-related costs are e.g. costs for operating resources. Please specify these costs **excluding** energy costs and **excluding** value added tax (VAT).
[18] Operation-related costs are e.g. costs for staff or maintenance. Please specify these costs **excluding** energy costs and **excluding** value added tax (VAT).
[19] Other costs are e.g. costs for insurance or administration. Please specify these costs **excluding** energy costs and **excluding** value added tax (VAT).

Generation	CONCERTO Project Acronym	Country	City	Area
-				

CES 2 Cogeneration - Combined heat and power (CHP) plant

Aggregated Monitoring Data - 1st year

Monitoring data		Monitored data month 1	...	Monitored data month 12	**Monitored data total year 1**
	start [dd/mm/yy]	dd/mm/yy		dd/mm/yy	dd/mm/yy
	end [dd/mm/yy]	dd/mm/yy		dd/mm/yy	dd/mm/yy
1 General data - if biomass is used in the CHP					
place(s) where biomass is collected		please specify		please specify	please specify
average distance between collection places and power plant [3]	[km]				
transportation type, e.g. truck, rail etc.		-	-	-	-
primary energy factor of biomass or biogas used	[$kWh_{primary}$/$kWh_{final\ [4]}$]				
2 Technical monitoring					

Energy demand [input]		Monitored data month 1		Monitored data month 12	**Monitored data total year 1**
Energy carrier 1					
total quantity of energy carrier 1 consumed in the specified period	please specify				0,00
if energy carrier 1 is biomass, please specify:					
lower heating value per specified unit of energy carrier 1	please specify				0,00
content of moisture of energy carrier 1	[% moisture]				0,00
density of energy carrier 1	[kg/m³]				0,00
Energy carrier 2					
total quantity of energy carrier 2 consumed in the specified period	please specify				0,00
if energy carrier 2 is biomass, please specify:					
lower heating value per specified unit of energy carrier 2	please specify				0,00
content of moisture of energy carrier 2	[% moisture]				0,00
density of energy carrier 2	[kg/m³]				0,00
Energy carrier for peak load supply					
total quantity of energy carrier used for peak load supply in the specified pe	please specify				0,00
Auxiliary energy used for energy generation [6]	[kWh/month]				0,00

Energy generation [output]		Monitored data month 1		Monitored data month 12	**Monitored data total year 1**
Total electricity generation [7]	[MWh_{el}/month]				0,00
Total heating energy generation - metered on the output of the CHP plant (= input into district heating network) [8]	[MWh_{th}/month]				0,00

Aggregated Monitoring Data - 2nd year					
Monitoring data		Monitored data month 1		Monitored data month 12	**Monitored data total year 2**
	start [dd/mm/yy]	dd/mm/yy		dd/mm/yy	dd/mm/yy
	end [dd/mm/yy]	dd/mm/yy		dd/mm/yy	dd/mm/yy
1 General data - if biomass is used in the CHP					
place(s) where biomass is collected		please specify		please specify	please specify
average distance between collection places and power plant [3]	[km]				
transportation type, e.g. truck, rail etc.		-	-	-	-
primary energy factor of biomass or biogas used	[$kWh_{primary}/kWh_{final\ [4]}$]				
2 Technical monitoring					
Energy demand [input]		Monitored data month 1		Monitored data month 12	**Monitored data total year 2**
Energy carrier 1					
total quantity of energy carrier 1 consumed in the specified period	please specify				0,00
if energy carrier 1 is biomass, please specify:					
lower heating value per specified unit of energy carrier 1	please specify				0,00
content of moisture of energy carrier 1	[% moisture]				0,00
density of energy carrier 1	[kg/m³]				0,00
Energy carrier 2					
total quantity of energy carrier 2 consumed in the specified period	please specify				0,00
if energy carrier 2 is biomass, please specify:					
lower heating value per specified unit of energy carrier 2	please specify				0,00
content of moisture of energy carrier 2	[% moisture]				0,00
density of energy carrier 2	[kg/m³]				0,00
Energy carrier for peak load supply					
total quantity of energy carrier used for peak load supply in the specified pe	please specify				0,00
Auxiliary energy used for energy generation [6]	[kWh/month]				0,00
Energy generation [output]		Monitored data month 1		Monitored data month 12	**Monitored data total year 2**
Total electricity generation [7]	[MWh_{el}/month]				0,00
Total heating energy generation - metered on the output of the CHP plant (= input into district heating network) [8]	[MWh_{th}/month]				0,00

