



**NEARLY
ZERO
ENERGY**
HOUSING FOR
COLD/CONTINENTAL
CLIMATE ZONES

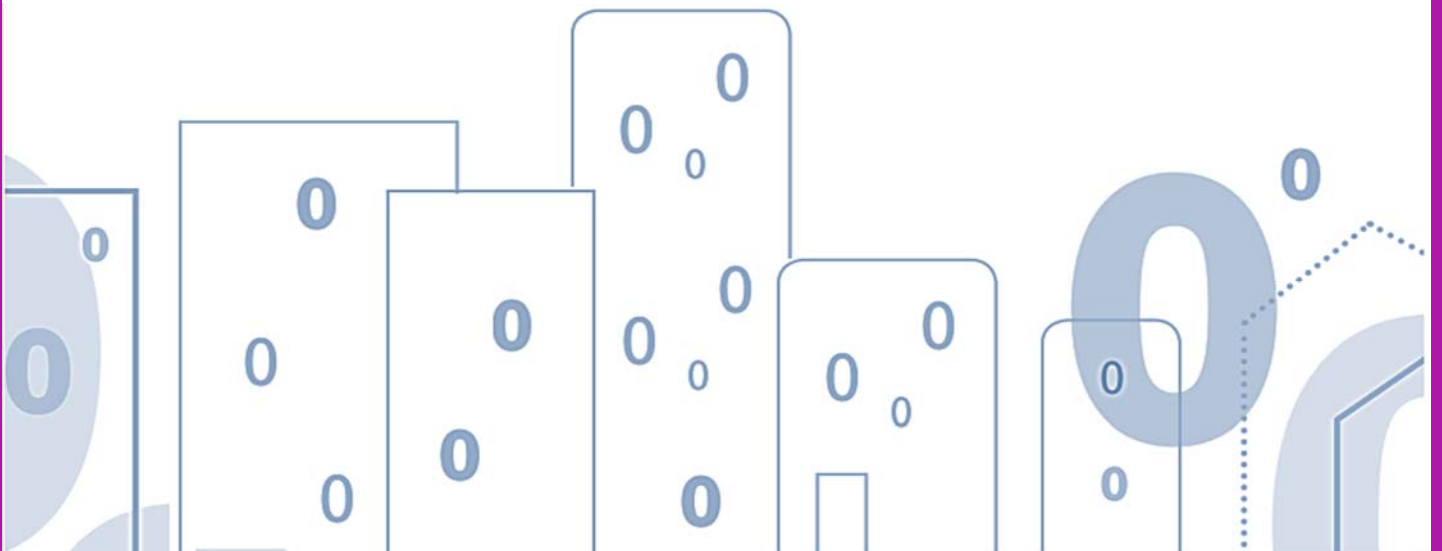
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Needs Analysis and Work Programme
Including nZEB Legislation review



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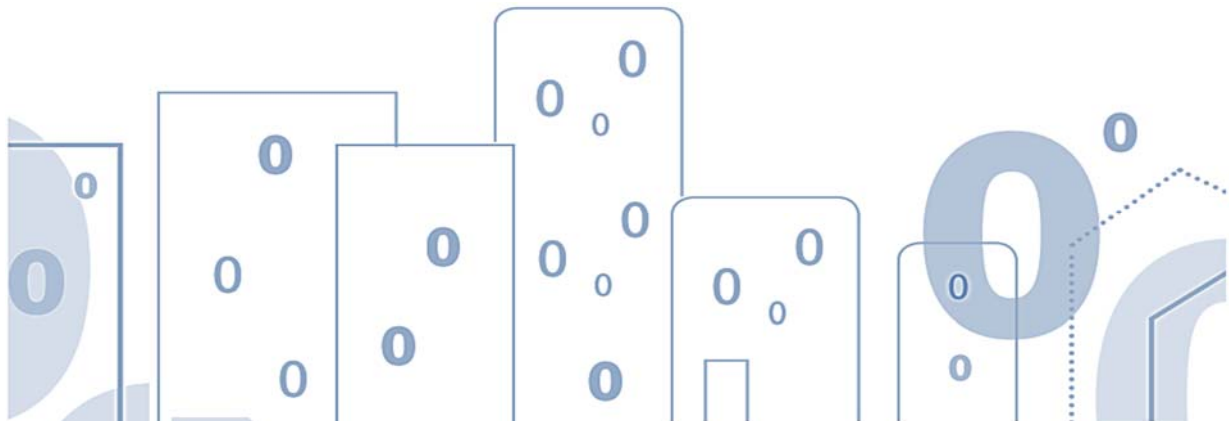
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1. Introduction

The following needs analysis is based on the reports delivered by TaskForce members from eight different countries. The national frameworks are different as well as the status of low energy buildings. Since the processes of definition of nZEB and shaping the Roadmaps for the implementation are still in progress, this report tries to give an updated picture for the end of the year 2012/beginning 2013.

2. Task Force Needs Analysis

2.1 Taskforce Theme

The first “very low energy buildings” have been developed in countries/regions with modest cold or continental climates. One of the drivers for these types of buildings was the search for new construction features reducing energy consumption to a minimum – using optimal insulation and technical devices to use passive sources of energy. At least in some countries (social) housing providers are amongst the forerunners of low energy building/housing provision. As in other economic activities the introduction of new technologies requires new skills in production and management of the production process; users have to adapt to the new technologies as well. As regards housing, housing providers are developers but not producers of the buildings/dwellings they rent out – which means that they bear the financial responsibility and risks of long lasting goods and also have their commitments and responsibilities towards their (social) tenants. It is rather that tension that shapes the focus theme of the taskforce, while the question of the climate only constitutes part of it: Cold climate requires extra measures since the heating demand in colder regions may be more than 50% above the continental level. Nevertheless, the question of overheating in hot summer periods also occurs in continental climates and thus may not be neglected in nZEB construction.

2.1.1 Definition of nZEB for the purpose of the ongoing project

The definition of the Building Directive leaves room for different definitions of nZEB as well as in the strategy of approaching the 2020 target. At present, it is only one country amongst taskforce members (France) that has an exact definition for nZEB plus a roadmap. In other countries the discussion on the definition is still ongoing; but in some countries a stepwise tightening in building regulations introduced around the years 2005 - 2009 shows the direction. Anyway - an exact (final) definition is not the focus of the ongoing project. It

rather deals with different versions of (very) low energy or nZE buildings to identify their cost effectiveness and usability in practice.

2.1.2 Current number of “nZEB”

One of the questions discussed with taskforce members was the existence of (very) low energy buildings to find out about the current energetic level of housing construction and via this information about the experience with low energy housing.

