REPORT
D2.9 - DESCRIPTION FOR A DESIGN-STAGE-APPROVAL CONCEPT

Criteria for a design-stage-approval concept (D 2.10)

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CONTACT

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OUTPHIT – DEEP RETROFITS MADE FASTER, CHEAPER AND MORE RELIABLE
outPHit pairs such approaches with the rigour of Passive House principles to make deep retrofits cost-effective, faster and more reliable. On the basis of case studies across Europe and in collaboration with a wide variety of stakeholders, outPHit is addressing barriers to the uptake of high quality deep retrofits while facilitating the development of high performance renovation systems, tools for decision making and quality assurance safeguards. **outphit.eu**

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INTRODUCTION

EnerPHit is an international high efficiency standard for building retrofits, based on Passive House principles and construction components. The EnerPHit standard offers immense benefits. These include significantly increased supply and crisis security and improved residential health and domestic value creation. The low heating load relieves the grid in the sustainable supply structure of the future.

A building that fulfils the EnerPHit criteria as defined by the Passive House Institute can be certified by a member of the international network of accredited Passive House certifiers. EnerPHit certification is typically done in at least three steps, with a rough check at early design stage, a detailed check before start of construction works and a final check after completion of the renovation measures.

Passive House seal

EnerPHit seal

PHI Low Energy Building seal

Download:
Criteria for the Passive House, EnerPHit and PHI Low Energy Building Standards

The outPHit project promotes a streamlined renovation process, such as prefabricated construction elements (e.g. insulated wall panels) or one-stop-shop models. In such renovation approaches changes to the energy efficiency properties of the components or connection details during on-site construction works are not possible any more. Thus a thorough check of the construction planning and the energy balance calculation before start of the construction works becomes especially important. The involved parties also need a clear approval or go-ahead by the certifier or other qualified expert in order to be sure, that the desired efficiency standard will be achieved. Failure to achieve the standard could lead to withdrawal of government funding or compensation claims by the investor.

THE DESIGN STAGE APPROVAL CONCEPT

Thus a formalised procedure for the Design Stage Approval will be very helpful for the parties involved in a renovation project. This paper describes the concept for the design stage approval process (DSA) and the resulting document called Design Stage Approval Letter (DSAL). The approach has been applied to the outPHit renovation projects and further feedback has been collected among. The results of this feedback (also see ANNEX III) was integrated into this final version of the DSA concept.

POINT OF TIME FOR THE DESIGN STAGE APPROVAL

In general, the point of time when the DSAL is issued, should be flexible, because depending on different approaches for the project design and development or additional requirements by funding or building permission concepts, an independent confirmation of the buildings energy efficiency may be required at different design stages. However there are three points of time, when a DSA letter can most reasonably be issued:

1. **Design Phase Review**
   In some city districts the building regulations require Passive House or EnerPHit standard or some government funding programs require Passive House Certification. In order to give a first funding approval they might already ask for a DSAL in the early design phase **at the time of permit planning**. Furthermore, in some countries the responsibility for the project development is transferred from design team to planning and execution teams after the building permit, thereby the DSAL serves as a confirmation for the design team to have achieved adequate energy efficiency design during the early design stage of the project
2. **Execution Planning Review**
   However, the certifier will typically issue the DSAL at **the end of the construction design phase** before the call for tenders. In this stage, most of the project properties have been defined as target specifications and connection details have been developed, the construction works thereby have been described sufficiently. This way the design teams can be sure that the calls for tenders are in line with the requirements for Passive House certification.
3. **Tender process Review**
   After the contract negotiation, the specifications of relevant materials or equipment to be applied to the project should be available in form of data sheets and component descriptions. Sometimes the contractors might adapt or further specify the construction drawings to a considerable extent. Moreover the construction products actually used, might have different characteristic values than originally specified in PHPP. In this case a later DSAL that takes these changes into account might be needed **after the contract negotiation and before the start of the construction works**.

The DSA is an instrument for quality assurance and attestation during the design stage. Therefore DSALs are generally not issued at later stages during the construction phase.

CHRONOLOGY AND ALLOCATION OF TASKS

The DSA process is intended for projects aiming at certification to one of Passive House Institute's energy efficiency standards for buildings (Passive House, EnerPHit and PHI Low Energy Building Standard). Therefor the involved energy consultants and designers usually have an education as Passive House Designer/Consultant.