Aggregated Monitoring Data - 3rd year

Monitoring data		Monitored data month 1		Monitored data month 12	Monitored data total year 3
	start [dd/mm/yy]	dd/mm/yy		dd/mm/yy	dd/mm/yy
	end [dd/mm/yy]	dd/mm/yy		dd/mm/yy	dd/mm/yy
1 General data - if biomass is used in the CHP					
place(s) where biomass is collected		please specify		please specify	please specify
average distance between collection places and power plant [3]	[km]				
transportation type, e.g. truck, rail etc.		-	-	-	-
primary energy factor of biomass or biogas used	[$kWh_{primary}/kWh_{final\ [4]}$]				
2 Technical monitoring					

Energy demand [input]		Monitored data month 1		Monitored data month 12	Monitored data total year 3
Energy carrier 1					
total quantity of energy carrier 1 consumed in the specified period	please specify				0,00
if energy carrier 1 is biomass, please specify:					
lower heating value per specified unit of energy carrier 1	please specify				0,00
content of moisture of energy carrier 1	[% moisture]				0,00
density of energy carrier 1	[kg/m³]				0,00
Energy carrier 2					
total quantity of energy carrier 2 consumed in the specified period	please specify				0,00
if energy carrier 2 is biomass, please specify:					
lower heating value per specified unit of energy carrier 2	please specify				0,00
content of moisture of energy carrier 2	[% moisture]				0,00
density of energy carrier 2	[kg/m³]				0,00
Energy carrier for peak load supply					
total quantity of energy carrier used for peak load supply in the specified pe	please specify				0,00
Auxiliary energy used for energy generation [6]	[kWh/month]				0,00

Energy generation [output]		Monitored data month 1		Monitored data month 12	Monitored data total year 3
Total electricity generation [7]	[MWh_{el}/month]				0,00
Total heating energy generation - metered on the output of the CHP plant (= input into district heating network) [8]	[MWh_{th}/month]				0,00

[3] If biomass is collected in different places, consider the average distance between the CHP plant and the different collection places.
[4] Final energy is defined to be the energy supplied to the final consumer's door, e.g. oil or domestic gas delivered to the CHP plant.
[6] Specify the quantity of electricity used to drive the system e.g. energy for pumps etc..
[7] Please specify the **total** amount of electricity that has been generated, **NOT** only the remaining amount after substracting the electricity used for energy generation.
[8] Please specify the **total** amount of heating energy that has been generated and fed into the district heating network.

Annex C Data collection sheet for a district heating/cooling system

Generation	CONCERTO Project Acronym	Country	City / Municipality	Area	ID	Date	Contact Person for data sheet
-					DCS-E_CES4_1		Name / E-Mail
							Pre-filled by: (CP contact) Name / E-Mail

CES 4 Spatial transformation - district heating/cooling network

A General Data

1 Characteristics

location			
characterisation of network	type	-	
	construction	-	
is the network a CONCERTO demonstration project		☐ YES ☐ NO	
district network: product name(s)			
manufacturer			
operator of the network			
owner of the network			
% of network owned by public institutions	[%]		
construction period of the network - for existing or new networks	start [month/year]		end [month/year]
construction period of the extension of the network - if applicable	start [month/year]		end [month/year]
date of commissioning	[month/year]		
status of the district heating network		-	*if other, please specify here*

Comments:

2 Technical specifications

Temperature level of district heating network

set temperature of fluid at feed-in in district network in **winter**	[°C]		please specify the **winter period**	start *mm/yy*
set return temperature of fluid in district network in **winter**	[°C]			
average temperature of fluid in district network in **winter**	[°C]			end *mm/yy*
set temperature of fluid at feed-in in district network in **summer**	[°C]		please specify the **summer period**	start *mm/yy*
set return temperature of fluid in district network in **summer**	[°C]			
average temperature of fluid in district network in **summer**	[°C]			end *mm/yy*

maximum thermal capacity of network connection	[kW_{th}]	
installed capacity of pumps	[kW]	
maximum pipe cross section Ø	[cm]	
no. of connections i.e. households		
thermal capacity of each connection to households	[kW_{th}]	
network losses	[%]	

local primary energy factor for district heating / cooling	
please specify the calculation method used to determine the local primary energy factor (e.g. exergy balanced approach etc.)	