As it turns out nowhere is an accurate reporting/monitoring system in both new construction and refurbishing. In Germany and Austria, the two leading countries in the construction of passive housing, for some years there had been reports on the construction/refurbishment of passive houses that were based on initiatives partially financed by promotion funds. In Austria out of different reasons this reporting system has been given up in the recent past – either as there were “too many cases” for the existing reporting system or because of different definitions and concepts (interpretation of Johannes Kislinger, head of Austrian IG Passivhaus <http://derstandard.at/1343744371073/Sehr-viele-Passivhaeuser-sind-leider-gar-keine>).

In Germany reporting of heating systems together with building permissions has been introduced by the official statistic office, but this is criticized also because of the use of misleading concepts of passive housing (<http://www.phk-verlag.de/news/newsdetails/artikel/statistisches-bundesamt-zaehlt-passivhaeuser-falsch-und-bald-gar-nicht-mehr/>). Nevertheless some conclusions can be drawn for Germany using the reporting system for low energy housing promotion (see below). In France there is a certification system for new built buildings and at least there is a number for dwellings with pending applications for a certification and those which already have been certified. Of course there are reports by providers or their umbrella organisations which highlight at least the energetic quality of a part of the housing stock or activities in new construction and refurbishment.

Additional conclusions for new housing construction and refurbishment can be drawn from the existing building regulations (see below legislation review).

We cannot provide a clear picture of energetic standards of the existing housing stock or the housing units in new construction and renovation. The information available is presented on the following table.

To summarise the findings: Compared to total constructions activities low energy or passive housing accounts only to a small part. The situation in Germany and Austria seems to be different as at least the reporting umbrella organisations show significant shares of refurbishments and new construction at least on the “low energy” level. One has also take into consideration the total building activities: While in Germany there seem to be more intense activities in retrofitting – last but not least due to the general low level of new

construction – Austria seems to produce more nZEB in new construction. Interpretation has to be done carefully as data sources also differ between member states. It has also kept in mind that due to tightening of building regulations some countries will follow the next years.

Nevertheless, we cannot assume that experiences with passive and very low energy buildings (both new construction and renovation) have a solid backbone.

Overview 1: Data on nZEB in Housing Stock, New Housing Construction and Refurbishment						
Cou nt	National 2009+ ALL TYPES OF HOUSING	Data	NEARLY ZERO ENERGY BUILDINGS - Findings by project			
	Total housin g Stock 1.000	Total annual new constr	Source	Stock	New construction About 2009 - 2012	Refurbishment
BE/ Flan	5.043	47.000	Umbrella org SH	"a handful"		
BG	3.860					
DE	39.268	159.000	Official statistics		40% of new construction better than energy regulation (promotion system), of which 1/3 50% better than imposed	
			Umbrella org	See refurbishme nt	20 – 30% of GdW total new construction nZEB (last 2 years; total per year = 13.000)	2011: appr. 2% of total renovated (110.000 per year) units nZEB; 120.000 units = 6% of total stock renovated to low energy level or better
EE	651			One demonstration site (kindergarden)		
FR	31.264	357.000	Certification		138.000 applicants + 14.000 certified as RT2012 (=50kwh)	2007 – 2012: 39.000 "BBC80"
IT	na	244.000	Only demonstration sites reported			

AT	4.200	50.000	Voluntary reporting on passive housing (see text)	120 new built multi-family blocks buildings/4500 dwellings passive house standard; number of single family homes unknown	Multi-family blocks: about 3% in passive house quality (= about 760 of 21.000)	About 500 dwellings passive house standard; low energy unknown
			Umbrella org	71 new built multi-family blocks buildings/3100 dwellings passive house standard	GBV: About 5 % of annual new construction passive housing (=600 of 12.000); rest low energy	Passive house standard: only demonstration sites; Low energy standard: about 35% of annual refurbishment (Total = 12.000 units)
SE	4.508	23.000	Umbrella org	43 new built multi-family blocks buildings/3200 dwellings low energy standard		
UK	27.108	146.000	Only demonstration sites reported			

2.1.3 Main Obstacles/barriers for the implementation of nZEB in housing

Taskforce members report obstacles of different nature. There are problems related to the introduction of the new technologies, directly in form of weak technical performance of some technical devices plus the lack of knowhow of technicians/planners/building trade and the lack of experience/education in proper use and maintenance of new technologies. Economic and financial problems are serious barriers as housing construction requires huge investments and low energy buildings are even more expensive; not only is the rent level affected by higher costs of construction, there are also problems related to financing and rent setting. Also the lack of data (documentation) of in-use projects is mentioned as well as the uncertainty about the proper methods of analysis. Last but not least the existence of

prejudices as an obstacle has to be mentioned. As regards the institutional framework there are some reservations concerning the legislation being too much in advance of development. In particular:

A. Technical problems in proper functioning of buildings parts/technical devices

Especially in the very first projects the new buildings materials/technology showed some weakness. It happened that in passive house projects which were supposed to be heated without a conventional heating system an additional heating had to be installed. Ventilation systems had to be exchanged; in some projects it turned out, that missing pre-installed outside-sunshades caused problems of overheating. As regards the materials for insulation there is are discussions concerning the fire resistance of polysterol.

B. Lack of knowhow in the planning/building chain and in proper use

There is lack of knowhow in all stages of the planning and building chain (designers, planners, building trade, building managers, contractors) and housing providers.

Also concerning the use, service and maintenance lack of knowhow is a barrier for proper functioning. That refers to residents in dwellings as well as to housing managers. In very low energy buildings, especially those requiring automatic ventilation residents have to find an appropriate way between use of the new system and “conventional” ventilation (opening windows). Heating and ventilation systems require regular cleaning, service and repair for proper functioning, similar for solar panels.

C. Economic and financial problems

Economic and financial problems seem to be one of the major problems. Additional costs for construction – and planning - have been mentioned in the introductory remarks. And there is an additional aspect in the question of financing linked to the use of new materials and technical equipment: housing finance requires long-term finance, the lack of empirical evidence of the longevity of new products causes problems getting mortgages on the market.

Those additional costs of nZEBs constitute a “big” issue to deal with in the process of bringing them on their way. It is often said that those costs may be compensated by lower costs for energy. Calculation has to be proved by an appropriate method. Existent data are regarded with some doubts, lack of reliable data is one of the obstacles mentioned as well. For those additional costs a wide range is mentioned,

often the difference is indicated in a percentage without hinting to the reference building and/or reference cost level. Expressed in absolute values the difference ranges between 40 and 340 Euro per m² (passive houses in contrast to low energy house in AT/DE/CH, Source: Schöberl 1/2012); for individual cases even higher figures are reported.