A typical chronology of a renovation project with a DSA at the end of the construction design phase could be as follows (variations of this process are possible):

- Permit planning
    - architect/designer defines overall design of the building, ideally in close cooperation with engineers and a Passive House Consultant, who creates the first PHPP version;
    - Passive House certifier does preliminary/rough review of drawings and PHPP
- Detailed design
    - architect/designer/engineers create more detailed design for call for tenders;
    - Passive House Consultant updates PHPP
    - Passive House Certifier checks PHPP. If everything is OK, the Certifier issues the DSAL; if not he/she gives feedback and issues the DSAL after one or more iterations
    - The Passive House Consultant creates a specification sheet for all aspects that are relevant for achieving the target energy standard of the building.
- Call for tenders / contracts
    - architect/designer/contractor creates call for tenders based on specification sheet
    - Signing of contracts
- Construction works
- Completing certification
    - When the construction works are completed the Passive House Consultant provides the Certifier with information about deviations from the original design and an updated PHPP. He/she also provides the airtightness test report and the construction manager's declaration.
    - The certifier checks the updated documentation. If everything is in line with the Criteria for the Passive House, EnerPHit and PHI Low Energy Building Standards, the certifier issues the certificate.

WHO MAY ISSUE A DSAL?

A DSAL as described in this document is part of a certification process to one of the Energy Standards published by Passive House Institute. Therefor only **Passive House Institute** itself **or a Passive House Certifier accredited by Passive House Institute** may issue a DSAL.

PLANNING DEPTH AND EXTENT OF EXAMINATION BY THE PASSIVE HOUSE CERTIFIER

Depending on in which planning stage the certifier issues the DSAL, the depth of the information/documentation the DSAL refers to, will differ. Therefor the certifier has to note on the DSAL the planning stage, for which the DSAL is issued. The certifier needs to verify that the level of detail provided is adequate for the corresponding construction stage. In earlier planning stages more assumptions may be used for information that is not available yet (e.g. window frame product not specified yet). The certifier needs to check and approve that these assumptions are conservative enough (e.g. heat losses through thermal bridges).

The documentation Passive House consultant has to provide to the Certifier is described in the document "Criteria for the Passive House, EnerPHit and PHI low Energy Building Standards". As written above, in earlier planning stages some of the information required will be delivered as mere assumptions that need to be substantiated with further evidence at a later stage.

For the DSA the certifier examines all information that is relevant for the PHPP calculation available at that point of time and checks if the documentation corresponds to the information entered in the PHPP. A list of recommended documents that should be provided for the DSA at the different design stages described above can be found in ANNEX II.

ROLE OF PHI AS PROVIDER OF THE DESIGN STAGE APPROVAL SCHEME

The Passive House Institute (PHI) provides the energy standards and the formal structure, materials and support necessary for building certification in the Passive House, EnerPHit and PHI Low Energy Building Standard.

However, as written above, the DSAL is a bipartisan document between the certifier and the certification client. The certifier does not need to inform Passive House Institute about issuing a DSAL and does also not need to provide a copy to PHI. The Passive House Institute is not directly involved in specific DSALs issued by an accredited certifier, other than setting the general guidelines and recommendations for DSALs

CONSTRUCTION TYPES AND ENERGY STANDARDS

In the outPHit project the DSA has been developed for fast and deep retrofits. The energy standard aimed for is generally the EnerPHit standard, Passive House Institute's standard for building retrofit with Passive House components.

However the same process can also be applied to new buildings, aiming for Passive House standard (or for PHI's "PHI Low Energy Building" standard). Thus the DSA process and the DSAL can also be used for new constructions.

For retrofits to the EnerPHit standard as well as for new-built Passive Houses all three certification classes "Classic", "Plus" and "Premium" can be used. The classes express how efficiently the building uses renewable energy as well as how much renewable energy it produces.

BUILDING USES

The DSA process can basically be applied to any building use that can be certified under one of Passive House Institute's building standards, i.e. buildings uses for which PHI offers certification criteria. This covers the most common building uses like residential, office, educational etc. For some more special building uses like indoor swimming pools or hospitals PHI may develop project specific criteria upon request.

HOW ARE SUBSEQUENT CHANGES TRACKED IN THE DSAL?

The DSAL is a snapshot of the planning stage at which it has been issued. This is explicitly stated on the DSAL. Therefore it is generally not required to update the DSAL during the further planning process. However in some cases this might be helpful or necessary:

- if a funding authority requires DSALs at more than one point of time during the planning process
- as a service for the building owner or designer, giving additional security that the desired energy standard will be achieved.

