



Implications of Article 6 Targets for Denmark

Denmark's approach and equivalent kWh savings calculation

27. marts 2025



Danish Energy Agency

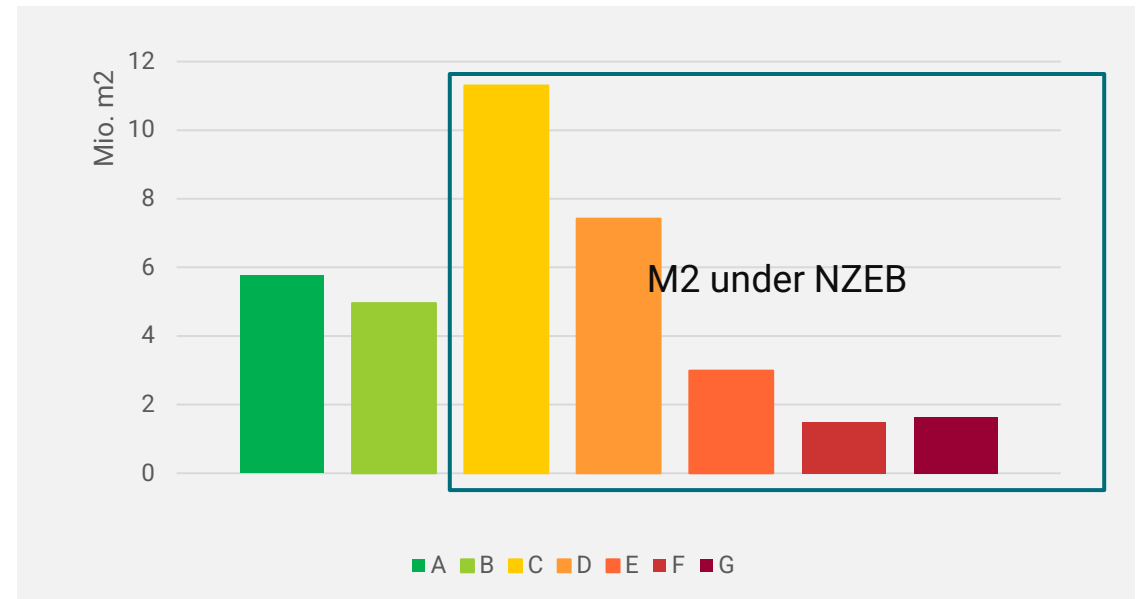
Understanding the 3% deep retrofitting target

Finding the baseline

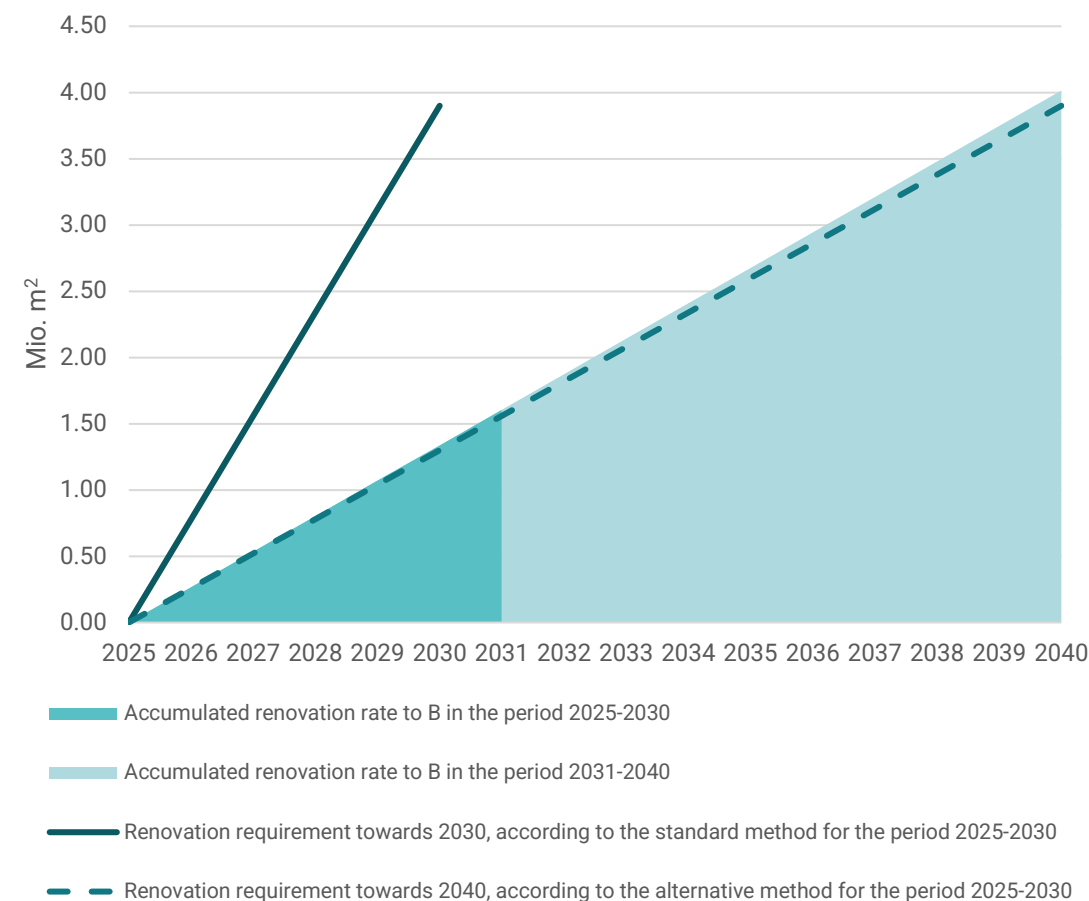
- Finding the total floor area over 250 m2
- Finding the buildings that are not nearly zero-energy buildings by January 1st 2024
- Analysing data

