



Rialtas na hÉireann
Government of Ireland

EPBD and Part L 2019

NZEB Dwellings and Major Renovations

27th -28th March 2019

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Outline



Part L 2019 - Conservation of fuel and energy - Dwellings

EPBD

NZEB + Major Renovations

TGD L 2019

- New dwellings
- Existing dwellings
- Major renovations to cost optimum level
- Examples
- Transitional arrangements
- Regulatory Impact Assessment

Part F 2019 - Ventilation

Energy Performance of Buildings Directive (EPBD) NZEB and Major Renovations

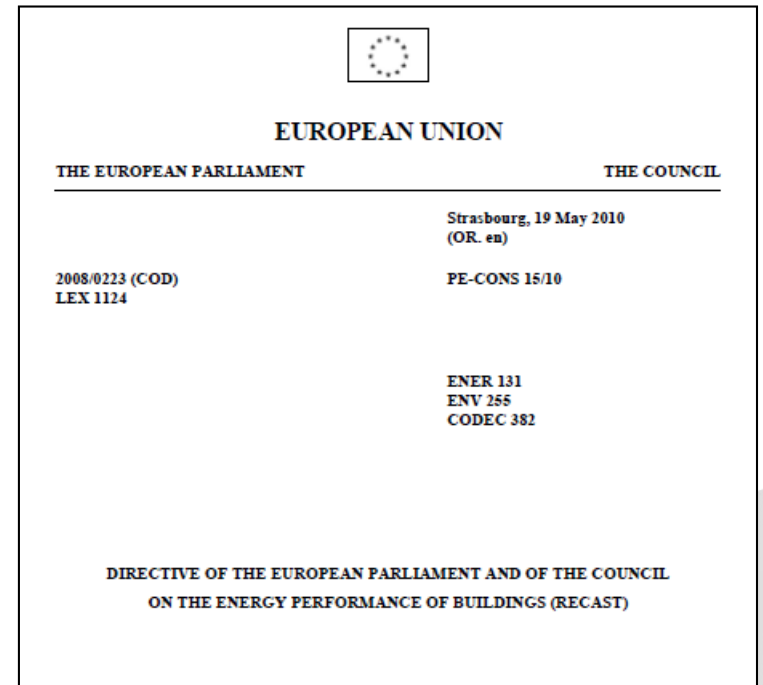


Article 9

Member states to ensure that all new buildings are “Nearly Zero Energy Buildings” by 31st Dec 2020