One may argue that the question of costs is not the ultimate reason to decide about provision of nZEB. That is of course partially true; nevertheless the price of a consumer good has to be taken into consideration, especially if that good consumes such a huge part of income as rents or mortgage payments do. For social housing provision this question is even of more significance as that sector has to fulfill the demand for affordable housing.

In that respect the lack of subsidies is mentioned by task force members; for Germany it is reported, that nZEBs are provided in the upper price class of dwellings, for Austria it is stated that nearly all passive house projects are realized within the subsidized sector where not only “normal” subsidies are available but also additional grants for lowest energy or passive house components.

The lack of subsidies is also to be reflected in the framework of the problems of public budgets in the aftermath of the financial and economic crisis. Those countries affected more severely see these problems as an extra barrier (like for instance Italy).

D. Prejudices

Also prejudices are mentioned as obstacles for the implementation of nZEB in housing. These prejudices concern costs, health and durability of building parts.

E. Legislation in contrast to praxis and background

Also incongruence between legislation and development is mentioned as obstacle insofar as legislations is too far ahead of the implementation process.

That incongruence seems to be influenced by the fact that some of the drivers of the nZEB-strategy on side of the building industry have different views than the housing providers which have to manage the respective housing stock and aim for more time of experience.

F. Problems with the decision making process in co-operative (divided) ownership

(See divided ownership taskforce for further information)

2.1.4 Legal framework, financial incentives/public finance assistance and other instruments

The following part presents the existing legal framework concerning energetic building standards as well as the existence of financial incentives. The EU building directive (Art. 4) requires member states to set minimum standards for the energetic performance of buildings (new built and refurbished). In Article 10 of the EU building directive the importance of provision of appropriate financing and other instruments for the transition to nZEB is highlighted and member states are recommended to take appropriate steps. So it seems worth to identify if and in which way national policies do combine compulsory energetic standards and financial – or other – incentives.

As regards financial incentives the question of state aid is involved. Since that is a complicated legal matter we are not going into this discussion. If the financial incentives constitute state aid – in line with EU primary or secondary legislation or not – is not subject of that project. In that respect we do not divide financial incentives in those being subsidies (declared or not) and others being “pure incentives”.

Overview: Legal Framework, financial incentives, other instruments			
	Legal framework energy performance	Financial incentives	Other instruments
BE/ Flan	Stepwise tightening of building regulations new construction; from 2010 to 2014 reduction to 60% level to reference building	Non for regular construction, only special funding for test sites	Tax reduction, premium for grid operators
BG	See divided ownership		
DE	Stepwise tightening of building regulations; First “Energiesparverordnung 2002; new versions 2007 and 2009; next versions planned (draft legislation Oct. 2012) for: 2014 - 12,5% and 2016 – 12,5%	There is a promotion scheme available for housing providers: KfW-Programm energy-efficient construction; loans/grants via a public bank are provided for buildings with better energy standards than imposed (new construction and refurbishment). Standards are defined in a percentage of imposed level;	
EE	Stepwise tightening of building regulations beginning 2013 (-20% Primary Energy Demand)	Some schemes available	
FR	“One-Step” tightening of building regulations; from 2013 (RT2012) primary energy demand only 33% of former imposed standard (150 => 50kWh/m2a primary energy demand)	Non for new construction; for refurbishment standard promotion schemes + ERDF	Tax incentives; Certification

IT	None, national and regional plans in discussion	On national level in discussion for public sector, for the purchase of low energy individual family homes: grants; (limited fund) regional level: in 2 provinces capital grants for low energy construction; but limited funds	
AT	Stepwise tightening of building regulations since 2009 on a two-fold level: one in general and another (tighter) for subsidized housing. Reduction of heating demand between 2009 and 2012: from -20% (refurbishment) to -45% (new construction subsidized housing)	New constructions: Financial compensation is integrated in "normal" promotion schemes, which means that to get the standard scheme the building needs to meet energy performance requirements; in addition there are extra grants for very low or passive house elements in some provinces. Refurbishment: similar	In discussion: rent setting as an incentive (only in the private sector)
SE	Stepwise tightening of building regulations since 2006. From 2013 there will be new requirements about 20% below former levels. Levels depend amongst others from heating system and climate zone.	None, in discussion for test sites	
UK	Climate Act 2008 defines „Carbon Plan“ to lower emissions; within this plan there is a link to energetic performance: from 2016 all new buildings have to be 0 carbon (definition currently under revision) Voluntary standard: Code for Sustainable Homes CSH with different levels; these levels are incorporated in some regional plans as well as provision of subsidized housing	Newly introduced „green deal“ for individual residents; no "big" program for housing associations, regular funding schemes are not related to energy efficiency. But: to receive standard programs better energy level is required (see CSH) London: Funding for retrofitting of public housing	Levy on electricity bill for suppliers to create funding for energy efficiency investments; from 2013 tax incentives

What is not made explicit in this overview is the current or future energy performance required by legislation in different countries. That is due to different definitions of energy performance which have to be made comparable. That will be subject of (preparations of) the second taskforce workshop. It has to be taken into considerations that also different climate zones are involved.

So the crucial question concerning current energy performance – and with that the distance to nZEB - can only be answered vaguely.

The conclusions which can be drawn from the presentation above:

- There are countries which seem to follow the “stepwise” introduction of improving the energy performance: Belgium, Germany, Austria, Sweden; while in Germany and Austria there are financial incentives of significance, there are none in Belgium and Sweden. But there is a difference to be mentioned between the two countries mentioned at last: in Belgium there is (limited) general funding for new housing construction while in Sweden there is none at all. Also Germany and Austria are not in the same position as regards public support; in Austria there is an integrated system of assistance for housing construction and energetic aspects, while in Germany general/social housing assistance is divided from incentives for improving energy efficiency – with the effect that energy efficient housing and social housing have different positions in the market - energy-efficient housing being in the upper price sector, while in Austria there is an integrated approach and there seem to be a broader base for energy efficiency in housing.
- Two other countries seem to aspire the transition to the nZEB-level in one step (at least as regards new construction): France and Estonia (?); and: they do that without financial support programs. But what was said above concerning Belgium is also applicable for France – general housing assistance is available.
- In Italy and the UK there is still an ongoing discussion on strategies; but there is some funding on regional level, while building regulations do not show a pattern of an approach towards nZEB.

The legislation report for each of the countries is presented in the following part.

One has to be aware the organizations presenting these reports are not all integrated in the process of modeling the roadmap of the nZEB strategy to the same extent, as housing providers are not recognized as partners in this process everywhere.

3. Legislation Reports

3.1 Belgium - Flanders

Legal (national/regional) framework and relevant stakeholders

- Is the nZE standard going to be implemented in already existing legal framework (law, ordinance)?

In Belgium the implementation of the EPBD is a regional responsibility.