Primary energy	EPC	1. jan 2024	% Total
< 33	A2020	1.147.213	3%
< 41 + 1000 / A	A2015	2.057.698	6%
< 71,3 + 1650 / A	A2010	2.562.528	6%
< 95,0 + 2200 / A	B	4.963.173	14%
< 135 + 3200 / A	C	11.300.942	32%
< 175 + 4200 / A	D	7.423.913	21%
< 215 + 5200 / A	E	2.987.233	9%
< 265 + 6500 / A	F	1.502.184	4%
> 265 + 6500 / A	G	1.643.117	5%
Total		35.588.000	100%

Ownership	Area > 250 m2 m2	Number > 250 m2 pcs.
Staten	5.500.000	2.929
Region	4.928.000	1.424
Municipality	25.160.000	16.821
Total	35.588.000	21.174



Understanding the 3% deep retrofitting target



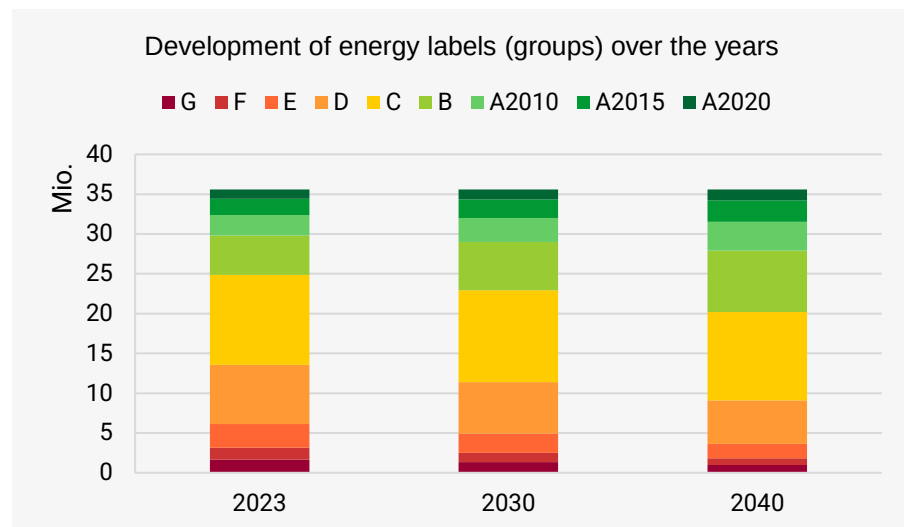
	Stat	Region	Municipality	Total
Area under NZEB, subject to the renovation requirement, Mio. m²	3,5	3,7	17,7	24,9
Share of the area under NZEB, subject to the renovation requirement from Oct. 2025 - 2030, Mio. m²	0,5	0,6	2,8	3,9