Comments:

B Energy balance of district heating network

please list all plants feeding energy into the district heating network

Technology used, Name of plant	Energy carrier 1	Energy carrier 2	Construction start year	Construction end year	Maximum energy output (excluding peak load supply) heat [kW]	electricity [kW]	cooling [kW]	Is CONCERTO demonstration project	Ownership structure
	-	-						☐ yes	-
	-	-						☐ yes	-
	-	-						☐ yes	-
	-	-						☐ yes	-
	-	-						☐ yes	-
	-	-						☐ yes	-

Comments:

C Investments - please specify if district heating network is part of CONCERTO

	[€]	costs are	costs refer to price level of which year	incl. VAT
Total investment		planned		☐YES ☐NO
		invoiced		☐YES ☐NO

	Please specify which components are included in the TOTAL INVESTMENT	Please specify which components are included in the ELIGIBLE COSTS				
Costs for network (incl. delivery and fitting)	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for monitoring equipment and control systems (e.g. meters, incl. delivery and fitting)	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for connection to energy supply units (e.g. CHP)	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for connection to energy demand units (e.g. buildings)	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for planning, engineering and consulting	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for approval procedure are included	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for custom duties and licence fees	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for construction interest	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Contingencies	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for plot of land are included	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Other costs *please specify costs contained in 'other costs'*	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Other costs *please specify costs contained in 'other costs'*	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Other costs *please specify costs contained in 'other costs'*	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO

Total eligible investment		planned		☐YES ☐NO
		invoiced		☐YES ☐NO
Investment-related grants from CONCERTO		planned		☐YES ☐NO
		invoiced		☐YES ☐NO
Other investment-related grants		planned		☐YES ☐NO
		invoiced		☐YES ☐NO

How have the CONCERTO eligible costs been determined? Please specify information on the **development** and the **amount** of the **CONCERTO eligible costs** here:

B Aggregated Monitoring Data

Monitoring data		Design data [1]	Monitored data Year 1	Monitored data Year 2	Monitored data Year 3
start [dd/mm/yy]	-		dd/mm/yy	dd/mm/yy	dd/mm/yy
end [dd/mm/yy]	-		dd/mm/yy	dd/mm/yy	dd/mm/yy
1 Technical monitoring					
operation hours of pumps	[h/a]				
average inlet temperature in network during operation	[°C]				
average return temperature of the network during operation	[°C]				
auxiliary energy used for energy transport (pumps)	[MWh/a]				
Subtotal amount of energy fed into the network	[MWh/a]				
Subtotal amount of energy extracted from the network	[MWh/a]				

Comments:

2 Economic monitoring

Revenues / Grants		Design data [1]	Monitored data Year 1	Monitored data Year 2	Monitored data Year 3
Heating energy					
Net revenues for network usage - network usage charges for delivered heating energy	[€/a]				

If the separation of net revenues and network usage charges is impossible, please indicate the total revenues for heating energy on the CONCERTO Premium data collection sheet of the corresponding plants.

Costs			Design data [1]	Monitored data Year 1	Monitored data Year 2	Monitored data Year 3
Net energy costs for auxiliary energy [2]		[€/a]				
Net non-energy requirement-related costs [3]		[€/a]				
Net operation-related costs [4]		[€/a]				
Net other costs [5]	*please specify*	[€/a]				

Comments:

[1] Design data - the **calculated** generation data according to CONCERTO requirements.
[2] Energy costs should be specified **including** the costs for delivery and/or connection and **including** energy tax but **excluding** value added tax (VAT).
[3] Non-energy requirement-related costs are e.g. costs for operating resources. Please specify these costs **excluding** energy costs and **excluding** value added tax (VAT).
[4] Operation-related costs are e.g. costs for staff or maintenance. Please specify these costs **excluding** energy costs and **excluding** value added tax (VAT).
[5] Other costs are e.g. costs for insurance or administration. Please specify these costs **excluding** energy costs and **excluding** value added tax (VAT).