The Flemish action plan “nearly zero energy” gives in terms of promoting low energy and nearly zero energy buildings an interpretation of:

- Pact 2020
- the Flemish Government agreement
- the policy document on Energy 2009 – 2014.

The coalition agreement sets: ‘By 2020 all new buildings should meet the optimal energy performance norm.’

Since January 2006, there is an E-level requirement for new housing and new offices and schools. For dwellings with a building permission request from the 1st of January 2010 the E-level requirement was tightened from E100 to E80. From January 2012, the maximum E-level requirement was tightened to E70 for both dwellings, offices and schools. From the 1st of January 2014, this requirement will be tightened to E60.

The level of isolation in **new buildings** in Flanders improved significantly since the introduction of the energy performance regulation.

	2004	2007	2009	2011	Evolution 2004-2011 (%)
Facade insulation (average thickness in mm)					
Mineral wool	53,5	57,7	69,7	96,6	80,6
Other insulation	40,4	47,8	63,3	78,8	95
Roof insulation (average thickness in mm)					
sloping roof	113,9	132,7	158	186,9	64,1
flat roof	76,1	81,1	105,2	116,2	52,7
high performance glazing (in %)					
HR++ (U < 1,2 W/m ² K)	42,8	57,3	99,6	100	

The number of new and renovated buildings is limited in comparison to the volume of existing buildings, but they largely determine the energy performance of the building stock in the long term. Buildings in Belgium have a long life (30 years until the first thorough renovation, the total life can reach over 100 years).

As indicated in the policy document on energy 2009-2014, an implementation plan will be drafted in this legislature for a tightened roadmap on long terms for residential and non-residential buildings.

- [Who are the relevant stakeholders in the policy process?](#)

RELEVANT STAKEHOLDERS	
Agentschap voor Facilitair Management	KU Leuven
Agion	Minaraad
Agoria	NAV
Associatie van Thermische Technieken (ATTB)	ODE / BelPV / Belsolar
ATIC	Orde van Architecten
Bond Beter Leefmilieu	ORI
Bouwunie	Passiefhuis-Platform
BVS-UPSI / Cofinimmo	PMV (Participatie Maatschappij Vlaanderen)
CEDUBO	Provinciale Hogeschool Limburg
Cogen Vlaanderen	Sociaal-Economische Raad van Vlaanderen (SERV)
DAR - transitiearena DuWoBo	Syntra
De Nayer Instituut - Lessius Mechelen	Ugent - Vakgroep Architectuur en Stedenbouw
Departement EWI (Economie, Wetenschap en Innovatie)	UA - Institute of Environment & Sustainable Development
Departement LNE (Leefmilieu, Natuur en Energie)	VENTIBEL
Departement RWO - dienst Onroerend Erfgoed	Verbond van de Glasindustrie (VGI-FIV)
Departement RWO - Ruimtelijke Ordening	Vereniging van Vlaamse Steden en Gemeenten (VVSG)
Departement RWO (ruimtelijke ordening, wonen en onroerend erfgoed)	Verozo
Eandis	VITO
Federplast	Vlaams Elektro Innovatiecentrum (VEI)
Hogeschool Gent	Vlaams Infrastructuurfonds voor Persoonsgebonden Aangelegenheden (VIPA)
Infrac	Vlaamse Confederatie Bouw
Isolatie Raad (CIR)	Vlaamse Maatschappij voor Sociaal Wonen (VMSW)
IWT	Vlaamse provincies en provinciale steunpunten
Kabinet minister Lieten	Agentschap Ondernemen
Kabinet minister Van den Bossche	VOKA
KaHo Sint-Lieven	VUB

Kamp C	Warmtepompplatform
KHK	WTCB
Luc Dedeeyne	VEA

- Is there a (public) evaluation procedure planned, involving interest groups like the housing sector?

The Flemish Energy Agency (VEA) should, according to the energy Decree, evaluate every two years the method of calculating the energy performance of buildings, the procedures to be followed, the EPB-standards and the administrative burden of the regulation. This happens after consulting the stakeholders.

The social housing sector, represented by the VMSW is one of the stakeholders.

Status of the process and time schedule

- What is the current status of the process regarding the national report to the Commission acc. to Art. 5 EPBD (cost optimal levels of minimum energy performance requirements)?

In May 2012 the study on cost optimal levels for energy performance requirements was started. The results will be available in 2013.

- Is there already a draft report existing/under discussion/available to the NZC project?
- Planned of foreseeable time schedule?

Country	A	B- BR	B- FL	B- W	BG	CR	CY	CZ	D	DK	EE	ES	FI	F	GR	HU	I	IR	LV	LT	LX	MT	NL	N	PL	PT	RO	SL	SK	S	UK	Total/Ø	
State of application	Offic. approved									X																						1	
	Developed	X						X		X			X			X														X		6	
	Study performed						X	X								X				X													4
	Work ongoing	X	X	X	X	X	X	X	X				X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17
	Study planned											X											X	X			X						4
Included energy aspects	Annex I: H, C, V, DHW, L (non-res.)	X	X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	26	
	1+ aspects missing																									X							1
	Additional aspects						X	X			X												X	X				X			X		7
Used indicators	Primary energy	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	23
	Other	X						X	X			X	X				X	X	X	X			X					X		X	X	X	13
Type of requirement	Fixed value(s)	X	X		X	X	X	X				X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17
	Fixed + allowances				X					X	X					X				X		X		X				X	X				3
	Technology set							X	X							X				X	X	X									X		7
Renewable requirement	Ratio		X		X	X	X									X				X			X					X	X				3
	Minimum		X		X	X	X						X			X	X						X			X	X						9
	Non	X								X	X		X			X	X						X								X		7
Renewable inclusion (generation)	On building		X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	23
	On-site		X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	21
	Nearby		X		X			X	X		X			X	X	X	X	X	(X)	X			X			X			X				14
	Green certificates																X						X										2
	Self-consumed		X		X		X	X	X							X	X	X			X	X	X						X	X			13
	Fed-in						X	X			X			X	X	X	X						X						(X)		X		3
	Only up to building's energy use							X	X	X			X	X								X				X							7
Size	Single building	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	29
	Building complex									X	X					X	X	X	X		(X)	X			X		X				X		3
NZEB application approach	Based on current requirements	X	X	X	X		X	X	X	X	X	X	X		X	X	X					X		X	X	X	X	X	X	X	X	X	21
	New approach									X				X		X	X	X	X												X		3
Tightening ratio [%]					35		40	40	34				60		35	70		70		25		70	25-50	20		75					47,1		

Table 1: status of implementation of NZEB-definition in the member states.