Building stock by ownership category, 1,000 m²				
Building stock by building type	Stat	Region	Municipality	Total
110-190 Residential, excl. 160	150	200	1.048	1.399
320 Office and storage	662	234	1.568	2.465
410 Culture	98	0	732	830
420 Education and research	727	190	8.045	8.962
430 Healthcare	326	2.520	250	3.096
440 Institution, incl. 160	110	402	3.838	4.350
490 Other institution	1.187	33	235	1.456
530 Building for leisure and sports	12	5	1.583	1.600
Other (Remaining building area)	167	112	419	697
Total usable floor area subject to the renovation requirement, 1,000 m²	3.439	3.696	17.717	24.853
Renovation requirement from 2025 - 2030, 1,000 m²	540	580	2.782	3.902

Calculating equivalent kWh savings

EPC	Primary energy	a) The estimated energy consumption of reference buildings not meeting NZEB standard/before renovation (in kWh/ m2)	b) The estimated energy consumption of the same reference buildings after they would be transformed into NZEB (in kWh/m2)	(a-b) Annual targeted amount of energy savings (in kWh/m2)
C	< 135 + 3200 / A	117	85	33
D	< 175 + 4200 / A	158	85	73
E	< 215 + 5200 / A	199	85	114
F	< 265 + 6500 / A	245	85	160
G	> 265 + 6500 / A	322	85	237

Annual targeted amount of energy savings (kWh) = $\sum(a-b) \times c$



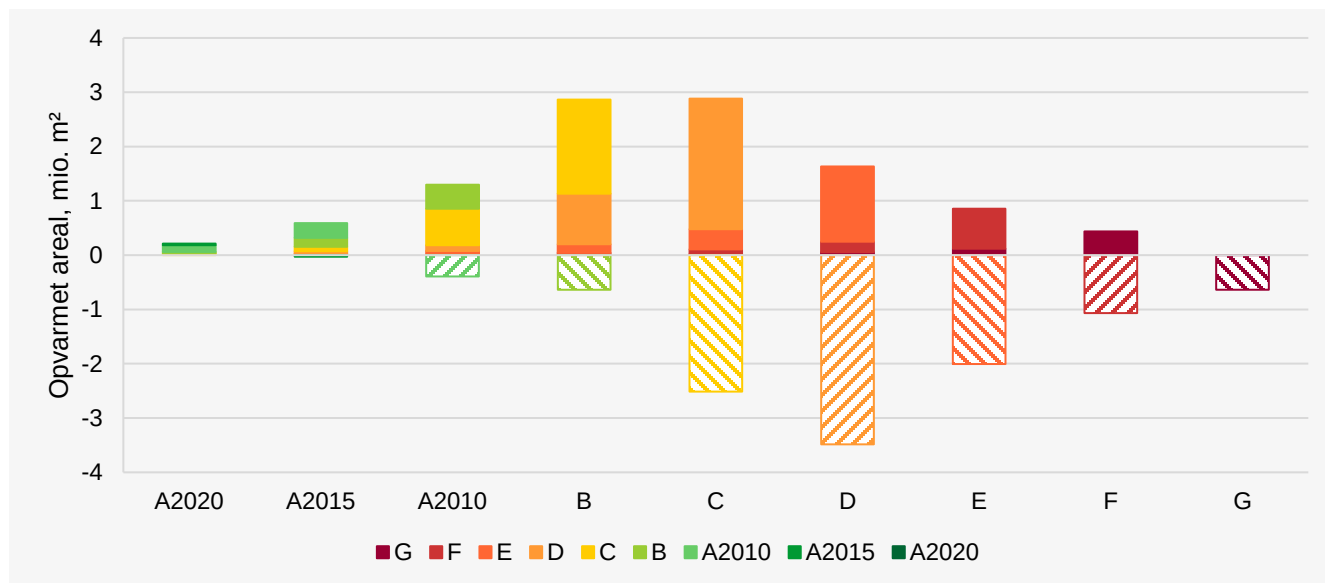
Annual renovation of 3 pct. pct. under NZEB							Total
Year	2025	2026	2027	2028	2029	2030	
Annual renovation, Mio. m2	0,17	0,75	0,75	0,75	0,75	0,75	3,90