In this case the certifier will check all updated or new documents and the updated PHPP and will issue a new DSAL that again states the current planning stage.

COSTS FOR THE DSAL

The DSA process is part of the certification process under Passive House Institute's building certification standards. In principle no extra checks are needed for the design stage approval that wouldn't have to be done in a certification process without DSA. The DSAL is only a written approval that confirms that the planning at a certain stage is in line with the target energy standard.

However, checks might be necessary at an earlier planning stage, at which the certifier would normally not have done a check. Then more checks are necessary at later planning stages to confirm the more detailed and substantiated information available. This can mean some extra work for the certifier which might result in a slightly higher certification price.

PHI does not specify how much accredited certifiers should charge for certification. The certifier decides this independently based on the expected work load. So the question, if there is an added cost for the DSAL, depends on how many checks at which planning stages the certifier would do anyway. In most cases no additional checks should be necessary. In this case the additional costs for the DSA would be marginal.

THE DESIGN STAGE APPROVAL LETTER

CONTENTS OF THE DSAL

The DSAL must at least include the following items, preferably in the same order as here:

- letterhead and company logo of the certifier
- name and location of the construction/renovation project
- short description of the building, including...
    - building type
    - building use
    - distinctive features
    - etc.
- the target standard (Passive House, EnerPHit, or PHI Low Energy Building)
- version numbers of PHPP and certification criteria used for the project, as well as a reference to the Passive House Institute as issuer of the standard
- names and contact information, of...
    - Passive House Consultant
    - Passive House Certifier
- list of documents provided for the DSA and checked by the certifier
    - or alternatively: reference to zip archive on the certification platform
- information in which planning stage the DSAL has been issued (and the related planning depth verified for the DSAL)
- notes about critical points or uncertain assumption that may compromise the certification if not taken care of
- A confirmation that the project will meet the target standard, if all planning aspects relevant for this will be realized in compliance with the documentation that the certifier has received
- place and date of issue
- signature of the certifier
- a copy of the results sheet of the PHPP (Verification sheet without signature) with preliminary characteristic values of the building fulfilling the criteria

DESIGN, LAYOUT, TEMPLATES, SEALS OF THE DSAL

PHI provides a MS Word template file for the DSAL that all certifiers can use. **The DSA letter does not constitute a certificate for the project**. Certifiers may use their own company letter design / letterheads. Depending on the necessary information for a given project, the DSAL will usually have two or more pages.

The DSAL is a bipartisan document between the Certifier and the certification client. Passive House Institute is not directly involved in specific DSALs issued by an accredited certifier, other than setting the general guidelines for DSALs. Therefore neither the Passive House Institutes company logo, nor any of Passive House Institute's seals may be shown on the DSAL. **As the DSA is only a check at planning stage, no certification seal may be shown on the DSAL**.

The seal on the DSA letter makes the DSA visually more attractive. It confirms, that the energy efficiency design of the project has been approved according to the Criteria for Buildings by the Passive House Institute and that the approval has been issued by a Building Certifier accredited by Passive House Institute.

For deep retrofits to the EnerPHit Standard:

For deep retrofits to the Passive House or PHI Low Energy Building Standard:

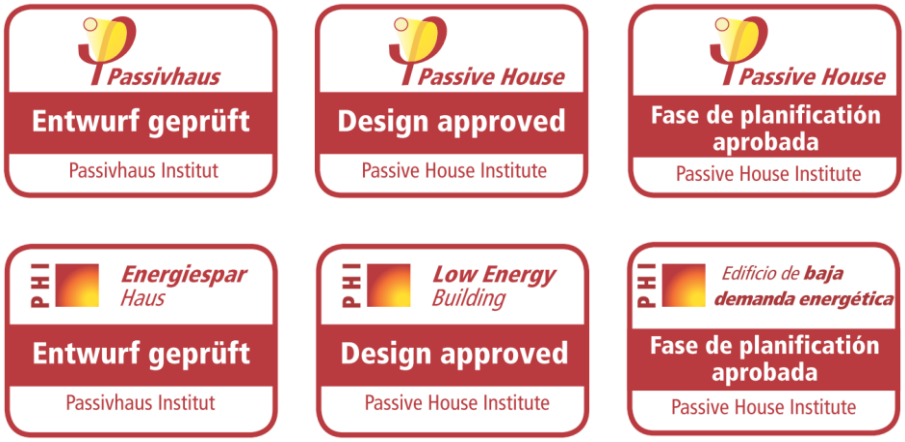

Figure 1 Stamp-like „approved design" seals to be put on the DSAL

DOCUMENTATION OF THE PLANNING STATE AT THE TIME OF DSAL

The Passive House consultant will normally upload all documentation and the PHPP to the Passive House Institute's certification platform. On the platform the certifier can create a zip archive of the current state including all files and communication. This file gives a snapshot of the state at the time of the DSA. The file can be downloaded and then uploaded again to the DSA section of the platform where it will be saved permanently. This storage location can be referenced from the DSAL.

