

Safer Buildings in Wales: A Consultation

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1. Introduction

1.1. This document sets out the estimated costs and benefits of the policy proposals outlined in the Welsh Government's White Paper: 'Safer Buildings in Wales'. These policy proposals shall be referred to as the Building Safety regime throughout this document and includes:

- Category 1 buildings (buildings 18m or more in height or more than 6 storeys and containing two or more dwellings);
- Category 2 buildings (buildings under 18 metres in height containing two or more dwellings).

2. Executive Summary

Buildings in scope

- Category 1 Buildings - the analysis is based on assuming 150 buildings in scope¹, containing approximately 10,000 flats. The analysis estimates that the stock of category 1 buildings will increase by 3% (4 to 6 buildings) per annum.
- Category 2 Buildings - the number of buildings in scope is estimated to be between 13,000 and 37,000. This is a considerable range because there is no accurate data on the stock of buildings in scope. Relevant buildings range from converted houses to 6 storey blocks of flats. The number of flats is estimated to be approximately 130,000 based on the most recent dwelling stock estimates.

Benefits

Types of benefit

2.1. The Building Safety Regime proposals for residential buildings are expected to provide the following benefits:

- For Category 1 buildings (buildings 18m or more in height or more than 6 storeys and contain two or more dwellings), three main types of benefits will derive:
 - = Reduced casualties, fatalities, building and other damage/loss resulting from reduced fire spread and structural failure;
 - = Avoided costs of resolving another systemic issue;

¹ As of September 2020, Welsh Government had identified 148 high rise residential buildings that meet the Category 1 criteria in Wales

= Wider cost savings to the construction industry, building owners and leaseholders.

- For Category 2 buildings (buildings under 18 meters in height, containing two or more dwellings), the more limited nature of the proposals are anticipated to result only in reduced casualties, fatalities, building and other damage/loss, through reduced fire spread.

Extent of benefit

Category 1 Buildings

2.2. The analysis estimates that the Building Safety Regime proposals for Category 1 buildings will give rise to annual benefits of between £2.3m to £6.4m² (central estimate of £4.1m pa). Table 2.1 provides a breakdown:

- Reduced fire spread accounts for between £1.4m to £4.8m annual benefits (central estimate of £2.9m pa);
- Avoided costs of resolving systemic issues accounts for between £0.4m to £0.8m annual benefits (central estimate of £0.6m pa).
- Other avoided costs account for between £0.4m to £0.7m annual benefits (central estimate of £0.6 pa).

Table 2.1	High-scenario		Central Estimate		Low-scenario	
	70yr NPV	10yr Equivalent Annual Benefit	70yr NPV	10yr Equivalent Annual Benefit	70yr NPV	10yr Equivalent Annual Benefit
	NPV £m	EAB £m	NPV £m	EAB £m	NPV £m	EAB £m
Reduced fire spread	£44.54	£4.88	£26.77	£2.92	£13.25	£1.44
Avoided costs of resolving systemic issues	£7.03	£0.82	£5.27	£0.61	£3.51	£0.41
Other avoided costs	£6.39	£0.74	£4.92	£0.57	£3.44	£0.40
Total – Category 1 Buildings benefits	£57.96	£6.44	£36.95	£4.11	£20.21	£2.25

² EAB – equivalent annual benefit over a 10 year policy period.

Category 2 Buildings

2.3. The analysis estimates that the Building Safety Regime proposals for Category 2 buildings will give rise to annual benefits of between £5.5m to 10.1m³ (central estimate of £7.8m pa).

Table 2.2	High-scenario		Central Estimate		Low-scenario	
	70yr NPV	10yr Equivalent Annual Benefit	70yr NPV	10yr Equivalent Annual Benefit	70yr NPV	10yr Equivalent Annual Benefit
	NPV £m	EAB £m	NPV £m	EAB £m	NPV £m	EAB £m
Reduced fire spread £m	£87.12	£10.12	£67.02	£7.79	£46.91	£5.45

Wider benefits (not monetised in this analysis)

2.4. The Impact Assessment for the draft Building Safety Bill⁴ monetises, at the level of the UK, a number of wider benefits, a proportion of which will apply to Wales:

- UK construction industry innovation benefits deriving from the Building Safety Regime;
- Increased exports across the UK construction industry.

Non-monetised benefits

2.5. Some benefits have not been monetised because of the absence of a sufficiently robust evidence base, while in other cases it was not considered proportionate to monetise benefits. Non-monetised benefits are discussed below.

2.6. The benefit estimates set out here have been calculated over a 70-year appraisal period. This includes benefits experienced in the 10-year policy appraisal period (equal to that used to estimate costs) and benefits that may persist over the lifespan of a building, assumed to be 60 years. This is to best capture all the benefits and reflects HM Treasury's Green Book⁵ guidance on 'persistence' of benefits. For example, benefits associated with residents' engagement are likely to last the 10-

³ EAB – equivalent annual benefit over a 10 year policy period.