	Area under NZEB	3% renovation requirement	Area with less stringent requirements	Total area
C	11,3			
D	7,4			
E	3,0	0,8		0,8
F	1,5	1,3	0,2	1,5
G	1,6	1,4	0,2	1,6
Sum	24,9	3,5	0,4	3,9

Calculating equivalent kWh savings

Assumptions and reservations:

- An average energy consumption from the energy rating scale for non-residential buildings
- An average building size of 1,130 m² for public buildings



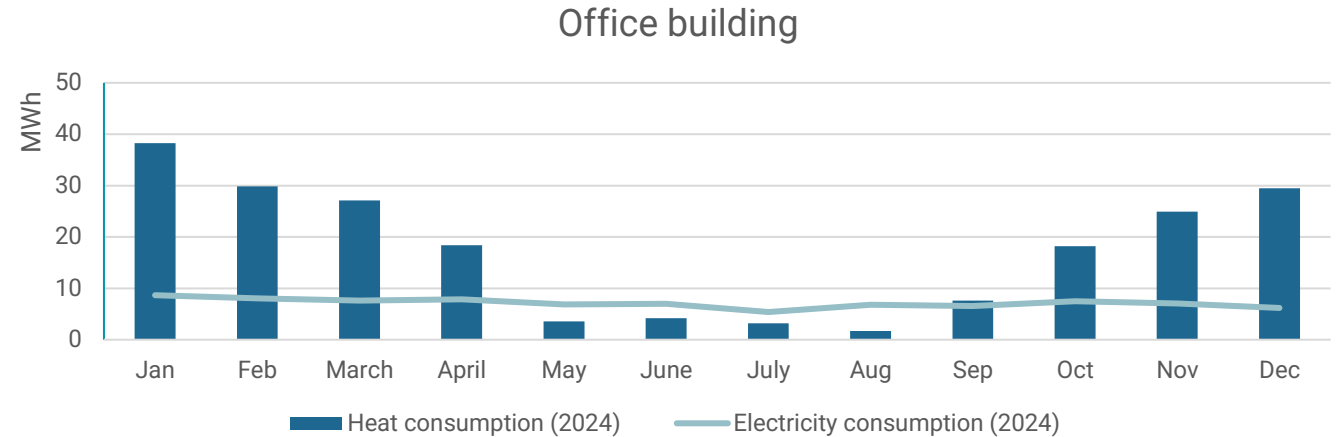
Follows the renovation rate							
Energy saving [GWh]	2025	2026	2027	2028	2029	2030	Sum
Year 1	9	9	9	9	9	9	53
Year 2		38	38	38	38	38	191
Year 3			38	38	38	38	152
Year 4				38	38	38	114
Year 5					38	38	76
Year 6						38	38
Total	9	47	85	123	161	200	625

Worst performance first							
Energy saving [GWh]	2025	2026	2027	2028	2029	2030	Sum
Year 1	39	39	39	39	39	39	236
Year 2		168	168	168	168	168	842
Year 3			168	168	168	168	673
Year 4				128	128	128	384
Year 5					111	111	222
Year 6						94	94
Total	39	208	376	504	615	709	2.450

High performance first							
Energy saving [GWh]	2025	2026	2027	2028	2029	2030	Sum
Year 1	6	6	6	6	6	6	34
Year 2		24	24	24	24	24	121
Year 3			24	24	24	24	97
Year 4				24	24	24	73
Year 5					24	24	49
Year 6						24	24
Total	6	30	54	78	103	127	398

Approach to achieving annual savings

A2020	Deep	Deep	Deep	Deep	Deep
A2015	Deep	Deep	Deep	Deep	Deep
A2010	Deep	Deep	Deep	Deep	Medium
B	Deep	Deep	Medium	Medium	Light
C	Deep	Medium	Medium	Light	
D	Medium	Medium	Light		
E	Medium	Light			
F	Light				
G					
	G	F	E	D	C



- Energy savings in public buildings for the period 2026 to 2030 from the implementation of the EPBD.
 - MEPS and solar energy
- Focus on the conversion of natural gas to electricity and district heating.
- Possible focus on Defense buildings within the governmental building portfolio.
- Across public building owners, buildings that are expected to undergo renovation by 2040 or can cost-effectively be upgraded to energy label B are identified.
- The renovation requirement is implemented through voluntary agreements between the Ministry for Climate, Energy, and Utilities, state building owners, Local Government Denmark (KL), and Danish Regions.
- 3 pct. of the designated buildings prepare a renovation passport annually.
- The Danish Energy Agency supervises and monitors progress through the Energy and Building Analysis (EBA) database.