Article 7

Major Renovations to be at Cost Optimal Level in Building Codes



EPBD and RED Definitions - Nearly Zero Energy Buildings & Major Renovation



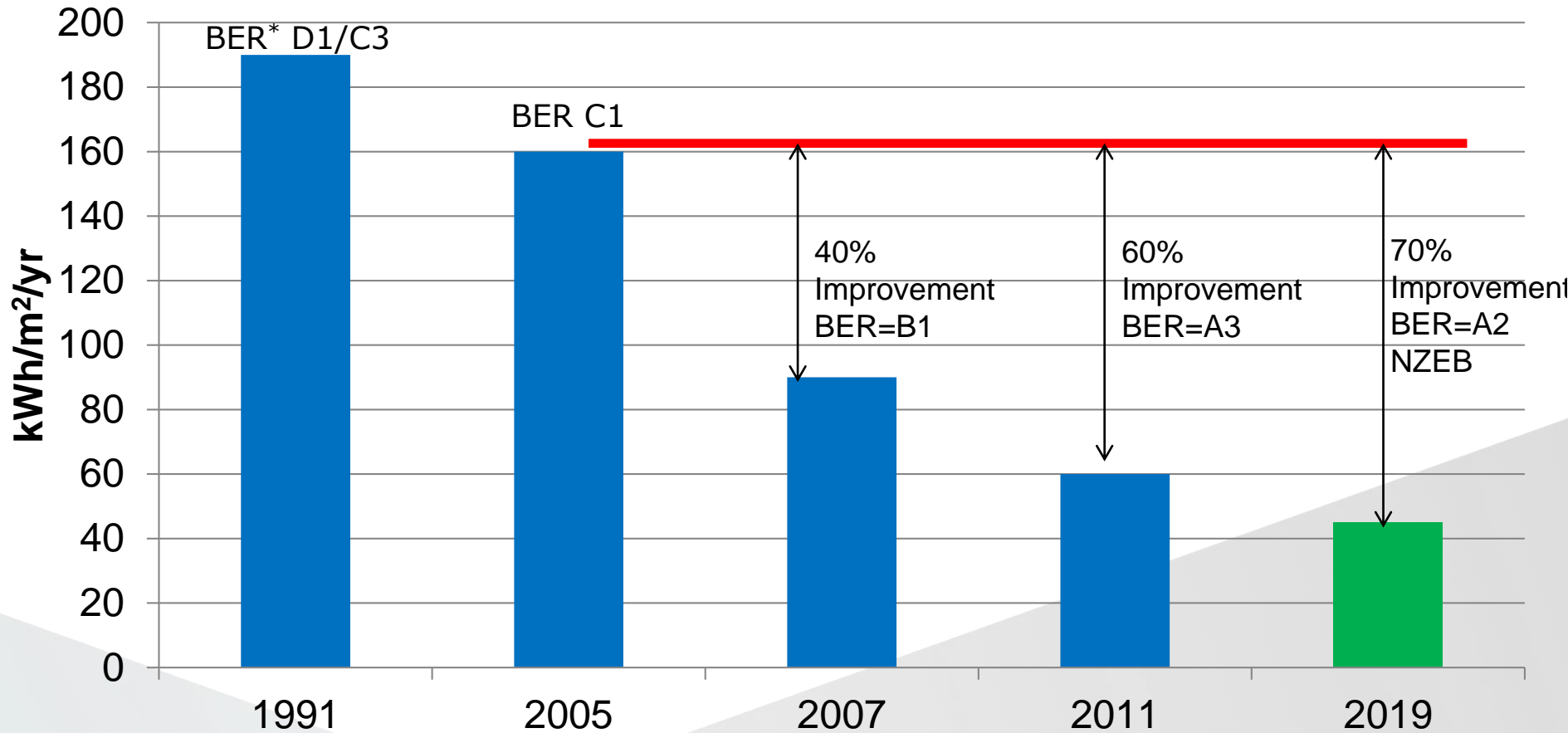
*'nearly zero-energy building' means a building that has a very high energy performance, as determined in accordance with Annex I (i.e. DEAP). **The nearly zero or very low amount of energy** required should be covered to a **very significant extent by energy from renewable sources**, including energy from renewable sources produced on-site or nearby;*

Renewable Energy: Energy from renewable non-fossil energy sources, namely solar energy (thermal and photovoltaic), wind, hydropower, biomass, geothermal, ambient energy, wave, tidal, landfill gas, sewage treatment plant gas and biogases.



***'major renovation'** means the renovation of a building where more than 25 % of the surface of the building envelope undergoes renovation.*

Building Regulations Part L Development - Dwellings



Achieving compliance with TGD L Dwellings 2019



Overall Compliance

Sect. 1.1 calculation in DEAP by achieving MPEPC (0.3) and MPCPC(0.35) (equivalent to 70% Reduction on 2005)

+

Minimum Threshold Level Compliance

TGD L Sections:

1.2 Renewable Energy Ratio =0.20

1.3 Building Fabric

U-Values (Backstops)

Thermal Bridging ACDs

Air tightness: Air permeability < 5m³/hr/m²

1.4 Building Services

Boiler Efficiency 90%

Heat Pumps SPF

Space Heating Controls

(zoning and time control)