Before creating the zip file it is important that the Passive House consultants marks as "obsolete" all outdated documents that do not show the current state of planning. Otherwise there can be uncertainty which documents are relevant for the DSA.

The use of the certification platform is not obligatory for accredited certifiers. If a project does not use the platform, all documents relevant for the DSA with their corresponding dates must be listed individually in the DSAL.

ANNEX I: DESIGN STAGE APPROVAL LETTER - TEMPLATE

PHI provides a MS Word template file for the DSAL that all certifiers can use. The DSA is rather a letter than a certificate. Certifiers may use their own company letter design / letterheads. Depending on the necessary information for a given project, the DSAL will usually have two or more pages.

The DSAL is a bipartisan document between the Certifier and the certification client. Passive House Institute is not directly involved in specific DSALs issued by an accredited certifier, other than setting the general guidelines for DSALs. Therefore neither the Passive House Institutes company logo, nor any of Passive House Institute's seals may be shown on the DSAL. As the DSA is only a check at planning stage, no certification seal may be shown on the DSAL.

The seal on the DSA letter makes the DSA visually more attractive. It confirms, that the energy efficiency design of the project has been approved according to the Criteria for Buildings by the Passive House Institute and that the approval has been issued by a Building Certifier accredited by Passive House Institute.

The seal is available in the language of the DSAL:

Letter head: company logo and address of accredited Passive House certifier here.

Feel free to copy the text below into a template with your corporate design.

Company
Name of contact person
Address
City, postal code
Country

EnerPHit
Design approved
Passive House Institute

City, dd.mm.YYYY

Design Stage Approval Letter

Dear Mr. Building Owner,

We are happy to inform you that the design stage review of the project below has now been completed. Provided that the building is realized according to the design parameters given in the project documentation, it is expected that the project will achieve the Passive House / EnerPHit / PHI Low Energy Building energy standard as defined by the Passive House Institute. The certification criteria and requirements are available in the **Criteria for Buildings** and verified with the Passive House Planning Package (PHPP).

Project name:	Building name
Project location:	Example Street 99, PC 99999, Example city, Country
Short description:	Building typology and use
Energy consultant:	**Energy Consultant**
Planning stage:	Before call for tenders
Energy standard:	**Passive House / EnerPHit / PHI Low Energy Building**
Criteria version:	**10 c**
PHPP version:	10.6 EN

The expected results can be found in the Appendix I of this letter. These results and the assessment are based on the project documentation submitted by the energy consultant via the Passive House certification platform / per email / through a shared folder in Dropbox or other cloud, during the period of March to August of 2023. In some cases, the values included in PHPP may not match those of the project documentation. These values have been corroborated by the energy consultant, and it is assumed that changes will be made to the project to meet the values in the PHPP.

Changes to the current design parameters may result in significant changes in the calculation results in PHPP. The parameters that can significantly impact the results of this project include:

Examples:

- Airtightness of the thermal envelope (0,4/h at 50Pa)
- Efficiency of the cooling units (average SEER of 18,4 per manufacturer's documentation)
- Good insulation quality of the pipes for domestic hot water, including mountings, suspensions, connections, etc.

Therefore, it is strongly recommended that any changes that may impact the energy balance of the project are confirmed by the energy consultant.

Please note: this letter does not constitute a certificate for the project. Certification is only awarded upon the successful final verification of the energy balance calculation with the PHPP and the documentation of the constructed project. Good quality and appropriate supervision on building site is necessary for this.

We are looking forward to the realization of this energy efficient and comfortable Passive House / EnerPHit / PHI Low Energy Building.