Key insights and decisions taken

Average of rentable proposal_kr/m2					
Building type	C	D	E	F	G
Før 1890	802	1.836	2.629	2.731	3.432
1891-1930	658	1.667	2.511	3.029	5.634
1931-1950	630	1.646	2.329	3.130	2.844
1951-1960	661	1.409	2.384	3.248	4.183
1961-1972	536	1.445	2.044	3.052	3.837
1973-1978	449	1.192	1.579	1.854	3.932
1979-1998	511	1.157	1.987	2.555	2.690
1999-2006	430	1.331	2.301	1.228	2.117
2007-2014	403	1.097	–	–	–
Efter 2014	354	–	–	–	–
Total avg.	545	1.461	2.300	2.950	4.162

Average of rentable proposal_kr/m2					
Building type	C	D	E	F	G
110-190 Residential, excl. 160	532	1.736	2.087	1.987	5.448
320 Office and storage	543	1.412	2.410	3.448	4.249
410 Culture	622	1.463	2.223	4.136	4.347
420 Education and research	529	1.440	2.077	2.661	3.625
430 Healthcare	532	1.277	2.921	2.737	2.910
440 Institution, incl. 160	561	1.469	2.418	3.087	2.565
490 Other institution	562	1.418	2.334	2.782	3.934
530 Building for leisure and sports	487	1.313	2.138	2.820	4.103
Other (Remaining building area)	601	1.575	2.687	2.850	5.054
Total avg.	545	1.461	2.300	2.950	4.162

Average of rentable proposal_kr/m2					
Building type	C	D	E	F	G
s3: 251-1000 m²	739	1.816	2.659	3.331	4.762
s4: 1001-2500 m²	710	1.531	2.240	2.410	3.894
s5: 2501-5000 m²	679	1.330	2.205	2.728	–
s6: 5001-10000 m²	519	1.040	1.448	2.369	–
s7: >10000 m²	580	1.259	1.354	–	–
Total avg.	709	1.675	2.524	3.147	4.681

	Number, pcs.	Area, 1.000 m²
Energy-labeled public buildings	18.287	29.553
Public buildings below NZEB	14.474	20.035
Public buildings that can become at least NZEB through cost-effective savings proposals	3.139	4.882