Insulation

Mechanical Ventilation

System Efficiency

1.5 Construction Quality and Commissioning

1.6 User Information

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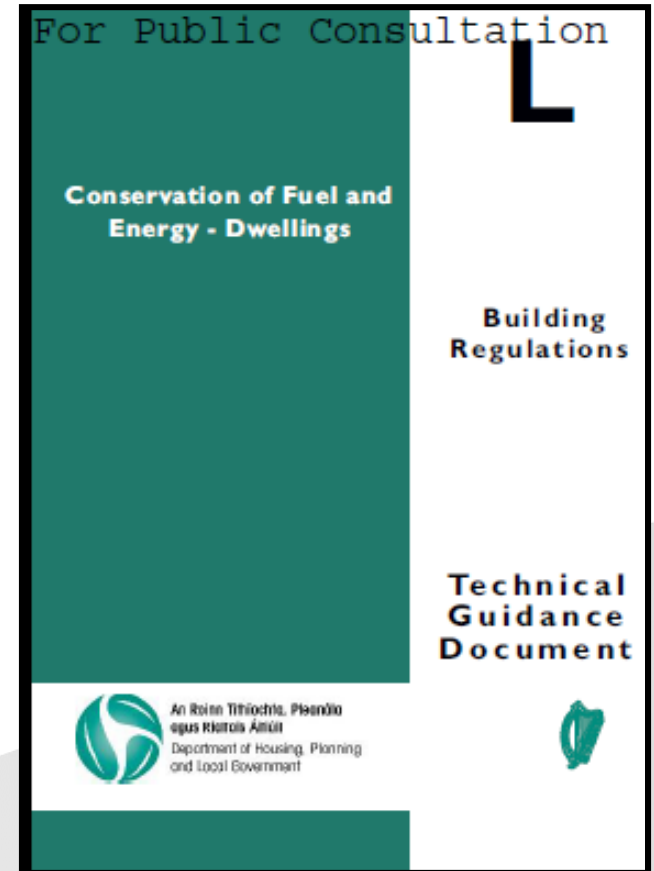
Compliance with Part L Dwellings

N.B. Check Overall compliance prior to Commencement at design stage

Overview of key changes to TGD L Dwellings 2019



- Introduction of NZEB, MPEPC=0.30, MPCPC=0.35
- Introduction of Major Renovations to a cost optimal level where technically, economically and functionally feasible
- Introduction of a Renewable Energy Ratio (RER) of 20% as per ISO EN 52000 (to replace 10kWh/m²/yr).
- Reduction of air permeability backstop from 7m³/hr/m² to 5m³/hr/m²
- Table 1- Reduction of wall and floor backstop U-Value from 0.21W/m²K to 0.18 W/m²K
- Table 1- Reduction of window backstop U-Value from 1.6 W/m²K to 1.4 W/m²K
- Inclusion of guidance to avoid overheating in dwellings
- Paragraph 1.3.2.5 – Removal of variation of U-Value with percentage glazing
- Introduction of calculation of R_u value for corridors in apartments.



Backstop U-values - New Dwellings



Table 1 Maximum elemental U-value (W/m ² K) ^{1, 2}		
Column 1 Fabric Elements	Column 2 Area-weighted Average Elemental U-value (U _m)	Column 3 Average Elemental U-value – individual element or section of element
Roofs		
Pitched roof		
- Insulation at ceiling	0.16	0.3
- Insulation on slope	0.16	
Flat roof	0.20	
Walls	0.18	0.6
Ground floors ³	0.18	0.6
Other exposed floors	0.18	0.6
External doors, windows and rooflights	1.4 ^{4,5}	3.0
Notes:		
1. The U-value includes the effect of unheated voids or other spaces.		
2. For alternative method of showing compliance see paragraph 1.3.2.3.		
3. For insulation of ground floors and exposed floors incorporating underfloor heating, see paragraph 1.3.2.2.		
4. Windows, doors and rooflights should have a maximum U-value of 1.4 W/m ² K.		
5. The NSAI Window Energy Performance Scheme (WEPS) provides a rating for windows combining heat loss and solar transmittance. The solar transmittance value g_{pers} measures the solar energy through the window.		

