Nearly Zero Energy Buildings (NZEBs) – Non Residential

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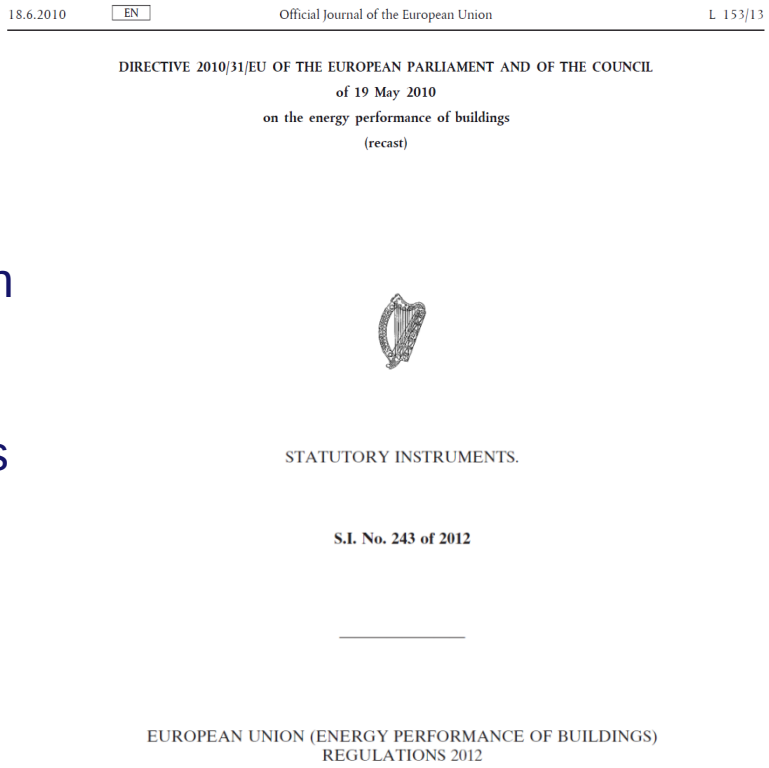
21st May 2015

Legislation and Background

- The EU Energy Performance of Buildings Directive (EPBD), transposed into Irish Law from 2006 onwards, contains a range of provisions to improve the energy performance of new and existing buildings
- The EPBD obliges specific forms of information and advice on energy performance to be provided to building purchasers, tenants and users for consideration in property transactions
- From 2013, the EPBD was superseded by the Recast EPBD and S.I. No. 666 of 2006 was superseded by S.I. No. 243 of 2012
- For further information on the EPBD, Recast EPBD, implementation in Ireland and other EU Member States visit: http://www.seai.ie/Your_Building/BER/EPBD



18.6.2010 EN Official Journal of the European Union L 153/13

DIRECTIVE 2010/31/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 19 May 2010
on the energy performance of buildings
(recast)

STATUTORY INSTRUMENTS.

S.I. No. 243 of 2012

EUROPEAN UNION (ENERGY PERFORMANCE OF BUILDINGS) REGULATIONS 2012

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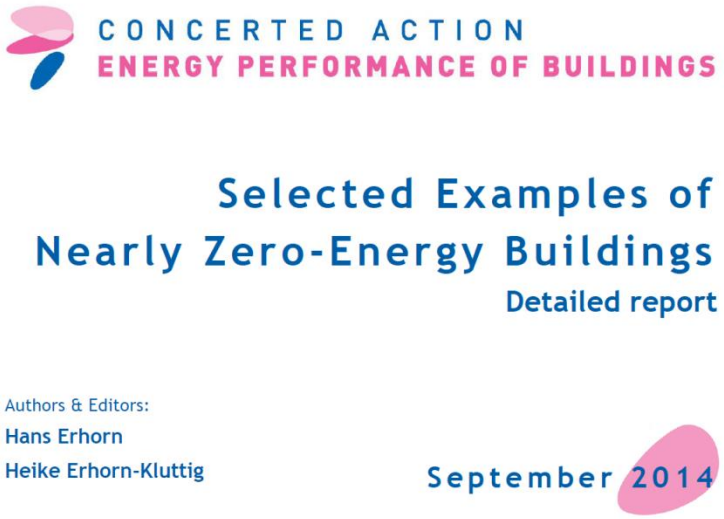
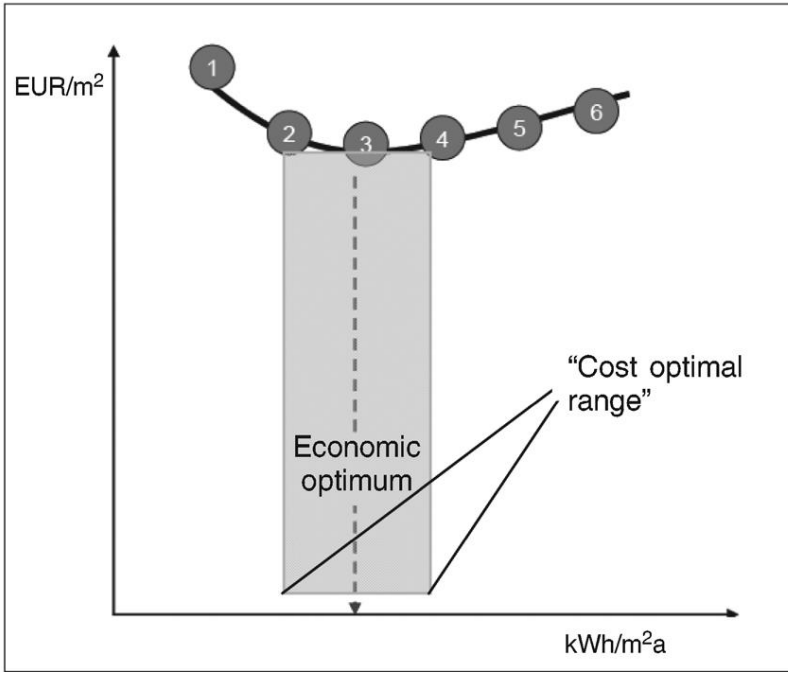
NZEB Definition and Requirements