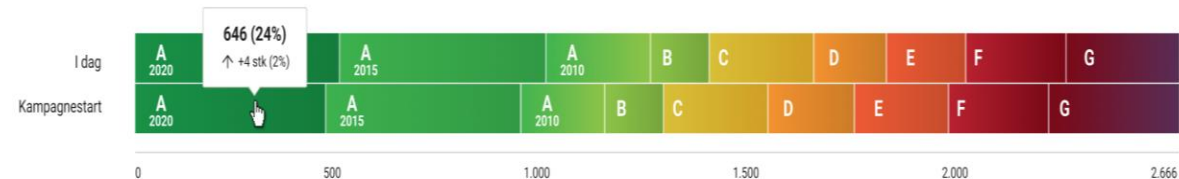
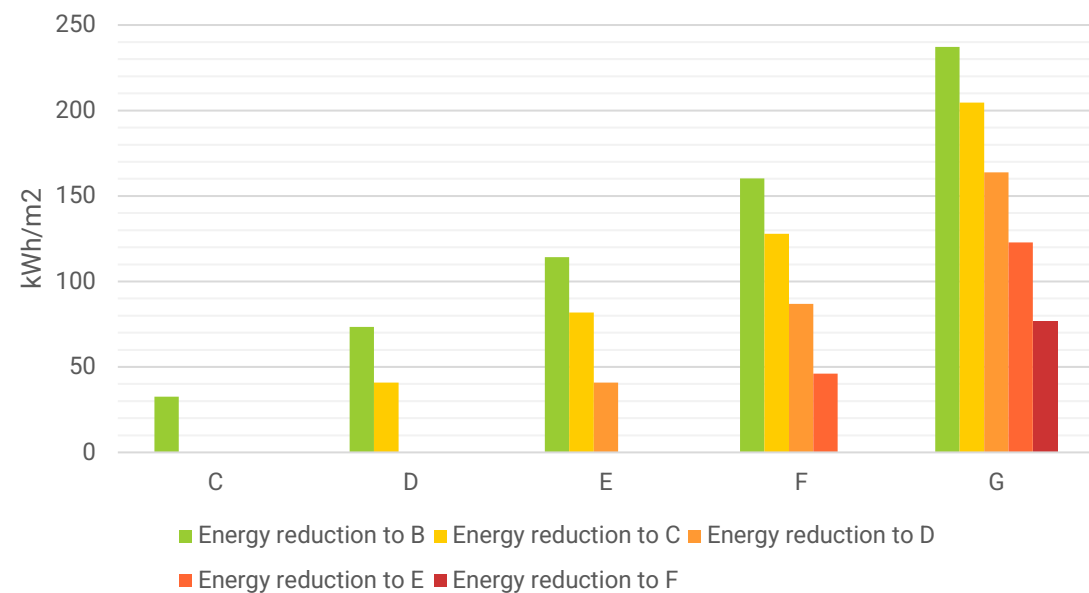
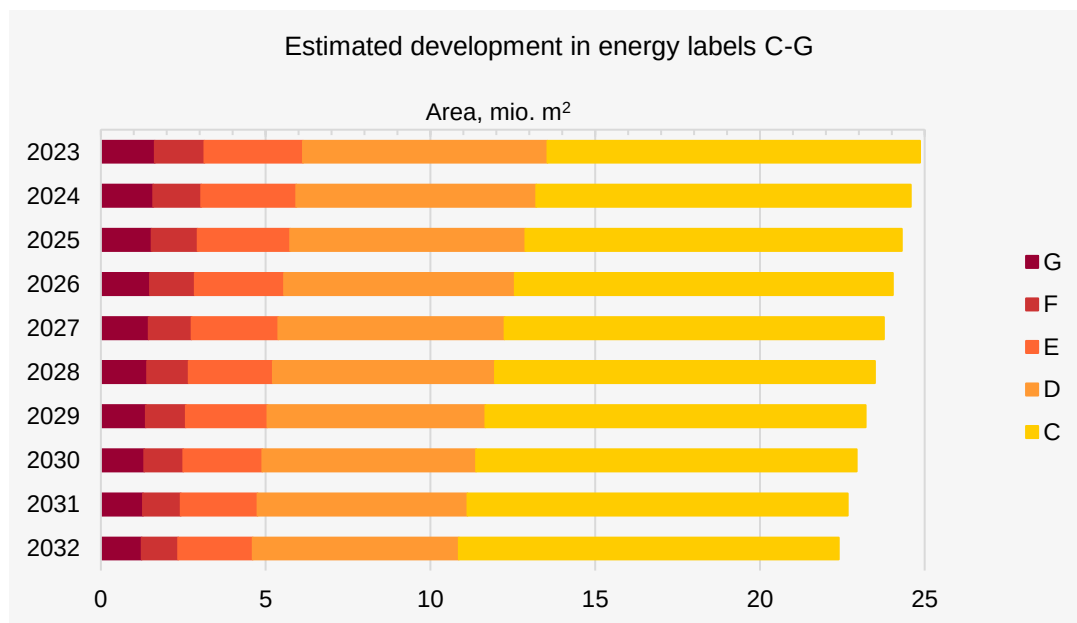
Use of the energy labels for:

- promote transparency
- identifying energy efficiency opportunities
- encourages energy-saving behavior
- monitoring and benchmarking
- energy performance targeting

Key insights and decisions to be made

- Short time to renovate a lot, especially with MEPS in EPBD
- MEPS and the EPBD can provide savings for Article 6 EED

- A lot to gain in the low-performing energy labels





Thank you for your attention