Backstop U-values - Existing Dwellings



Table 5 Maximum elemental U-value (W/m ² K) ^{1, 2, 6} for Material Alterations or Material Change of Use		
Column 1 Fabric Elements	Column 2 Area-weighted Average Elemental U-value (Um)	Column 3 Average Elemental U-value – individual element or section of element
Roofs		
Pitched roof		
- Insulation at ceiling	0.16	0.35
- Insulation on slope	0.25	
Flat roof	0.25	
Walls		
Cavity walls ⁴	0.55	0.6
Other walls	0.35	
Ground floors ³		
	- 0.45 ⁵	-
Other exposed floors ³	0.25	0.6
External doors, windows and rooflights and curtain walling	1.40	3.0
Notes:		
1. The U-value includes the effect of unheated voids or other spaces.		
2. For material alterations, the U-values relate to the new works.		
3. For insulation of ground floors and exposed floors incorporating underfloor heating, see paragraph 2.1.2.2.		
4. This only applies in the case of a wall suitable for the installation of cavity insulation. Where this is not the case it should be treated as for "other walls".		
5. This U-value only applies where floors are being replaced.		
6. For buildings of architectural or historical interests or permeable traditional construction, refer to paragraph 0.6.		

Main changes TGD L Appendix E – 2011 vs 2019



- 6 example dwellings including apartments: HP, Gas + PV, NV, CMEV, MVHR
- In semi-detached example, PV increases from 7.9m² to 8.63m² with gas boiler
- In semi-detached example, double glazing of 1.4 W/m²K changes to triple glazing 0.9 W/m²K
- LED lighting accounted for in DEAP (A+ bulbs, 94 lumen/cW, 4 W/m²)
- Efficient hot water use in showers/taps accounted for in DEAP (125 l/p/d and 6l/min flow restrictor)
- User defined R_u value for unheated corridors included in mid- and top- floor apartment example

TGD L Appendix E

Semi-Detached Example performance



	TGD L 2011 Dwelling heated by mains gas + PV	TGD L 2019 Dwelling heated by mains gas + PV	TGD L 2019 Dwelling heated by heat pump
Primary energy [kWh/m ² /yr]	56	43	41
CO2 emissions [kg/m ² /yr]	10	8	8
EPC	0.40	0.29	0.28
CPC	0.37	0.26	0.26
Renewable Energy Ratio (RER)	0.18	0.24	0.38

TGD L 2019 - Dwellings Major Renovations



Where more than 25 % of the surface of the building envelope undergoes renovation the energy performance of the building or the renovated part thereof is upgraded in order to meet minimum energy performance requirements with a view to achieving a cost optimal level in so far as this is technically, functionally and economically feasible.

The cost optimal performance level to be achieved is 125 kWh/m².yr when calculated in DEAP (B2).

Qualifying elemental works for surface area calculation defined in Table 6.

Alternative compliance routes in Table 7.

Major Renovation-Table 6



Table 6

Elemental works that are included in the surface area calculation for major renovation^{1,2,3}

External walls renovation

- External insulation of the heat-loss walls
- Replacement or upgrade of the external walls' structure
- Internal lining of the surface of heat-loss walls

Windows renovation

- Replacement of windows

Roofs renovation

- Replacement of roof structure

Floors renovation

- Replacement of floors

Extension

- Extension works which affect more than 25 % of the surface area of the existing dwelling

¹ Major renovation requirement can be activated by works to a single element or to a combination of elements as per column 1 of table 7.

² Where major renovations to walls, roofs and ground floors constitute essential repairs e.g. repair or renewal of works due to fire, storm or flood damage or damage as a result of a material defect such as reactive pyrite in sub-floor hardcore or defective concrete blockwork, it is not considered economically feasible to bring these renovations to a cost optimal level.

³ Painting, re-plastering, rendering, re-slating, re-tiling, cavity wall insulation and insulation of ceiling are not considered major renovation works.

