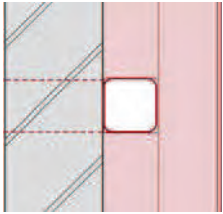
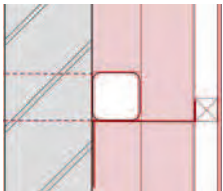
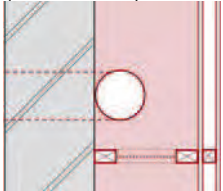
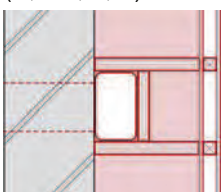
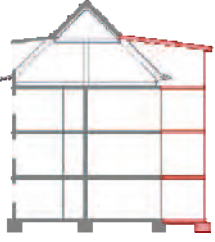
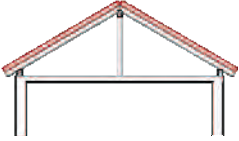










**Renovation modules (March 2007)**

The specification and required documentation of the standard renovation was discussed. The summarized results are shown below. They are the basis for the further development of the renovation modules. Specification: to be specified as standard requirement by Annex team; Documentation: to be documented by industry partner.

Module	Description	Specification	Documentation
F1 Compact façade insulation (CH, CZ, F, P) 	Conventional compact insulation with polystyrene or mineral wool insulation, plaster finish  Prefabrication could focus on duct and pipe integration, and insulated window frames	<ul style="list-style-type: none"> <li>- U-value</li> <li>- Mechanical robustness</li> <li>- Fire protection requirements</li> <li>- Piping and duct integration</li> <li>- Existing window vertical /horizontal section</li> </ul>	<ul style="list-style-type: none"> <li>- Standard section</li> <li>- Fixing on soft/inadequate undergrounds</li> <li>- Window vertical /horizontal detail</li> <li>- Piping integration/fixing</li> <li>- Fire breaks</li> <li>- Building socket</li> <li>- Flat roof interface</li> <li>- Façade profiling</li> <li>- Material specifications</li> <li>- Prices per m2</li> </ul>
F2 Ventilated façade insulation (CZ, S, F) 	Mineral wool insulation and ventilated cladding, fixed with mounting system, mounting and cladding system prefabricated.  Prefabrication could focus on substructure, pipe integration, and insulated window frames	<ul style="list-style-type: none"> <li>- U-value, thermal bridges</li> <li>- Fire protection requirements</li> <li>- Air tightness</li> <li>- Tolerances (existing façade)</li> <li>- Piping and duct integration</li> <li>- Existing window vertical /horizontal section</li> </ul>	<ul style="list-style-type: none"> <li>- Standard section</li> <li>- Convex building corners</li> <li>- Window vertical /horizontal detail</li> <li>- Piping integration/fixing</li> <li>- Building socket</li> <li>- Flat roof interface</li> <li>- Cladding materials</li> <li>- Material specifications</li> <li>- Prices per m2</li> </ul>
F3 Cellulose fibre insulated façade cladding (CH, D, A, F) 	Blow in fibre insulation and ventilated cladding, mounting system permeable to air, mounting and cladding system prefabricated	<ul style="list-style-type: none"> <li>- U-value, thermal bridges</li> <li>- Fire protection requirements</li> <li>- Air tightness</li> <li>- Tolerances (existing façade)</li> <li>- Piping and duct integration</li> <li>- Existing window vertical /horizontal section</li> </ul>	<ul style="list-style-type: none"> <li>- Standard section</li> <li>- Convex building corners</li> <li>- Window vertical /horizontal detail</li> <li>- Piping integration/fixing</li> <li>- Building socket</li> <li>- Flat roof interface</li> <li>- Cladding materials</li> <li>- Material specifications</li> <li>- Prices per m2</li> </ul>
F4 Prefabricated façade module (D, CH, F, P) 	Mineral wool, foam or vacuum insulation in frame construction and ventilated cladding, full system prefabricated, incl. windows and duct system	<ul style="list-style-type: none"> <li>- U-value opaque façade</li> <li>- U-value windows and doors</li> <li>- Fire protection requirements</li> <li>- Piping and duct integration</li> <li>- Air tightness</li> <li>- Tolerances (existing façade)</li> <li>- Transportation limits (seize, weight)</li> <li>- Existing window vertical /horizontal section</li> </ul>	<ul style="list-style-type: none"> <li>- Standard section</li> <li>- Mounting system, process</li> <li>- Convex building corners</li> <li>- Window vertical /horizontal detail</li> <li>- Piping integration/fixing</li> <li>- Building socket</li> <li>- Flat and steep roof interface</li> <li>- Cladding materials</li> <li>- Material specifications</li> <li>- Transportation protection</li> <li>- Prices per m2</li> </ul>
F5 Room extension	Prefabricated light	- Size requirements	- Standard section vertical