- ‘Nearly zero-energy building’ means a building that has a very high energy performance, as determined with Annex I. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby
- Annex I – common general framework for the calculation of energy performance of buildings
- By 31 December 2020 all new buildings are nearly zero energy buildings
- After 31 December 2018 new buildings occupied and owned by public authorities are nearly zero-energy buildings
- http://www.epbd-ca.eu/wp-content/uploads/2011/05/CT5_Report_Selected_examples_of_NZEBs-final.pdf



Cost Optimal Levels of Minimum Energy Performance Requirements

- Energy Efficiency Standards in Building Regulations for new buildings and for buildings undergoing major renovation to be set at cost optimal or cost effective levels
- ‘cost-optimal level’ means the energy performance level which leads to the lowest cost during the estimated economic lifecycle, taking into account energy-related investment costs, maintenance and operating costs (including energy costs and savings, the category of building concerned, earnings from energy produced), where applicable, and disposal costs, where applicable. It refers to the remaining estimated economic lifecycle of a building where energy performance requirements are set for the building as a whole, or to the estimated economic lifecycle of a building element where energy performance requirements are set for building elements



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Reference Buildings

- Building selected were based on the categories identified by EPBD
- Building models were adapted from other AECOM work with the exception of the primary school building based on an exemplar building provided by the Department of Education and Skills

Building Category	*Construction type*	
	Cavity Wall	Steel Frame
Retail (Air Conditioned)		1,250 m²
Office (Natural Ventilation)	1,500 m²	
Office (Air Conditioned)		1,500 m²
School (Primary – Natural Ventilation)	2,300 m²	
Hotel (Air Conditioned)	2,500 m²	

Building measures (naturally ventilated buildings)

Fabric (3 options)	***A***	***B***	***C***
Wall U-value (W/m²K)	0.3	0.21	0.15
Roof U-value (W/m²K)	0.25	0.2	0.15
Floor U-value (W/m²K)	0.25	0.2	0.15
Window U-value (W/m²K)	1.8	1.4	0.9
Improved Thermal Bridging	NO	YES	YES
Air Tightness (m³/m².hr @ 50 Pa)	7	5	3

Services (3 options)	***1***	***2***	***3***
Lighting (lm/W)	65	75	80
Display Lighting (lm/W)	15	15	22
Daylight Lighting Control	NO	YES	YES
Occupancy Lighting Control	NO	YES	YES

Heating (5 options)					
Heating Source	Gas boiler	Gas boiler + SHW	CHP	GSHP	GSHP + SHW