Source: VLAAMS ENERGIEAGENTSCHAP; ACTIEPLAN BIJNA-ENERGIENEUTRALE GEBOUWEN

Time schedule

2012

Third evaluation of the EPB

Mai 2012: start study cost optimal level (8 months)

Determine and fix minimum percentage of renewable energy in buildings.

April-august: draw up national plan nearly zero energy buildings

September: presentation of the national plan nearly zero energy buildings in European commission

Start process to convert government buildings into NZEB buildings.

2013

Fix cost optimal performance level

Report to the European Commission about study on the cost-optimal performance levels

Elaborating a proposal for the definition NZEB and the NZEB roadmap.

Set up national application of NZEB definition

Set up energy level requirements 2021

Preliminary results: nZEB definitions and cost optimality

2006 Energy performance: E100 Thermal insulation: K45 netto energy consumption heating: -
2010 Energy performance: E80 Thermal insulation: K45 netto energy consumption heating: -
2012 Energy performance: E70 Thermal insulation: K40 netto energy consumption heating: max70 kWh/m ²
2014 Energy performance: E60 Thermal insulation: K40 Netto energy consumption heating: max70 kWh/m ² Mandatory renewable energy target or E54

3.2 Germany

Legal (national/regional) framework and relevant stakeholders

- Is the nZE standard going to be implemented in already existing legal framework (law, ordinance)?

In Germany the relevant existing legal framework consists of

- the Energy Saving Act and
- the Energy Saving Ordinance

In the ongoing amendment of both the requirements regarding nearly zero energy buildings will be implemented as legal authorization. The proposal of the energy saving act says:

§ 2a Nearly zero-energy buildings to be constructed

(1) Who after December 31st 2020 will erect a building heated or cooled according to its purpose, must build the building in order to save energy as nearly zero-energy building in accordance with paragraph 2 of an ordinance, to be enacted. For non-residential buildings to be constructed, which are owned or used by public authorities, the obligation in Clause 1 begins after 31 December 2018. A nearly zero-energy building is a building that has a very good energy performance, the energy consumption of the building must be very low and should be covered as far as possible, to a very significant extent by energy from renewable sources.

Because of the economic efficiency of a 2012 building standard is not yet known, there is no exact definition in the energy saving act. But till 2021 the energy saving ordinance must have a definition.

- Who are the relevant stakeholders in the policy process?

The relevant stakeholders in Germany are

- three ministries: the Federal Ministry of Transport, Building and Urban Development, the Federal Ministry of Economics and Technology and the Federal Environment Ministry
 - the German Bundestag for agreeing with the Energy Saving Act and the Federal Council of Germany for agreeing with the Energy Saving Ordinance
 - the German Länder because of the necessary implementation in the federal states of Germany.
 - the associations of involved economic sectors are directly involved in the legislative procedure: for example building owners.
- Is there a (public) evaluation procedure planned, involving interest groups like the housing sector?
 - There is no planned process known, but every change in the Energy Saving ordinance is accompanied by a wide spread public discussion.
 - Implementation of the nZEB process

The implementation of the EPBD in Germany is over the energy saving ordinance. So the institutional way to implement the EPBD is very clear. But there is no clearness regarding the concrete definition – how much energy, how much renewable? This is because of unknown economic feasibility in 2020 for nearly zero energy buildings. There is a very important principle in Germany:

In the ordinances established by the Energy Saving Act, the legal requirements must be achievable in an economically feasible way according to the state of the art and for buildings of the same type and use. Requirements are considered economically feasible if the general expenses incurred during normal life time can be generated by the entering savings. In existing buildings, yet the expected lifetime is to be considered.

Status of the process and time schedule

Current status: legislative embedding of the term "nearly zero energy building" in the energy saving act without exact definition. There is no report available. Before 2020 an exact definition of an economic feasible nearly zero energy building will be available.

Preliminary results: nZEB definitions and cost optimality

- Is there a draft nZEB definition already available or under discussion?
- What are the core elements in terms of 2020 requirements on the building shell (efficiency) and renewable energy?
- Forseeable roadmap to 2020?
- How far is the cost optimality method from the Commission already transposed to national level?

A first report was published: "Study on amendment of the EU Energy Performance of Buildings Directive (EPBD) - Identification and analysis of barriers for new construction of high-efficiency (nearly zero energy) buildings and development of an approach to market penetration by 2020". In this study economic barriers were cited by the building owners as much strongest obstacles to constructions, which are better than required by the statutory requirements. Second place achieved the lack of information, then with approximately equal weights followed the technology and then the organizational barriers.

- A study from 2011 found that passive buildings better than KfW 70 buildings have advantages in the heating costs (7 cents per m² per month), but this cost advantage is nearly compensated by the heat recovery ventilation system. Reason is the higher cost of electricity and maintenance in additional amount of 4 cents per m² month (total: 13 cents per m² per month).
- First lifecycle calculations found that lifecycle costs can rise with increasing energetic level because of increasing investment costs.

Economic feasibility studies regarding the requirements of the energy saving ordinance use the Amortization Method, the Net Present Value Method and the Annuity Method. Official calculations based on the cost optimality method are expected but not available yet.

German National Plan for increasing the number of nearly zero-energy buildings (Dec. 2012/Jan. 2013)

According to Article 9 of Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings Member States are required to draw up national plans for increasing the number of nearly zero energy buildings and to submit the plan to the Commission. Germany has drawn up its national plan with a communication dated 18.12.2012.

Regarding measures for increase energy efficiency Germany uses differentiated strategy. In the building sector the approach: "Encourage, Promote, Inform - strengthen market forces" stands in the foreground. With this mix of instruments, the number of nearly zero energy buildings will increase significantly by 2020. In view of the very different building and owner structure with a very high proportion of private ownership and considering the constitutional commandments of subsidiarity and proportionality of state action Germany focuses on voluntary, financial incentives and information. Therefore a numerical specification of intermediate future targets regarding the number of nearly zero energy buildings is neither possible nor necessary.

Significant contributions to the increase in the number of nearly zero energy buildings will come from

- KfW's funding " Energy Efficient New Buildings" (more than 450,000 subsidized homes since 2003) and "Energy Efficient Rehabilitation" (over 1 million founded homes since 2001)
- the market incentive program for renewable energy in heating
- the promotion of combined heat and power
- the KfW program "Energetic Urban Renewal"
- the on-site energy consultancy in residential buildings.

The National Plan makes the following estimates:

- Regulatory requirements for increasing the number of nearly zero energy buildings in the portfolio are not possible, because they are not cost-effective in terms of the energy performance of buildings directive and do not comply with the economic efficiency principle.
- The primary aim of achieving the nearly zero energy buildings - standard is for new buildings in 2020. The building stock is not in focus.