⁴ [Draft Building Safety Bill Impact Assessment:](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/901877/Draft_Building_Safety_Bill_Impact_Assessment_web.pdf)

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/901877/Draft_Building_Safety_Bill_Impact_Assessment_web.pdf

⁵ [Treasury Green Book:](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf)

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf

year policy period, however improvements in the construction quality of new builds will likely last the lifespan of the building.

- 2.7. A more detailed description of the methodology used to estimate these monetised benefits is set out in Annex A.

Costs

Types of cost

- 2.8. The Building Safety Regime proposals for residential buildings are expected to generate costs. The analysis estimates costs for the new requirements of the regime under the headings of Gateways; Safety Cases; Remediation works; Dutyholder responsibilities; Golden Thread; Key Dataset; Sanctions; Residents Voice; Appeals; Refurbishment; and other regulator costs.
- 2.9. Costs will be borne by the regulator and by industry and will involve transition costs plus annual ongoing costs.

Extent of costs

Table 2.3						
	NPV (10yr)			Annual Cost (EAC)		
	Low	Central	High	Low	Central	High
Category 1 Buildings	£32.3m	£46.93m	£64.11m	£3.76m	£5.45m	£7.45m
Category 2 buildings	£87.51m	£143.20m	£198.89m	£10.17m	£16.64m	£23.11m
Wider Dutyholder Role	£4.77m	£5.96m	£7.16m	£0.55m	£0.69m	£0.83m

Category 1 Buildings

- 2.10. The analysis estimates that average annual cost of meeting the new requirements of the Building Safety Regime⁶ will be between £3.8m and £7.4m (central estimate of £5.4m).
- The average annual cost **to industry** is estimated to be between £3.0m and £6.0m (central estimate of £4.3m);
 - The average annual cost **to the Regulator** is estimated to be between £0.8m and £1.4m (central estimate of £1.1m).

⁶ These annual costs exclude the costs of undertaking fire and structural remediation works to address faults with existing buildings.

Category 2 Buildings

2.11. The analysis estimates that the average annual cost⁷ of meeting the new requirements of the Building Safety Regime for Category 2 buildings are between £10.2m and £23.1m (central estimate of £16.6m).

Wider dutyholder costs for all buildings

2.12. There will be additional requirements for dutyholders in all building work where building regulations are triggered. The analysis estimates:

- Transition costs of between £0.4m and £0.7m⁸ (central estimate of £0.5m);
- Annual on-going costs⁹ of £0.5m to £0.8m (central estimate of £0.6m).

⁷ Equivalent Annual Costs (EAC)

⁸ Present Value over a 10-year appraisal period

⁹ Equivalent Annual Costs (EAC)

3. Benefits

Reducing the risk of fire spread

Table 3.1: Reduced fire spread	High Estimate		Central Estimate		Low Estimate	
	70yr NPV	10yr Equivalent Annual Benefit	70yr NPV	10yr Equivalent Annual Benefit	70yr NPV	10yr Equivalent Annual Benefit
	NPV £m	EAB £m	NPV £m	EAB £m	NPV £m	EAB £m
Category 1 Buildings	£44.54	£4.88	£26.77	£2.92	£13.25	£1.44
Category 2 Buildings	£87.12	£10.12	£67.02	£7.79	£46.91	£5.45

- 3.1. The Building Safety Regime proposals are expected to reduce the risk of fires spreading across multiple dwellings within an in-scope building (referred to here as fire incidents), and in particular to reduce the risk of major fires. This will be achieved through stronger oversight, clearer accountability for, and stronger duties on, those responsible for the safety of buildings in scope throughout design, construction, and occupation, and stronger enforcement and sanctions to deter and rectify non-compliance. A stronger voice for residents will also contribute.
- 3.2. The Building Safety Regime proposals complement and build on other recent policies to reduce the risk of future incidents and the impact that they would have. Relevant policies include the combustible materials ban, review of Approved Document B and the Fire Safety Bill¹⁸. Changes to industry practice may also act to reduce this risk.
- 3.3. The Building Safety Regime proposals are expected to further reduce the risk of fire spread in in-scope buildings and consequently the risk of fatalities and injuries to residents. There are also expected to be reductions in negative impacts on the mental health of residents involved in such incidents, their family members and others, as well as the avoidance of the cost and disruption of rehousing residents, site management and demolition costs, and loss of property.
- 3.4. Estimates of the scale of these benefits take account of the projected residual risk of such incidents in the absence of the Building Safety Regime proposals (but after the measures already taken, some of which are discussed above), the extent to which the proposals will reduce this risk, and the expected harm caused by such incidents. While the uncertainty around each of these factors makes any monetised estimates of the scale of benefits highly uncertain, an indicative range of £0.6m - £1.8m per annum is suggested.
- 3.5. Substantially reducing the risk of fire spread in buildings in scope is likely to have the important additional benefit (not monetised in this impact assessment) of reassuring

residents and making them feel safer in their homes. This is further discussed in the section on non-monetised benefits below.