Major Renovation-Table 7

Table 7 - Cost Optimal Works activated by Major Renovation

Major Renovation > 25% surface area ^{1,2,3,5}	Cost Optimal level as calculated in DEAP (Paragraph 2.3.3 a.)	Additional Works to bring dwelling to cost optimal level in so far as they are technically, economically and functionally feasible (Paragraph 2.3.3 b.)
External walls renovation	The cost optimal performance level to be achieved is 125 kWh/m ² /yr.	Upgrade insulation at ceiling level where U-values are greater than in Table 5 & Oil or gas boiler replacement ⁶ & controls upgrade where the oil or gas boiler is more than 15 years old and efficiency less than 86% &/or Replacement of electric storage heating ⁷ systems where more than 15 years old and with heat retention not less than 45% measured according to IS EN 60531.
External walls and windows renovation		
External walls and roof renovation		
External walls and floor renovation		
New Extension affecting more than 25% of the surface area of the existing dwelling's envelope (see 2.3.6)	The cost optimal performance level to be achieved is 125 kWh/m ² /yr	Upgrade insulation at ceiling level where U-values are greater than in Table 5 & Oil or gas boiler replacement ⁶ & controls upgrade where the oil or gas boiler is more than 15 years old and efficiency less than 86% &/or Replacement of electric storage heating ⁷ systems where more than 15 years old and with heat retention not less than 45% measured according to IS EN 60531 & Upgrade insulation at wall level where U-values are greater than in table 5.

Major Renovation - Examples



Semi-detached house (126 m²): hollow blocks walls with 25 mm mineral wool internal insulation, pitched roof with 50 mm mineral wool insulation on the ceiling, double glazing with 6 mm air gap, 80 % gas boiler installed with no heating controls, solid fuel stove secondary heating.

Proposed works to elements [†]	Major renovation (Yes/No)	Required additional works
A) Window replacement (13 % of envelope)	No	NA
B) EWI or IWI of walls (35 % of envelope)	Yes	Upgrade insulation at ceiling level to 0.16 W/m ² K or better as per table 5, and 90 % efficiency condensing gas boiler replacement and controls upgrade: time and temperature controls for space heating + time and temperature controls on domestic hot water
C) EWI or IWI of Walls and windows replacement (48 % of envelope)		
D) EWI or IWI of Walls and replacement of roof structure (61 % of envelope)		
E) EWI or IWI of Walls and replacement of floor (61 % of envelope)		

[†] Major Renovation of all elements should meet the requirements of Table 5 where material alteration applies.

Primary energy consumption before major renovation: 233 kWh/m²/yr

Proposed works package B) is based on the following specification: 100 mm EWI, 300 mm attic insulation, 91 % efficiency gas boiler, full zone time and temperature controls on space heating with weather compensation, time and temperature control on domestic hot water with insulated primary pipework.

Primary energy consumption post major renovation: 121 kWh/m²/yr

Major Renovation - Examples



Terraced house (96 m²): solid wall, pitched roof with 50 mm mineral wool insulation on the ceiling, double-glazing with 12 mm air gap and a U-value of 2.8 W/m²K, 68 % efficiency gas boiler installed with no control.

Proposed works to elements ¹	Major renovation (Yes/No)	Additional works
A) Window replacement (15 % of envelope)	No	NA
B) EWI or IWI of walls (22 % of envelope)	No	NA
C) EWI or IWI of walls and ceiling insulation (53 % of envelope)	No ²	NA
D) EWI or IWI of Walls and windows replacement (37 % of envelope)	Yes	Upgrade insulation at ceiling level to 0.16 W/m ² K or better as per table 5, and 90 % efficiency condensing gas boiler replacement and controls upgrade: time and temperature controls for space heating + time and temperature controls on domestic hot water
E) EWI or IWI of Walls and replacement of roof structure (53 % of envelope)		
F) EWI or IWI of Walls and replacement of floor (53 % of envelope)		

¹ Major Renovation of all elements should meet the requirements of Table 5 where material alteration applies.

² Ceiling insulation is not replacement of the roof structure.

Primary energy consumption before major renovation: 187 kWh/m²/yr

Proposed works package D) is based on the following specification: 50 mm IWI, windows at 1.4 W/m²K, 300 mm attic insulation, 91 % efficiency gas boiler, time and temperature zone controls on space heating with weather compensation, time and temperature control on domestic hot water with insulated primary pipework.

Primary energy consumption post major renovation: 107 kWh/m²/yr

Draft Transitional Arrangements



Regulations to be signed by 19th April with 6 months proposed to application:

TGD L 2019 Dwellings intended to apply to new Dwellings commencing construction from 1st November 2019 subject to transition.