- For future regulatory requirements currently no precedent can be made. There is an uncertain price trend for energy and construction materials and services.
- The concrete definition of the nearly zero energy building standard will be developed by the federal government with scientific support, taking into account economic aspects.

3.3 France:

The French “Grenelle de l’Environnement” imposes the refurbishment of 800 000 accommodations dependent on public housing before 2020. In parallel, social housing organizations embarked on the production of new thermally-efficient accommodations. In that context, the French label for low-energy housing (BBC label), which is the standard for the new French thermal regulation (RT 2012), is used as a baseline by social housing organizations. In both cases, the aim is to reduce energy consumptions and greenhouse gas emissions, and to act on the reduction of tenants’ global costs, limiting the impact of the increase of energy prices on the costs, while ensuring the same level of comfort.

During the autumn 2011, two studies financed by the Union Sociale pour l’Habitat and the Caisse des Dépôts et Consignations enabled to evaluate new operations as well as refurbishment projects based on high thermal performances in social housing.

The conclusions of these studies are interesting concerning the level of energy efficiency reached, which is lower than expected, but also concerning the high level of investments involved. In addition, apart from the fact that the energy goals are not reached, the increase of the other expenses seems significant and needs to be studied.

Different reasons can explain these conclusions: inadequate appropriation by the tenants, wrong instructions from the master builder, absence of energy efficiency guarantee agreement, technical equipment which is unadapted or wrongly-sized, maintenance costs which are not taken into account.

The “arrêté ministériel” from 8th May 2007 defines regulatory requirements for energy performance of buildings (with five levels). Among these levels, BBC means “Low energy consumption building” and for new dwellings the annual requirement for heating, cooling, ventilation, hot water and lighting must be around 50 kWh/m² in primary energy (depending on climate area and altitude).

The new thermal regulation (RT 2012) will be set up in 1st January 2013 and will require for new buildings a limited consumption of primary energy to 50 kWh/m²/year.

3.4 Austria

Legal (national/regional) framework and relevant stakeholders

- Introducing remarks on the legal and institutional framework of building regulations in Austria:

In Austria according to the constitution building regulations are a matter of provincial legislation. Building regulations are set by the nine federal provinces via ordinances. Energy performance of buildings thus is also subject of provincial legislation. Different solutions have been developed to integrate provincial building strategies: According to the constitution there exists the model of a contract between provinces (“Article 15a-Contract”) in order to define common targets, commitments and obligations regarding matters of provincial responsibility. Based on such a contract a central institution has been founded in the year 1993 – the Austrian Institute of Construction Engineering (OIB). The foundation of this institution was triggered by EU-legislation (construction products directive); its mission is to function as platform for coordination of provincial activities in building matters as well as being a voice of the stakeholders in the building industry on international level. It is this institution which also coordinates the process of implementation of the EPDB in Austria. That is done via “Guidelines” which have to be implemented in the provincial building ordinances. It is noteworthy that this institution has close links to the building industry.

- Implementation of the nZEB process

The implementation of the EPBD in Austria is two-fold:

- For subsidized housing it is regulated in the provincial schemes for housing promotion. Another Art.15a- contract concerning energy matters has been established in the year 2006 concerning the promotion of energy efficient renovation and new construction; that contract did not refer to total building activities but only those promoted under the provincial promotion schemes which are basically schemes to promote affordable housing for a limited number of people. This contract had been renewed in 2009; both versions stated limits for the energy performance of promoted (public assisted) new built homes, the later version also limits for refurbished buildings. The standards in the promotion schemes are higher than those of the building ordinances. Since the central governments’ climate strategy (see below) suggested that new built promoted housing in multi-family blocks should be built in passive-house standard from 2015, respective regulation was expected from different sides; but the passive-house standard has not been implemented so far – with one exemption: In the province Vorarlberg passive house standard is compulsory for assisted housing from 2007 (date of building permission).
- For non-subsidized housing standards of the provincial building ordinances have to be followed; which have to implement standards formulated in the OIB-guidelines (see above).

From this background the institutional way to implement the EPBD seems to be clear. Since the presentation of a draft guideline by OIB for the National Plan towards nZEB end of October 2012 also the definition of nZEB in Austria has its first definition.

- Stakeholders

The different stakeholders involved are:

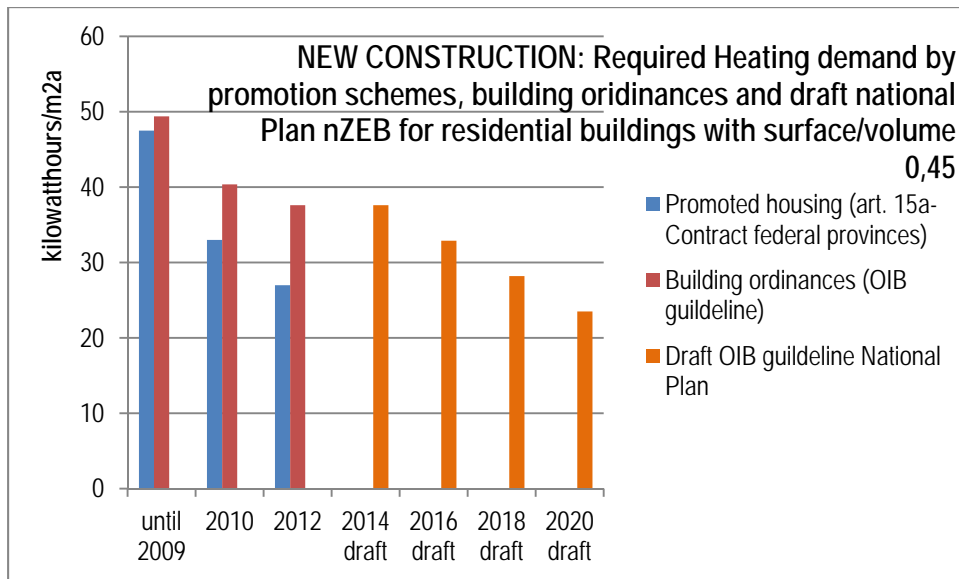
- The central government formulating political targets in the climate and energy strategy; e.g. the “Klimastrategie der Bundesregierung 2007” (Central Governments’ Climate Strategy); but due to the constitution the central government is not in the position of legislation concerning the building sector; nevertheless the government plays a role via the provision of (financial) incentives and via the legislative power as regards rental and homeownership regulations.
- The federal governments; they have the legal power and are involved in the political process around the formulation of the “National Plan towards nZEB;
- The above mentioned OIB which is the institution to define “guidelines” for nZEB definition; formally it is a coordination platform, but it is a major player in the process;
- The building (products) industry; they are not directly involved but have institutionalized relations with other stakeholders;
- Housing providers, housing investors, landlords: they are not directly integrated in an institutional way but have a vivid interest in the process;
- Residents; they are represented by tenants’ and owner occupiers organizations; they are interested in the process but not integrated.