<p>(D, DK, P, S)</p> 	<p>weight façade constructions, suitable for integration of balconies</p> <p>Preferred are largely glazed units that can be used as living room extensions and (in summer) as open spaces</p>	<ul style="list-style-type: none"> <li>- Glazing/opening requirements</li> <li>- U-value opaque/glazed façade</li> <li>- Solar gains and solar gain protection</li> <li>- Fire protection requirements</li> <li>- El. Piping integration</li> <li>- Air tightness</li> <li>- Window cleaning</li> <li>- Existing floor/façade interface</li> <li>- Tolerances (façade, floor levels)</li> <li>- Transportation limits (seize, weight)</li> </ul>	<ul style="list-style-type: none"> <li>- /horizontal</li> <li>- Floor section</li> <li>- system, process</li> <li>- Window vertical /horizontal detail</li> <li>- Sun shading</li> <li>- Façade interface</li> <li>- Roof and socket detail, foundation</li> <li>- Material specifications</li> <li>- Transportation protection</li> <li>- Prices per unit Mounting</li> </ul>
<p>R1 Insulated steep roof elements (CH, CZ)</p> 	<p>Large insulated roof elements, prefabricated</p>	<ul style="list-style-type: none"> <li>- Structural requirements, loads, span</li> <li>- Slope (steepness)</li> <li>- U-value, thermal bridges</li> <li>- Fire protection requirements</li> <li>- Air tightness</li> <li>- Tolerances (existing support structure)</li> <li>- Piping and duct integration needs</li> <li>- Roofing material</li> <li>- Inner finish</li> </ul>	<ul style="list-style-type: none"> <li>- Standard section</li> <li>- Structural system, bearings</li> <li>- Roof element joints</li> <li>- Roof window detail</li> <li>- Piping integration</li> <li>- Façade interface</li> <li>- Water drainage</li> <li>- Material specifications</li> <li>- Transportation protection</li> <li>- Prices per m2</li> </ul>
<p>R3 Attic steep roof space module (CZ, D, F, S)</p> 	<p>Complete light weight attic extensions (Velux type)</p>	<ul style="list-style-type: none"> <li>- Structural requirements, loads, span</li> <li>- Supporting structure</li> <li>- Slope (steepness)</li> <li>- Space requirements</li> <li>- U-values, thermal bridges</li> <li>- Fire protection requirements</li> <li>- Air tightness</li> <li>- Tolerances (existing support structure)</li> <li>- Piping and duct connections</li> <li>- Roofing material</li> <li>- Inner finishes</li> <li>- Access to roof extension</li> <li>- Transportation limits (seize, weight)</li> </ul>	<ul style="list-style-type: none"> <li>- Standard section, floor plan</li> <li>- Structural system, bearings</li> <li>- Roof element joints</li> <li>- Roof/dormer window details</li> <li>- Solar thermal/PV integration</li> <li>- Piping integration, connections with building</li> <li>- Façade interface</li> <li>- Water drainage</li> <li>- Material specifications</li> <li>- Transportation stabilisation/protection</li> <li>- Prices</li> </ul>
<p>R8 Attic flat roof space module (A, D, DK, F, S)</p> 	<p>Prefabricated roof solutions for new attic spaces</p>	<ul style="list-style-type: none"> <li>- Structural requirements, loads, span</li> <li>- Supporting structure</li> <li>- Space requirements</li> <li>- U-values, thermal bridges</li> <li>- Fire protection requirements</li> <li>- Air tightness</li> <li>- Tolerances (existing support structure)</li> <li>- Piping and duct connections</li> <li>- Roofing material</li> <li>- Inner finishes</li> <li>- Access to roof extension</li> <li>- Transportation limits (seize, weight)</li> </ul>	<ul style="list-style-type: none"> <li>- Standard section, floor plan</li> <li>- Structural system, bearings</li> <li>- Roof element joints</li> <li>- Solar thermal/PV integration</li> <li>- Piping integration, connections with building</li> <li>- Façade/roof interface</li> <li>- Water drainage</li> <li>- Material specifications</li> <li>- Transportation stabilisation/protection</li> <li>- Prices</li> </ul>
<p>R9 Attic flat roof space</p>	<p>Completely</p>	<ul style="list-style-type: none"> <li>- Structural requirements,</li> </ul>	<ul style="list-style-type: none"> <li>- Standard section, floor</li> </ul>