Kind regards,

Logo of the certifying organization

Name and signature of certifier
Certifying organization

Appendix I: Expected results

Appendix I: Expected Results

Project name

Passive House-Verification

10.4a EN

PHPP

Photo or drawing

Building:	End-of-terrace Passive House
Street:	Example Street 99
Postcode/City:	99999 Example City
Province/Country:	Example Province DE-Germany
Building type:	4-Row house
Climate data set:	DE-9999-PHPP-Standard
Climate zone:	3: Cool-temperate Altitude of location: -
Home owner / Client:	Passivhaus Association of Owners
Street:	Example Street 99
Postcode/City:	99999 Example City
Province/Country:	Example Province DE-Germany

Architecture:	Example Architectural Firm
Street:	Example Street 99
Postcode/City:	99999 Example City
Province/Country:	Example Province DE-Germany
Energy consultancy:	Example Energy Consultant
Street:	Example Street 99
Postcode/City:	99999 Example City
Province/Country:	Example Province DE-Germany

Mechanical engineer:	Example Mechanical Services Firm
Street:	Example Street 99
Postcode/City:	99999 Example City
Province/Country:	Example Province DE-Germany
Certification:	Passive House Institute
Street:	Rheinstr. 44/46
Postcode/City:	64283 Darmstadt
Province/Country:	DE-Germany

Year of construction:	2021	Interior temperature winter [°C]:	20.0
No. of dwelling units:	1	Internal heat gains (IHG) winter [W/m²]:	2.4
No. of occupants:	2.9	Specific heat capacity [Wh/K per m² TFA]:	204
		Interior temp. summer [°C]:	25.0
		IHG summer [W/m²]:	2.4
		Mechanical cooling:	

Specific building characteristics with reference to the treated floor area

					Criteria	Alternative criteria	Fullfilled?[2]
	Treated floor area	m²	156.0				
Space heating	Heating demand	kWh/(m²a)	**12**	≤	15	-	**Yes**
	Heating load	W/m²	**10**	≤	-	10	
Space cooling	Cooling & dehum. demand	kWh/(m²a)	**-**	≤	-		**-**
	Frequency of overheating (> 25 °C)	%	**1**	≤	10		**Yes**
	Frequency of excessively high humidity (> 12 g/kg)	%	**0**	≤	20		**Yes**
Airtightness	Pressurisation test result n_{50}	1/h	**0.2**	≤	0.6		**Yes**
Non-renewable Primary Energy (PE)	PE demand	kWh/(m²a)	**45**	≤	-		**-**
Primary Energy Renewable (PER)	PER demand	kWh/(m²a)	**36**	≤	30	36	**Yes**
	Renew. energy generation (in rel. to projected building footprint area)	kWh/(m²a)	**176**	≥	120	132	

I confirm that the values given here have been determined following the PHPP methodology and based on the characteristic values of the building. The PHPP calculations are attached to this verification.

Passive House Premium? **Yes**

Task:	First name:	Surname:	Signature:
1-Design	Example	Example	
Certificate-ID	Issued on:	City:	
		Darmstadt	

ANNEX II: DOCUMENTS TO BE APPROVED DURING THE DSA

For Passive House Building Certification, planning execution is checked carefully and comprehensively. Other documentation relates to the construction such as the airtightness test complete the quality assurance process and is only available after the completion of the building. A final certificate is only issued if the exactly defined criteria have been met without exception.

In general it is recommended to contact a certifier early on in the planning process. Any problems identified by the certifier can be easily corrected at this point in time. As a rule, all energy-relevant planning documents and technical data of the construction products are submitted before the start of construction work. After careful checking and comparison with the energy balance calculation, the certifier will provide information about any necessary corrections.

LIST OF DOCUMENTS FOR DIFFERENT DESIGN STAGES

Depending on in which planning stage the certifier issues the DSAL, the depth of the information/documentation the DSAL refers to, will differ. Therefor the certifier has to note on the DSAL the planning stage, for which the DSAL is issued. The certifier needs to verify that the level of detail provided is adequate for the corresponding construction stage. In earlier planning stages more assumptions may be used for information that is not available yet (e.g. window frame product not specified yet). The certifier needs to check and approve that these assumptions are conservative enough (e.g. heat losses through thermal bridges).

The documentation Passive House consultant has to provide for the final building certification is described in the document “Criteria for the Passive House, EnerPHit and PHI low Energy Building Standards”. The documents to be provided through PHI´s certification platform can be sorted into the following categories:

- PHPP calculation + EnerPHit Retrofit plan if applicable
- Planning documents for architecture
- Materials, connection details and thermal bridges
- Windows & doors
- Ventilation
- Heating / DHW / Cooling
- Electricity
- Renewable energy
- Construction phase documentation + certificates

As written above, in earlier planning stages some of the information required will not yet be available and has to be considered as mere assumptions within the design stage assessment, to be substantiated at a later stage. The level of detail required for a Design Stage Approval might also differ between the purposes of the DSA or the country where they are required. However, for the three different design stages that are suggested for a DSA, these documents to be approved by the certifier are recommended:

DESIGN PHASE REVIEW

Suggested documents for the Design Stage Approval **before the building permit** based on information and planning material most likely available:

- **PHPP calculation + EnerPHit Retrofit (ERP) plan if applicable**
- *PHPP calculation (+ERP) based on careful assumptions*
- *Map link to the building site*
- **Planning documents for architecture**
- *Planning documents (floor plan / sections / elevations etc) in adequate scale*
- *3D building models (e.g. designPH) if available*
- **Materials, connection details and thermal bridges**
- *Preliminary descriptions and careful assumptions of material specifications*
- *Indication of airtightness layer in planning materials*
- *Thermal bridge schedule and location plan*
- *Careful assumptions for thermal bridge coefficients*
- **Windows & doors**
- *Window schedule and location plans*
- *Careful assumptions for window and door specifications (U-values / g-values / standard installation Psi-Values)*
- *Careful assumptions for temporary shading*
- **Ventilation**
- *Preliminary description of the ventilation concept*
- *Preliminary calculation of volumes and air change rates*
- *Indication of position of the ventilation units and ductwork in planning materials*
- *Careful assumption of the efficiency specifications of the ventilation system*
- **Heating / DHW / Cooling**
- *Preliminary description of building services Heating / DHW / cooling if applicable*
- *Careful assumptions for the efficiency of heating / DHW / cooling*
- **Electricity**
- *Standard assumptions for standard applications*
- *Careful assumptions for special devices / services*
- **Renewable energy**
- *Preliminary descriptions of renewable energy systems to be installed*
- *Indication of RES systems in planning materials*
- *Careful assumptions for the efficiency specifications of the RES systems*
- **Construction phase documentation + certificates**
- *Not yet applicable*

Execution Planning Review

Suggested documents for the Design Stage Approval **after completion of the execution planning and before the tender process** based on information and planning material most likely available:

- **PHPP calculation + EnerPHit Retrofit (ERP) plan if applicable**
- *PHPP calculation (+ERP) based on target project values / specifications*
- *Map link to the building site*
- **Planning documents for architecture**
- *Planning documents (floor plan / sections / elevations etc) in adequate scale*
- *Drawings for treated floor area (TFA) or internal volumes and shading objects*
- *Detail drawings of relevant component connections in adequate scale*
- *3D building models (e.g. designPH) if available*
- **Materials, connection details and thermal bridges**
- *Descriptions and target specifications of materials and assemblies*
- *Indication and description of airtightness layer in planning materials*
- *Thermal bridge schedule and location plan*
- *Calculations of thermal bridge coefficients or reference values from literature*
- **Windows & doors**
- *Window schedule and location plans*
- *Target specifications for windows and doors (U-values / g-values /calculated Psi-values)*
- *Target specifications for temporary shading*
- **Ventilation**
- *Detailed description of the ventilation concept*
- *Calculation of volumes and air change rates*
- *Target values for the adjustment protocol for the ventilation system*
- *Technical drawings of the ventilation system and ductwork in adequate scale*
- *Pressure loss calculations if applicable*
- *Target specifications of the efficiency of the ventilation system (heat recovery / energy recovery / electric efficiency / airflow range / frost protection / sound)*
- **Heating / DHW / Cooling**
- *Detailed description of building services Heating / DHW / cooling if applicable*
- *Technical drawings of the building services and ductwork in adequate scale*
- *Target specifications for the efficiency of heating / DHW / cooling*
- **Electricity**
- *Standard assumptions for standard applications*
- *Target specifications for special devices / services*
- **Renewable energy**
- *Detailed descriptions of renewable energy systems*
- *Indication of RES systems in planning materials including installation details*
- *Target specifications for the efficiency specifications of the RES systems*
- **Construction phase documentation + certificates**
- *Not yet applicable*

Tender process Review

Suggested documents for the Design Stage Approval **after the tender process and before start of the construction works** based on information and planning material most likely available. Specifications of components of the building envelope and technical equipment have to be verified with datasheets of the components agreed within the tender and, if available, suitable certificates:

- **PHPP calculation + EnerPHit Retrofit (ERP) plan if applicable**
- *PHPP calculation (+ERP) based on agreed values / specifications*
- *Map link to the building site*
- **Planning documents for architecture**
- *Final planning documents (floor plan / sections / elevations etc) in adequate scale*
- *Drawings for treated floor area (TFA) or internal volumes and shading objects*
- *Final detail drawings of relevant component connections in adequate scale*
- *3D building models (e.g. designPH) if available*
- **Materials, connection details and thermal bridges**
- *Final descriptions and agreed specifications of materials and assemblies*
- *Indication and description of airtightness layer in planning materials*
- *Thermal bridge schedule and location plan*
- *Calculations of thermal bridge coefficients or reference values from literature*
- **Windows & doors**
- *Window schedule and location plans*
- *Agreed specifications for windows and doors (U-values / g-values /calculated Psi-values)*
- *Agreed specifications for temporary shading*
- **Ventilation**
- *Final description of the ventilation concept*
- *Calculation of volumes and air change rates*
- *Final values for the adjustment protocol for the ventilation system*
- *Final technical drawings of the ventilation system and ductwork in adequate scale*
- *Pressure loss calculations if applicable*
- *Agreed specifications of the efficiency of the ventilation system (heat recovery / energy recovery / electric efficiency / airflow range / frost protection / sound)*
- **Heating / DHW / Cooling**
- *Final description of building services Heating / DHW / cooling if applicable*
- *Final technical drawings of the building services and ductwork in adequate scale*
- *Agreed specifications for the efficiency of heating / DHW / cooling*
- **Electricity**
- *Standard assumptions for standard applications*
- *Agreed specifications for special devices / services*
- **Renewable energy**
- *Final descriptions of renewable energy systems*
- *Indication of RES systems in planning materials including installation details*
- *Agreed specifications for the efficiency specifications of the RES systems*
- **Construction phase documentation + certificates**
- *Not yet applicable*

ANNEX III: FEEDBACK FROM STAKEHOLDERS

QUESTIONNAIRE:
DESIGN STAGE APPROVAL (DSA)

For a Design Stage Approval (DSA) a Passive House Certifier checks the project documentation at a planning stage and confirms that the project will achieve the target energy standard if the building will be constructed according to the planning. Such a confirmation can be important for owners, designers, construction companies and public financing bodies. PHI is currently developing a more formalized process for this, with the idea to provide it to all certifiers as an optional generalized tool.

Answering the below questions will help us tailor this tool to your needs. If you don't have the time to answer all questions, you can still help us, by just answering the ones that appear most relevant to you.

1. Your current certification practice:
   - In what stage do you issue a design stage approval letter (e.g. before application for construction permit; before call for tenders; before start of construction)?
   - How do you deal with necessary assumptions for information not yet available at earlier planning stages?
   - What do you include in the DSA letter (e.g. copy of PHPP, detailed list of specifications, reference to Certification Platform)
2. Are there any third parties in your projects/country/region (e.g. public funding bodies) that require a DSA letter to prove that Passive House / EnerPHit standard can be achieved?
   If so, please tell us more about it:
   - Name and role of the third parties, link to requirements/guidelines:
   - Planning stage(s) at which they require a DSA letter:
   - In retrofits or in new construction?
   - Required documentation and content/form of the DSA letter.
   - Do you have many projects with DSA letters required by a third-party?
3. New formalized general DSA process by PHI:
   - Would it be helpful for your work if PHI defined an (optional) general formalized DSA process? Please give reasons.
   - Any points that you think are important to include (or not include) into such a formalized process?
   - In your opinion: Should there be a template for a DSA letter in PHI design and with PHI logo or should this be a document with the certifier's letterhead?
   - Any added functions of the certification platform that could help you in the DSA process (e.g. being able to save a snapshot of the documentation on the platform at the point of time when the DSA letter is issued)?
   - What are the main problems, hassles, unnecessary workloads that you encounter as a certifier in the DSA stage.
   - What are typical issues putting certification at risk that happen between the DSA and the final certification?
4. Any other points you would like to share regarding DSA?

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Figure 2 Questionnaire for Passive House Certifiers about the DSA concept

In February 2023, a questionnaire was shared among all **accredited Passive House Certifiers for buildings**. The questionnaire contained questions regarding

- the use of design stage approval concepts in the certification practise
- the stakeholders who require such design stage approval concepts
- the Certifier´s expectations for a formalised DSA approach by PHI
- other important points to be mentioned regarding DSA concepts

The answers from 18 certifiers have been summarized below. The main feedback was included in the final revision of the template of the Design Stage approval Letter (DSAL).