Status of the process and time schedule

Concerning the status of the process according to Art. 5 EPBD there is no progress since the presentation of the first draft of the IOB-guideline for the National Plan.

Preliminary results: nZEB definitions and cost optimality

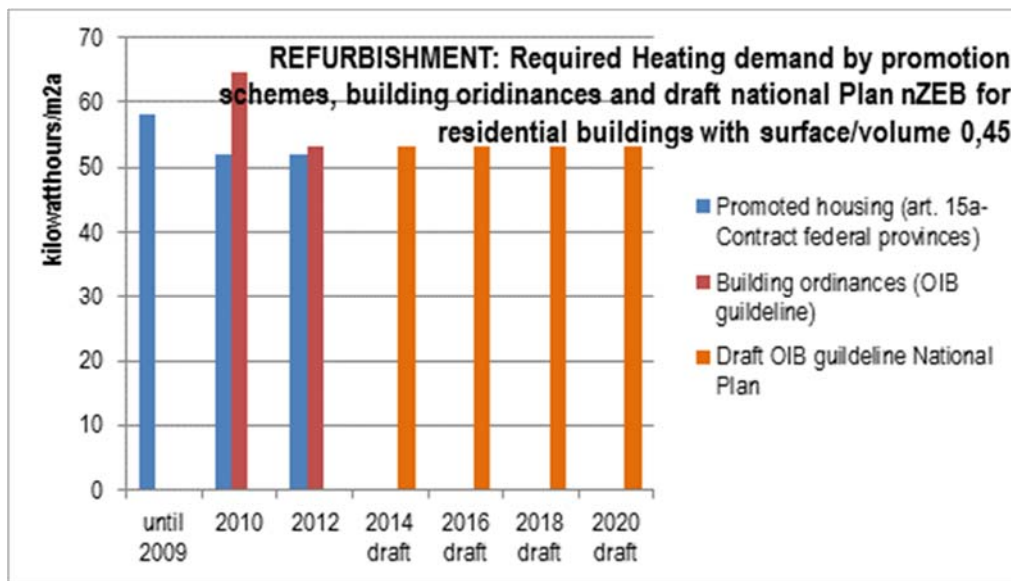
According to the draft guideline of OIB for the National Plan the required annual heating demand is to be tightened stepwise until the year 2020. The levels are indicated in heating demand, relative end energy efficiency and primary energy consumption. Since until now the levels have been defined by the heating demand the respective values are presented in the graph below. The values are calculated for a building with an relation between surface and volume of 0,45 – which is an average for the buildings in multi-family blocks.



Cost optimality is pretended but not made explicit. Housing providers doubt whether this conditions is fulfilled. It is to be expected that the forthcoming weeks will bring a vivid discussion on the presented Plan.

No legislation has been taken under consideration as regards renewables so far.

The respective values for refurbishments are presented in the following graph:



3.5 Sweden

The Government's assessment: A Swedish application of the concept of near-zero energy building, when near-zero energy from 2021, as a rule will be legally binding level of energy requirements required for all new buildings should include more stringent requirements energy compared to the requirements according to current building - At least for most categories of buildings and climates. There is currently insufficient evidence to indicate a quantified guideline for how far-reaching tightening that could be current, but this is assessed on the basis of concrete evidence based on inter alia evaluation of existing low-energy, some demonstration projects of new energy-efficient buildings, economic analysis etc. Only tightening that is environmentally, economically property and socio-economically motivated to be implemented. In Sweden, the review of energy requirements, including in light of the requirements of EU Directive on Energy Performance of Buildings is on-going. Such reviews have consistently resulted in tightening. Thus, for example with the requirements of non-electrically heated residential building in climate zone III tightened from the maximum energy level in 2006 was 110 kWh / m² to the maximum level from January 2013 to be 90 kWh / m². In the light of inter alia the tightening that occurred between 2006 and 2012 as well as technical and economic development and external factors affecting the construction industry it is estimated that future reviews will also lead to such successive tightening that is environmentally, economically property and economically motivated. A first inspection for this is 2015. These recurrent revisions are an important part of Sweden's strategy to approach near-zero energy requirements and gradually increasing demands for energy management and work with near-zero energy buildings.

In the figure below are the energy level for new buildings today in Sweden, the left column are the different climate zones, the middle column requirement for buildings with electrical heating and the right column for other heating sources.

		kWh/m ² och år
Klimatzon I	95	130
Klimatzon II	75	110
Klimatzon III	55	90

(Eva: kWh/m² End Energy)

3.6 United Kingdom

Legal (national/regional) framework and relevant stakeholders

- Is the nZE standard going to be implemented in already existing legal framework (law, ordinance)?
- Who are the relevant stakeholders in the policy process?
- Is there a (public) evaluation procedure planned, involving interest groups like the housing sector?

Different legislation exists for new build properties and refurbishment of existing properties.

New Build

The Building Regulations set out the legal requirements for new build properties, including specifications for energy efficiency. The Code for Sustainable Homes (CSH) is a voluntary standard but is a requirement for publicly funded affordable housing, which sets out how homes can be made sustainable taking into account not just energy efficiency but also the wider sustainability arena. The CSH is also incorporated into some Local Authority plans, which require social housing development proposals to aspire to particular minimum levels of the Code – this varies dependent on the local authority.

The Government has consulted on possible changes to the energy requirements (Part L) in the Building Regulations, as part of its pathway to zero carbon new homes from 2016.

Existing Properties

Building Regulations also apply to existing homes and when controlled work is undertaken cost-optimal energy efficiency standards are required. The Green Deal and Energy Company Obligation have been put in place to provide a framework for refurbishment, however these are not mandatory legal standards.

The CSH is not part of the Government's proposed zero carbon definition but its energy requirements will be mainly incorporated into Building Regulations by 2016. The future of CSH is under consideration by Government.

There is public consultation on any proposed changes to Building Regulations before they become legislation and the Government is currently considering the responses to its consultation on changes to Part L of the Regulations.

Status of the process and time schedule

- What is the current status of the process regarding the national report to the Commission acc. to Art. 5 EPBD (cost optimal levels of minimum energy performance requirements)?
- Is there already a draft report existing/under discussion/available to the NZC project?
- Planned or foreseeable time schedule?

The U.K. government has produced its Carbon Plan which sets out targets for 2020 and 2050.