Generation	CONCERTO Project Acronym	Country	City / Municip:	Area	ID	Date	Contact Person for data sheet	
					DCS-E_CES4_1		*Name*	*E-Mail*
							Pre-filled by: (CP contact)	
							Name	*E-Mail*

Spatial transformation - district heating/cooling network

A Aggregated Monitoring Data 1st year

Monitoring data		Monitored data month 1	Monitored data month 2	Monitored data month 3	Monitored data month 4	Monitored data month 5	Monitored data month 6	Monitored data month 7	Monitored data month 8	Monitored data month 9	Monitored data month 10	Monitored data month 11	Monitored data month 12	**Monitored data total 1st year**
	start [dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy
	end [dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy
Technical monitoring														
operation hours of pumps	[h/month]													0,00
average inlet temperature in network during operation	[°C]													0,00
average return temperature of the network during operatio	[°C]													0,00
auxiliary energy used for energy transport (pumps)	[MWh/month]													0,00
Subtotal amount of energy fed into the network	[MWh/month]													0,00
Subtotal amount of energy extracted from the network	[MWh/month]													0,00

B Aggregated Monitoring Data 2nd year

Monitoring data		Monitored data month 1	Monitored data month 2	Monitored data month 3	Monitored data month 4	Monitored data month 5	Monitored data month 6	Monitored data month 7	Monitored data month 8	Monitored data month 9	Monitored data month 10	Monitored data month 11	Monitored data month 12	**Monitored data total 2nd year**
	start [dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy
	end [dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy
Technical monitoring														
operation hours of pumps	[h/month]													0,00
average inlet temperature in network during operation	[°C]													0,00
average return temperature of the network during operatio	[°C]													0,00
auxiliary energy used for energy transport (pumps)	[MWh/month]													0,00
Subtotal amount of energy fed into the network	[MWh/month]													0,00
Subtotal amount of energy extracted from the network	[MWh/month]													0,00

C Aggregated Monitoring Data 3rd year

Monitoring data		Monitored data month 1	Monitored data month 2	Monitored data month 3	Monitored data month 4	Monitored data month 5	Monitored data month 6	Monitored data month 7	Monitored data month 8	Monitored data month 9	Monitored data month 10	Monitored data month 11	Monitored data month 12	**Monitored data total 3rd year**
	start [dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy
	end [dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy
Technical monitoring														
operation hours of pumps	[h/month]													0,00
average inlet temperature in network during operation	[°C]													0,00
average return temperature of the network during operatio	[°C]													0,00
auxiliary energy used for energy transport (pumps)	[MWh/month]													0,00
Subtotal amount of energy fed into the network	[MWh/month]													0,00
Subtotal amount of energy extracted from the network	[MWh/month]													0,00

Annex D Data collection sheet for a thermal storage unit

Generation	CONCERTO Project Acronym	Country	City / Municipality	Area	ID	Date	Contact Person for data sheet
-					DCS-E_CESS/1		Name / E-Mail

Pre-filled by: (CP contact) Name / E-Mail

CES 5 Temporal transformation - Thermal storage

A General Data

1 Characteristics

location - address or GPS coordinates (longitude and latitude in Dec: DD.DDDDDD°)			
type of storage		-	
technology used	storage medium	-	
	description		
thermal storage: product name(s)			
manufacturer			
demonstration activity scheme		-	
operator of the storage			
owner of the storage			
% of plant owned by public institutions	[%]		
construction period of the storage	start [month/year]		end [month/year]
date of commissioning	[month/year]		
status of the storage		-	*if other, please specify here*

Comments:

2 Technical specifications

volume of storage	[m³]	
installed capacity	[kWh]	
set temperature of fluid at feed-in in storage	[°C]	
set return temperature of fluid from storage	[°C]	

Comments:

B Energy balance of thermal storage

please list all plants feeding energy into the thermal storage

Technology used, Name of plant	Energy carrier 1	Energy carrier 2	Construction start year	Construction end year	Maximum energy output (excluding peak load supply) heat [kW]	electricity [kW]	cooling [kW]	Is part of CONCERTO	CONCERTO Premium ID
	-	-						☐ yes	
	-	-						☐ yes	
	-	-						☐ yes	

Comments:

C Investments - please specify if thermal storage is part of CONCERTO

	[€]	costs are	costs refer to which year	incl. VAT
Total investment		planned		☐YES ☐NO
		invoiced		☐YES ☐NO

	Please specify which components are included in the TOTAL INVESTMENT	Please specify which components are included in the ELIGIBLE COSTS				
Costs for thermal storage (incl. delivery and fitting)	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for monitoring equipment and control systems (e.g. meters, incl. delivery and fitting)	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for connection to energy supply units (e.g. CHP)	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for connection to energy demand units (e.g. district heating network, buildings)	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for planning, engineering and consulting	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for approval procedure are included	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for custom duties and licence fees	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for construction interest	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Contingencies	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Costs for plot of land are included	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Other costs *please specify costs contained in 'other costs'*	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Other costs *please specify costs contained in 'other costs'*	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO
Other costs *please specify costs contained in 'other costs'*	☐YES ☐NO	☐YES ☐NO		planned		☐YES ☐NO
				invoiced		☐YES ☐NO

Total eligible investment		planned		☐YES ☐NO
		invoiced		☐YES ☐NO
Investment-related grants from CONCERTO		planned		☐YES ☐NO
		invoiced		☐YES ☐NO
Other investment-related grants		planned		☐YES ☐NO
		invoiced		☐YES ☐NO

How have the CONCERTO eligible costs been determined? Please specify information on the **development** and the **amount** of the **CONCERTO eligible costs** here:

B Aggregated Monitoring Data

Monitoring data		Design data [1]	Monitored data Year 1	Monitored data Year 2	Monitored data Year 3
start [dd/mm/yy]		-	dd/mm/yy	dd/mm/yy	dd/mm/yy
end [dd/mm/yy]		-	dd/mm/yy	dd/mm/yy	dd/mm/yy
1 Technical monitoring					
auxiliary energy used for energy transport (pumps)	[MWh/a]				
Subtotal amount of heating energy fed into the thermal storage	[MWh/a]				
Subtotal amount of cooling energy fed into the thermal storage	[MWh/a]				
Subtotal amount of heating energy extracted from the thermal storage	[MWh/a]				
Subtotal amount of cooling energy extracted from the thermal storage	[MWh/a]				

Comments:

2 Economic monitoring

Costs		Design data [1]	Monitored data Year 1	Monitored data Year 2	Monitored data Year 3
Net energy costs for auxiliary energy [2]	[€/a]				
Net non-energy requirement-related costs [3]	[€/a]				
Net operation-related costs [4]	[€/a]				
Net other costs [5] *please specify*	[€/a]				

Comments:

[1] Design data - the **calculated** generation data according to CONCERTO requirements.
[2] Energy costs should be specified **including** the costs for delivery and/or connection and **including** energy tax but **excluding** value added tax (VAT).
[3] Non-energy requirement-related costs are e.g. costs for operating resources. Please specify these costs **excluding** energy costs and **excluding** value added tax (VAT).
[4] Operation-related costs are e.g. costs for staff or maintenance. Please specify these costs **excluding** energy costs and **excluding** value added tax (VAT).
[5] Other costs are e.g. costs for insurance or administration. Please specify these costs **excluding** energy costs and **excluding** value added tax (VAT).