PV (5 options)					
PV (% foundation area)	0%	10%	20%	30%	40%

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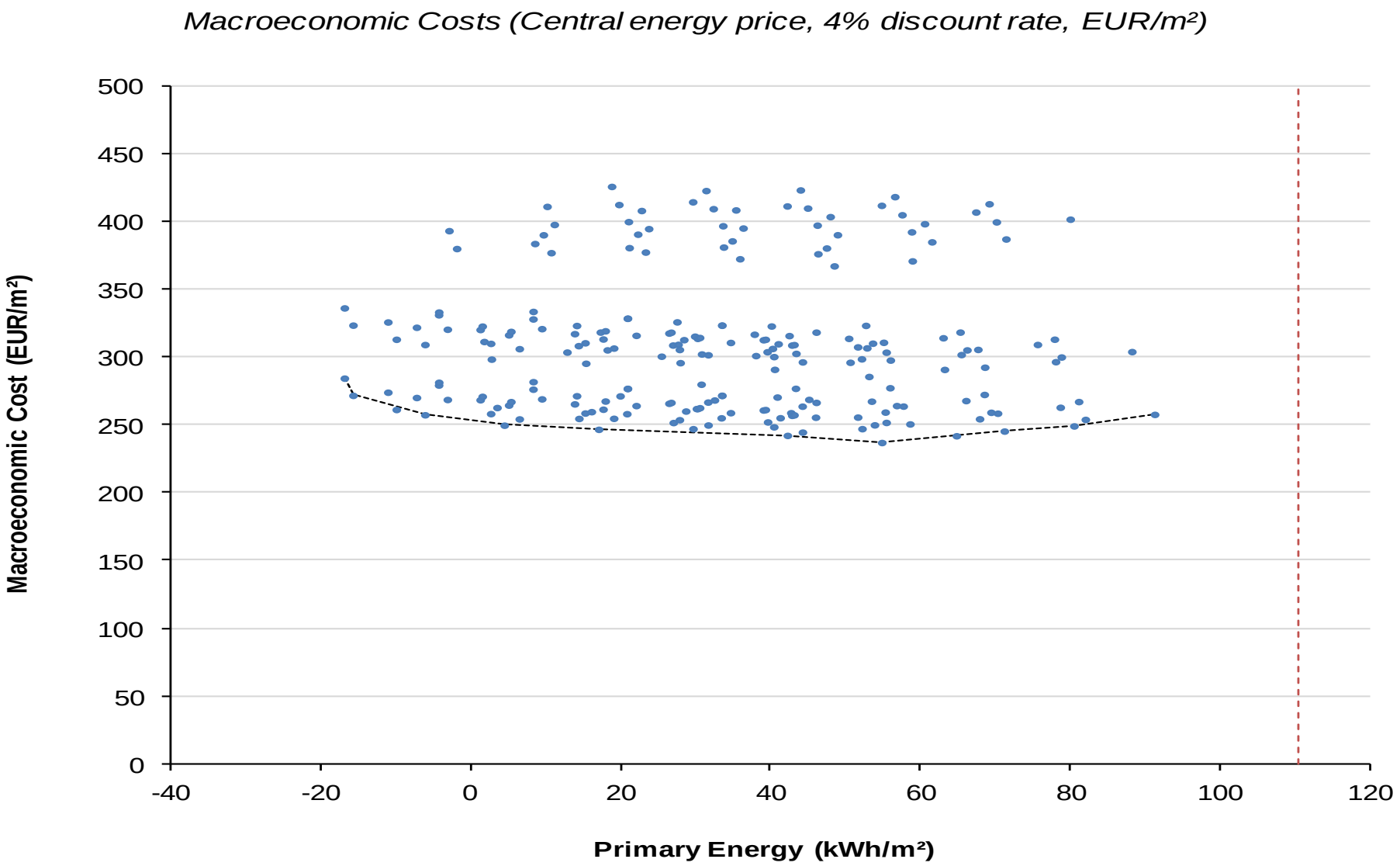
Results – Primary School



Results – Primary School

Package				PE	Initial	Annual Costs		Cost of	Resid	Macro
Fabric	Heating	Serv.	PV %	KWh/m²	Cost	Maint.	Energy	Carbon	Value	Cost
C	GSHP	3	40	-17	270	14	32	-2	-30	285
C	GSHP	2	40	-16	254	14	34	-1	-29	272
A	GSHP	2	40	-6	219	14	50	-1	-26	258
C	Gas	2	40	4	189	14	68	1	-21	250
C	Gas	2	30	17	176	14	74	2	-19	247
C	Gas	2	10	42	152	13	87	4	-15	242
C	**Gas**	**2**	**0**	**55**	**137**	**12**	**94**	**5**	**-12**	**237**
B	Gas	2	0	71	115	12	122	7	-10	246
B	Gas	1	0	80	100	12	138	8	-9	249
A	Gas	1	0	91	88	12	156	9	-7	258

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Comparative Gap Analysis

Reference building	*Cost Optimal Level (kWh/m²/yr)*	*Current Requirements (kWh/m²/yr)*	*Ratio of current requirements and cost optimal level*
Retail (Air Conditioned)	227-338	726	The current requirements are more than 15% greater than cost optimal
Office (Nat Vent)	35-103	247	
Office (Air Conditioned)	101-179	366	
School (Primary – Nat Vent)	8-80	111	
Hotel (Air Conditioned)	243-330	507	
Average	123-206	391	

- National reports on calculation of cost-optimal levels of minimum energy performance requirements available on

http://ec.europa.eu/energy/efficiency/buildings/implementation_en.htm

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Cost Optimal / NZEB Plan

- Review of TGD L Buildings other than Dwellings to Cost Optimal Level 2014/15-to include:
  - Stakeholder Review
  - Public Consultation
  - Regulatory Impact Assessment
  - NEAP Review
- Review TGD L to achieve NZEB in 2018

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Thank You

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