The Climate Change Act 2008 requires 5 yearly 'carbon budgets' to be set, three budget periods ahead, to ensure clarity as to what the U.K. intends its emissions pathway to be for the 15 years ahead. The first of these carbon budgets ends this year and requires a 23% reduction from a 1990 baseline. The percentage reduction required for the second carbon budget between 2013-17 is 29%, and the third carbon budget between 2018-22 requires a 35% reduction. The fourth carbon budget which is to run between 2023-2027 was set in June 2011 and requires a 50% reduction. Latest projections suggest that the U.K. is on track in regard to meeting the current target. A significant proportion of these reductions (which cover both the EU Emissions Trading System, and the non-traded sector which incorporates transport and housing) is intended to be achieved through ensuring that homes are far more energy efficient.

It is Government policy that from 2016 all new homes will be designed to be zero carbon. For building work existing homes, mandatory, cost-optimal energy efficiency requirements will be set through the Building Regulations but voluntary cost-optimal energy efficiency improvements will be encouraged through the Green Deal.

Preliminary results: nZEB definitions and cost optimality

- Is there a draft nZEB definition already available or under discussion?
- What are the core elements in terms of 2020 requirements on the building shell (efficiency) and renewable energy?
- Foreseeable roadmap to 2020?
- How far is the cost optimality method from the Commission already transposed to national level?

U.K. carbon policy is currently carbon-based (measured in carbon tonnes), but the Energy Performance of Buildings Directive requirement is energy-based (kWh) – although the terms of the directive which state that ‘reduction of energy consumption and the use of energy from renewable sources in the buildings sector constitute important measures’ could be fulfilled by either model. Both models begin with the requirement for fabric and on-site energy efficiency, and it seems that when compared currently the U.K. model will meet the requirement of the Directive that ‘remaining energy demand is covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced onsite or nearby’.

The definition of zero carbon is currently being reviewed by the Zero Carbon Hub (a house building industry group) that has been reporting to the Department for Communities and Local Government on practical targets. The original definition of zero carbon was equivalent to the energy requirements of Level 6 of the CSH, however, this definition proved expensive and unattainable. Development of a new definition that will be technically achievable, cost optimal and underpinned by the Fabric Energy Efficiency Standard (FEES) and Building Regulations is currently underway.

The current definition established by the Budget in 2011 is that a zero carbon home is one where net carbon dioxide regulated emissions (resulting from space heating/cooling, hot water and fans/pumps) are zero or better. This does not take into account unregulated emissions (occupants’ electrical appliances). The extent of the net carbon dioxide emissions to be achieved on site, both from the fabric of the building and also from on-site energy and heat supplies will be subject to further consultation. The remainder may be accrued through use of ‘allowable solutions’, which occur when the developer pays a set amount towards off-site mitigation of carbon emissions.

4 Work Programme

The work program is based on the Description of Action. Annex 2 – calendar provides dates of events and deadlines for deliverables. The main elements of the task force work program are described in this chapter.

Main issues and topics of taskforce work programme

As outlined above there seems to be some divergence

- between actual building regulations and to be achieved nZEB-standards from 2020 (or less tight standards from an earlier date) according to the Building Directive;
- between the time table defined by the Building Directive and the real progress made in member countries as regards
 - National Plans
 - Presentation of Cost-Optimal-Method on national level;
- Between knowledge based on experience with more energy efficient buildings and tempo of introduction of new standards;
- Between tasks of social housing and cost level of more energy efficient buildings

In addition it is hard to compare actual and future standards between member countries as existing regulation is based on different indicators of energy efficiency.

Therefore it is necessary to come to a common understanding of different indicators for energy efficiency as well as it is necessary to develop an instrument of comparison.

The next step will be an analysis of energy efficiency, cost efficiency and usability of different types of “energy – efficient” social housing estates.

Description and monitoring of individual social housing estates as regards costs of investment, running costs (rent, costs for energy and service) will be the lowest level of this analysis. Next step is the development of a (common) methodology of calculation.

If possible the national concepts of cost optimality should be reflected in this process.

The results of this analysis will lead to conclusions for taskforce members which will enable them to take an active position in the respective countries’ discussion of future standards of energy efficiency.

Taskforce workshops and Site Visits

Three Taskforce workshops have and will be organised during the project. During the workshops, the participants will have the opportunity to discuss the topics of the taskforce and plan the next steps.

The **1. Workshop** was held in Madrid; it was dedicated to the presentation of the taskforce’s needs analysis, based on the reports delivered by taskforce members.

The following two workshops will be held in early 2013 in Austria and 2014 in Germany. Both Workshops will be combined with Site Visits in respective countries.

2. Workshop in Austria February 2013:

- Discussion of indicators of energy efficiency in member countries;
- methodology of calculation of energy-efficiency and cost efficiency
- presentation of examples of calculation
- presentation of task force test cases
- presentation of new developments as regards “National Plans” of implementation nZEB and the cost optimality concepts on national level
- presentation of taskforce members strategies as regards national strategy towards nZEB
- presentation of monitoring process/first results in respective country (Austria)
- Site visits and expert’s reports

From side of the hosting country 1 external expert will be invited.

3. Workshop in Germany December 2013:

- Presentation and Discussion of (preliminary) results of monitoring
- Presentation of further developments on national levels

Local members’ experience – Presentation of Test Cases

Great importance is given to the experiences already matured in new built and renovation projects. These will be used to demonstrate what has been already done and in this field. Test cases detailed information will be publically accessible (Deliverable 2.3) on the Power House website

Selected test cases will be presented in Deliverable 2.3

Test cases from local members will be presented by partners according to the following table:

Partner	Test cases
AT GBV WP leader	10, documentation and monitoring
BE-FI, DE, SE, FR, UK BG, EE	Each 5, documentation
Total	40, 10 with monitoring, 30 without

Test cases information material will focus on the taskforce issues described in the chapter above and will be used to discuss the “range” of nZEB and will give opportunity to discuss the state of the art of new construction and refurbishment in different member states. Test cases will be selected according to Needs Analysis results; they won’t necessarily fulfil the nZEB standard, but they will contain elements which are evaluated as extremely significant for the achievement of the nZEB standard in future projects together with other measures.

Deliverable is due in April 2013

Monitoring Reports

The monitoring reports will be based on the cost and usability monitoring of 10 test cases (very low energy housing estates) during a 2-years period (2011 and 2012) in Austria. The monitoring process will be designed according to conceptualization of task force members – as far as availability of data and national framework allows. These cases also will represent different types of “very low energy buildings” and will not necessarily comply with (future) nZEB definition.

The monitoring will focus on operating costs, cost efficiency and usability, for each of these issues a report will be delivered (Deliverables 2.4, 2.5 and 2.6)

Taskforce work results

Taskforce work results will be summarized in Deliverable 3.6 “Guidelines/Recommendations for Multi-family low energy and Passive house buildings – lessons learned” and the linked document “Core elements for national nZE 2020 road maps”, where a report of workshops and study visits will also be included.



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