Transitional arrangements intended to allow TGD L 2011 - Dwellings to be used where planning approval or permission has been applied for on or before 31st October 2019 and substantial completion is completed within 1 year i.e. by 31st October 2020

“Substantial work has been completed” means that the structure of the external walls of the dwelling has been erected.

Regulatory Impact Assessment



- Uplift costed across 5 dwelling types (semi-detached, detached, bungalow, apartment-mid and top floor) using different combinations of fabric, services, ventilation and renewables.
- The average uplift in cost across all dwelling types modelled was 1.9% over current construction costs depending on the dwelling archetype and design specification applied. The range of uplift was 0.7% to 4.2%.
- Overheating assessment on all types with some mitigation measures (reduced solar transmittance, appropriate use of blinds).
- Training-working with IoTs and ETBs and Certification scheme by NSAI (Airtightness, Thermal modellers, Ventilation).
- High rise apartments assessed for renewables.

High Rise apartment blocks



Multiple storey apartment blocks modelled.

Photovoltaics with gas boiler viable up to 12 floors.

Heat pumps viable for all heights.



Passive House Tower –New York -27 Floors

<http://www.ctbuh.org/News/GlobalTallNews/tabid/4810/Article/2972/language/en-US/view.aspx>

Overview of key changes to TGD F 2019



- Mechanical Ventilation guidance for AP $\leq 3 \text{ m}^3/\text{hr}/\text{m}^2$
- Guidance provided for Continuous Mechanical Extract Ventilation
- Introduction of certification of ventilation systems installation
- New examples for apartments
- Installation and Commissioning guide for Ventilation systems
- Same application date as TGD L 2019



www.housing.gov.ie

email: buildingstandards@housing.gov.ie



The screenshot shows a web browser window displaying the homepage of the Department of Housing, Planning, Community and Local Government. The browser's address bar shows the URL <http://www.housing.gov.ie/>. The website header includes the department's name in both English and Irish, a search bar, and navigation links for FOI/AIE, News, Contact, English, and Gaelge. A main navigation menu contains links for Home, Who We Are, What We Do, Publications, Legislation, and Statistics. A featured banner for 'Rebuilding Ireland' highlights an action plan for housing and homelessness, with a 'More' button. A 'Quick find' sidebar lists links for Help to Buy Incentive, Motor Tax, Building Standards, Housing Statistics, and Transparency Data. The main content area is divided into three columns: News, Publications, and Public Consultations. The News column features articles about Minister Coveney's launches and address. The Publications column lists documents such as 'Local Property Tax Final Allocations to Local Authorities for 2017.pdf' and '2015 - Particulars of Fire Brigade Activities'. The Public Consultations column includes 'Irish Language Scheme 2017-2019: Request for Submissions' and 'Public Consultation - A Strategy for the Rented Sector'. The Windows taskbar at the bottom shows various application icons and the system clock indicating 15:58 on 25/10/2016.

Department of Housing, Planning, Community and Local Government

An Roinn Tithíochta, Pleanála, Pobail agus Rialtais Áitiúil

Department of Housing, Planning, Community and Local Government

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Rebuilding Ireland

Rebuilding Ireland. Action plan for housing and homelessness.

More

Quick find

- Help to Buy Incentive (External link)
- Motor Tax
- Building Standards
- Housing Statistics
- Transparency Data

News

- Minister Coveney launches Review of Residential Rental Sector 20/10/2016
- Minister Coveney's address to Seanad Éireann on the Report on the Programme to Review and Enhance Fire Safety in Local Authority-Provided Traveller Accommodation 19/10/2016
- Minister Catherine Byrne

Publications

- Local Property Tax Final Allocations to Local Authorities for 2017.pdf (223.92 KB)
- 2015 - Particulars of Fire Brigade Activities (20.73 KB)
- 2015 - Locations of Fires Attended by Brigades (17.7 KB)
- 2015 - Fire Prevention Statistics (71.5 KB)

Public Consultations

- Irish Language Scheme 2017-2019: Request for Submissions Status - Open
- Public Consultation - A Strategy for the Rented Sector Status - Open
- Public Consultation on the Review of Part B (Fire Safety) of the Building Regulations 2016