Generation	CONCERTO Project Acronym	Country	City / Municip.	Area	ID	Date	Contact Person for data sheet	
-					DCS-E_CES5/1		*Name*	*E-Mail*
							Pre-filled by: (CP contact)	
							Name	*E-Mail*

CES 5 Temporal transformation - Thermal storage

A Aggregated Monitoring Data 1st year

Monitoring data		Monitored data month 1	Monitored data month 2	Monitored data month 3	Monitored data month 4	Monitored data month 5	Monitored data month 6	Monitored data month 7	Monitored data month 8	Monitored data month 9	Monitored data month 10	Monitored data month 11	Monitored data month 12	Monitored data total 1st year
	start [dd/mm/yy]	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy
	end [dd/mm/yy]	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy
Technical monitoring														
auxiliary energy used for energy transport (pumps)	[MWh/month]													0,00
Subtotal amount of heating energy fed into the thermal storage	[MWh/month]													0,00
Subtotal amount of cooling energy fed into the thermal storage	[MWh/month]													0,00
Subtotal amount of heating energy extracted from the thermal storage	[MWh/month]													0,00
Subtotal amount of cooling energy extracted from the thermal storage	[MWh/month]													0,00

B Aggregated Monitoring Data 2nd year

Monitoring data		Monitored data month 1	Monitored data month 2	Monitored data month 3	Monitored data month 4	Monitored data month 5	Monitored data month 6	Monitored data month 7	Monitored data month 8	Monitored data month 9	Monitored data month 10	Monitored data month 11	Monitored data month 12	Monitored data total 2nd year
	start [dd/mm/yy]	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy
	end [dd/mm/yy]	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy
Technical monitoring														
auxiliary energy used for energy transport (pumps)	[MWh/month]													0,00
Subtotal amount of heating energy fed into the thermal storage	[MWh/month]													0,00
Subtotal amount of cooling energy fed into the thermal storage	[MWh/month]													0,00
Subtotal amount of heating energy extracted from the thermal storage	[MWh/month]													0,00
Subtotal amount of cooling energy extracted from the thermal storage	[MWh/month]													0,00

C Aggregated Monitoring Data 3rd year

Monitoring data		Monitored data month 1	Monitored data month 2	Monitored data month 3	Monitored data month 4	Monitored data month 5	Monitored data month 6	Monitored data month 7	Monitored data month 8	Monitored data month 9	Monitored data month 10	Monitored data month 11	Monitored data month 12	Monitored data total 3rd year
	start [dd/mm/yy]	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy
	end [dd/mm/yy]	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy	dd/mm/yy
Technical monitoring														
auxiliary energy used for energy transport (pumps)	[MWh/month]													0,00
Subtotal amount of heating energy fed into the thermal storage	[MWh/month]													0,00
Subtotal amount of cooling energy fed into the thermal storage	[MWh/month]													0,00
Subtotal amount of heating energy extracted from the thermal storage	[MWh/month]													0,00
Subtotal amount of cooling energy extracted from the thermal storage	[MWh/month]													0,00

7. Data Collection Experiences –

Please mind the following points for your data collection:

What is the originally planned number of buildings & energy systems in your project?

How many buildings & energy systems have actually been realised?

Buildings – please specify:

- the gross floor area **AND** the net heated floor area ideally
- the applied energy-related measures in the building in detail
- the date of the last refurbishment measures before CONCERTO and the construction year of the building
- the position to neighbouring buildings, the basement type, the attic type, the number of inhabitants and the number of occupants
- the type of the technologies used for energy generation in the building
- local primary energy & emission factors for biomass and district heat used in the building; either as calculated primary energy factor PLUS the calculation method used or as information about all energy supply units delivering heat to the network and the type and amount of energy carriers used for heat generation
- the energy carrier and technology used for energy generation before the CONCERTO refurbishment

Energy Systems – please specify:

- the energy demand separately for heating, domestic hot water (DHW) generation, cooling and electricity. If a separation of the energy demand for heating and DHW generation is impossible, please add this information on the data collection sheet
- **the monthly monitoring data for the CONCERTO demonstration projects!**
- the start and end date of the monitoring period(s)
- the monitoring data without heating/cooling degree day correction
- weather data like temperature and solar radiation in a daily resolution possibly
- if a secondary heating system is used
- local primary energy & emission factors for biomass and district heat used; either as calculated primary energy factor PLUS the calculation method used or as information about all energy supply units delivering heat to the network and the type and amount of energy carriers used for heat generation
- for PV systems the type of cells and the values for tilt angle and azimuth

Economic data - please specify:

- if the economic data is containing VAT or not and the corresponding year of price level
- what is included in the total costs or investments by ticking the corresponding checkboxes
- the **energy-related additional costs** for buildings