<p>module (A, D, DK, F, S)</p> 	<p>prefabricated light weight attic extensions (flat roof type)</p> <p>They may offer additional living space, space for technical installations or both.</p>	<p>loads, span</p> <ul style="list-style-type: none"> <li>- Supporting structure</li> <li>- Space requirements</li> <li>- U-values, thermal bridges</li> <li>- Fire protection requirements</li> <li>- Air tightness</li> <li>- Tolerances (existing support structure)</li> <li>- Solar thermal/PV integration requirements</li> <li>- Air handling unit, storage tank and other technical systems requirements</li> <li>- Techn. Systems performance requirements</li> <li>- Piping and duct connect.</li> <li>- Roofing material</li> <li>- Inner finishes</li> <li>- Access to roof extension</li> <li>- Transportation limits (seize, weight)</li> </ul>	<p>plan</p> <ul style="list-style-type: none"> <li>- Structural system, bearings</li> <li>- Roof element joints</li> <li>- Solar thermal/PV integration</li> <li>- Technical systems documentation</li> <li>- Piping integration, connections with building</li> <li>- Façade/roof interface, balustrades</li> <li>- Water drainage</li> <li>- Material specifications</li> <li>- Transportation stabilisation/protection</li> <li>- Prices</li> </ul>
<p>T1 Central air system (A, CZ, D, F, P)</p> 	<p>Central ventilation system with distribution ducts mounted on façade</p>	<ul style="list-style-type: none"> <li>- Air handling unit performance requirements (air volume, heat recovery, air pre-warming/cooling, noise)</li> <li>- Air distribution requirements</li> <li>- Return air requirements</li> <li>- Noise requirements</li> <li>- Installation space and service access</li> <li>- Fire protection requirements</li> <li>- Control requirements</li> </ul>	<ul style="list-style-type: none"> <li>- Installation plan</li> <li>- Installation documentation</li> <li>- Maintenance documentation</li> <li>- Electrical requirements</li> <li>- Noise protection measures</li> <li>- Condensation drainage</li> <li>- Air inlet / outlet</li> <li>- Prices per unit</li> </ul>
<p>T4 Floor heating (NL)</p> 	<p>Integration of slim floor heating/cooling systems, optional application of ceiling heating and cooling</p>	<ul style="list-style-type: none"> <li>- Heating/cooling demand and load distribution</li> <li>- Existing distribution system</li> <li>- Existing floor construction and possibility for static loads</li> <li>- Available floor height and interfaces at doors / stairs</li> </ul>	<ul style="list-style-type: none"> <li>- Installation /distribution plan</li> <li>- heating system requirements</li> <li>- Installation documentation</li> <li>- Standard floors section</li> <li>- Interfaces at doors / stairs</li> <li>- Noise protection measures</li> <li>- Prices per unit</li> </ul>
<p>T5 Hot water system (P)</p> 	<p>Renewal or adaptation of existing hot water system, connected to heat recovery (heat pump) and/or solar system</p>	<ul style="list-style-type: none"> <li>- Water consumption</li> <li>- Temperature needs</li> <li>- Solar gains, heat recovery gains</li> <li>- Back up system</li> <li>- Circulation/Distribution system needs</li> </ul>	<ul style="list-style-type: none"> <li>- Installation plan</li> <li>- Installation documentation</li> <li>- Maintenance documentation</li> <li>- Electrical requirements</li> <li>- Boiler drainage/expansion</li> <li>- Prices per unit</li> </ul>
<p>T6 Integrated solar system (A, D, DK, F, P, S)</p> 	<p>Integration of thermal solar collectors and/or PV to roof</p>	<ul style="list-style-type: none"> <li>- Solar thermal system requirements (gains, temperature level, storage capacity, hot water use, heating use)</li> <li>- Photovoltaic system requirements (peak, annual gains)</li> <li>- Instrumentation requirements</li> <li>- Orientation of solar areas</li> <li>- Climatic data</li> <li>- Back up heating</li> </ul>	<ul style="list-style-type: none"> <li>- Roof integration detail</li> <li>- System specification</li> <li>- Electrical and hydraulic connections</li> <li>- Predicted gains</li> <li>- Overheating protection</li> <li>- Instrumentation</li> <li>- Prices per m2</li> </ul>
<p>T7 Control system</p>	<p>Installation of</p>	<p>Required control functions</p>	<p>- Description of control</p>

<p>(DK, S)</p> 	<p>advanced control for heating, ventilation, light</p>	<p>and parameters</p> <ul style="list-style-type: none"> <li>- Heating</li> <li>- Ventilation</li> <li>- Cooling</li> <li>- Lighting / Daylighting / Sun protection</li> </ul>	<p>scheme and options</p> <ul style="list-style-type: none"> <li>- Control sensors</li> <li>- Control actuators</li> <li>- Controller unit</li> <li>- Installation needs</li> <li>- Prices per unit</li> </ul>
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