DSA IN YOUR CURRENT CERTIFICATION PRACTICE:

- **In what stage do you issue a design stage approval letter (e.g. before application for construction permit; before call for tenders; before start of construction)?**

  Many different points of time, but latest before start of construction.
  - *Cities often before construction permit is issued*
  - *Other: Pre-tender, when detailed design is finished*
  - *sometimes DSAs are required at more than one point of time in the planning process.*
- **How do you deal with necessary assumptions for information not yet available at earlier planning stages?**
  - *Conservative assumptions in PHPP defined either by designer or certifier.*
  - *Assumptions must be marked/colorcoded in PHPP or listed in the DSAL.*
  - *Or only issue DSA when there are no more uncertainties.*
- **What do you include in the DSA letter (e.g. copy of PHPP, detailed list of specifications, reference to Certification Platform)**
  - *Reference to PHPP and Certification Platform.*
  - *List of checked and unchecked items.*
  - *Cover letter highlighting all particular values for the thermal envelope, for the M&E and ventilation / airtightness.*
  - *Potential risks of failure.*
  - *Copy of PHPP verification sheet.*
  - *List of assumptions for PHPP*

WHICH STAKEHOLDERS REQUIRE DESIGN STAGE APPROVAL LETTERS?

Are there any third parties in your projects/country/region (e.g. public funding bodies) that require a DSA letter to prove that Passive House / EnerPHit standard can be achieved? If so, please tell us more about it:

- **Name and role of the third parties, link to requirements/guidelines:**
  - *Mostly on city level (Vancouver, NYC,)*
  - *State level: Massachusetts, Colorado (Build Back Better)*
  - *Scotland sometimes funding requirement*
  - *BASIX NSW Australia*
  - *project developers in Spain*
  - *European fund for regions and developpement (FEDER in french) in the "Region Grand Est" (Löthringen, Elsass, etc.) gives subsides for passivehouse projects, Mortgage lenders for a*

reduced mortgage on completion; https://www.triodos.nl/klimaat-plus-hypotheek; institutional clients

- **Planning stage(s) at which they require a DSA letter:**

  Various project stages before construction phase

- **In retrofits or in new construction?**

  Mostly new construction

- **Required documentation and content/form of the DSA letter.**

  Example City of Vancouver: The certifier must approve a so called "Passive House verification plan", which describes in a very detailed manner all quality insurances steps and measures making sure that the building will be executed as designed.

- **Do you have many projects with DSA letters required by a third-party?**

  Many projects in North America: Typically every Vancouver project and every New York CIty (NYSERDA) project is required to have a DSALetter.

NEW FORMALIZED GENERAL DSA PROCESS BY PHI:

- **Would it be helpful for your work if PHI defined an (optional) general formalized DSA process? Please give reasons.**
  - *Helpful if flexibel and not mandatory.*
  - *Standardized consistent process can create more confidence.*
  - *Some information directed at cities developing funding programs could be helpful.*
- **Any points that you think are important to include (or not include) into such a formalized process?**
  - *list of certifiers*
  - *list of assumptions, no more than 2 page*
  - *underlying PHPP date / underlying drawings date / underlying verification report*
  - *disclaimer concerning the role of the certifier*
  - *the approval as a conditional sentence, for example: "If the execution on the building site complies with the current PHPP calculation (verified version from the 22.06.2022) and if the blue marked remarks in this report are observed and implemented, the building can be awarded the Passive House Certificate Passive House Classic."*
- **In your opinion: Should there be a template for a DSA letter in PHI design and with PHI logo or should this be a document with the certifier's letterhead?**

  Certifier Letter Head, with accredited certifier seal

- **Any added functions of the certification platform that could help you in the DSA process (e.g. being able to save a snapshot of the documentation on the platform at the point of time when the DSA letter is issued)?**

  Uploaded documents are anyway dated, so no snapshot necessary

- **What are the main problems, hassles, unnecessary workloads that you encounter as a certifier in the DSA stage.**
  - *Planning changes after DSA.*
  - *Client taking project ahead without communicating.*
  - *Simple possibility to provide PHPP to others without PHPP licence in a read-only form (printing a PDF costs a lot of time)*

- **What are typical issues putting certification at risk that happen between the DSA and the final certification?**
  - *additional thermal bridges*
  - *specification changes for windows, insulation and HRV in the tendering process*
  - *undocumented as-built changes*
  - *airtightness result*
  - *changes effecting PE*

ANY OTHER POINTS YOU WOULD LIKE TO SHARE REGARDING DSA?

- *I think this would generally be quite useful to standardise.*
- *Do it on every project*
- *DSA as a positive incentive is always good!*