Avoided costs of resolving systemic issues – Category 1 Buildings

Table 3.2: Avoided costs of resolving systemic issues	High Estimate		Central Estimate		Low Estimate	
	70yr NPV	10yr Equivalent Annual Benefit	70yr NPV	10yr Equivalent Annual Benefit	70yr NPV	10yr Equivalent Annual Benefit
	NPV £m	EAB £m	NPV £m	EAB £m	NPV £m	EAB £m
Category 1 Buildings	£7.03	£0.82	£5.27	£0.61	£3.51	£0.41

- 3.6. There are wider costs associated with weaknesses in the current regime, where construction does not meet the necessary requirements and so buildings require subsequent and urgent remediation (which may or may not be triggered by an incident involving a specific building). An example of this is the remediation of unsafe Aluminium Composite Material (ACM) cladding on multi-occupied residential buildings over 18 metres following the Grenfell Tower fire and the emergence of other concerns requiring remediation during investigation. This has involved costs for remediation, waking watch fees, and related investigative/legal costs.
- 3.7. There is a risk that a similar systemic crisis could emerge in future and necessitate a similar response. The Building Safety Regime proposals are expected to reduce the risk of this happening and therefore to reduce the likelihood that such associated costs are incurred.

Other avoided costs – Category 1 Buildings

Table 3.3: Other avoided costs	High Estimate		Central Estimate		Low Estimate	
	70yr NPV	10yr Equivalent Annual Benefit	70yr NPV	10yr Equivalent Annual Benefit	70yr NPV	10yr Equivalent Annual Benefit
	NPV £m	EAB £m	NPV £m	EAB £m	NPV £m	EAB £m
Category 1 Buildings	£6.39	£0.74	£4.92	£0.57	£3.44	£0.40

- 3.8. The Building Safety Regime proposals are likely to lead to the avoidance of some costs to the construction industry. It is estimated that the overall package of additional checking and information-gathering will lead to a reduction in re-work costs relating to defects identified during and at the end of the construction period, as well as fewer latent defects identified during building occupation.

- 3.9. Information requirements would help to reduce costs from future invasive surveys and for general asset management. There would also be time saving benefits from the checking of products during design and construction, safety case preparation and establishing performance as a result of the products testing, declaration of performance and market improvements.
- 3.10. Finally, there are expected to be some costs avoided relating to replacement of windows and balconies and structural incidents in buildings.
- 3.11. Annex A provides further details of the methodology for estimating the benefits.

4. Costs of the Building Safety Regime

4.1. Costs of the Building Safety Regime have been estimated over a 10-year policy period. The costs have been presented separately for

- Category 1 buildings (18m or more in height or more than 6 storeys and contain two or more dwellings);
- Category 2 buildings (under 18m in height containing two or more dwellings); and
- Wider dutyholder role across all construction projects.

Category 1 Buildings

4.2. There are an estimated 150 Category 1 buildings containing approximately 10,000 flats.

Total cost for Category 1 Buildings

4.3. Total average annual costs¹⁰ of the Building Safety Regime for Category 1 buildings are estimated to be between £3.8m and £7.5m (central estimate of £5.5m).

Costs will comprise transition costs and annual ongoing costs

Transition costs

4.4. Transition costs will mainly be incurred in the first two years, to allow for adjustment to the new regime. These costs include preparing the existing buildings for the new regime, including preparing a digital record, resident engagement strategy and first safety case for existing buildings, as well as training costs, recruitment and transitional support provided by regulators.

4.5. Transition costs are estimated to be:

- For industry, the NPV of transition costs ranges from £5.0m to £10.5m:
- For regulators, the NPV transition costs are estimated at £0.6m to £1.6m.

¹⁰ Equivalent Annual Costs (EAC)

Annual ongoing costs

4.6. Once the Building Safety Regime is established, the analysis estimates that ongoing annual costs¹¹ will be between £3.1m and £6.1m with a central estimate of £4.4m.

4.7. The analysis estimates that:

- The annual cost to industry of meeting the new requirements of the Building Safety Regime¹² will be between £2.4m and £4.8m (central estimate of £3.4m)¹³;
- The annual cost to regulators of meeting the new requirements of the Building Safety Regime¹⁴ will be between £0.7m and £1.3m (central estimate of £1.0m). This estimate represent the cost of a regulator function in Wales to oversee proposed additional requirements of the Building Safety Regime. The calculated figure makes no pre-judgement of the regulatory approach to be adopted in Wales or how it could be implemented.

Table 4.1: Category 1 Buildings – breakdown of costs by regulator/industry							
		NPV (10yr)			Annual Cost (EAC)		
		Low	Central	High	Low	Central	High
Industry	Transition	£4.99m	£7.62m	£10.47m	£0.58m	£0.89m	£1.22m
Regulators	Transition	£0.62m	£1.17m	£1.57m	£0.07m	£0.14m	£0.18m
Industry	Annual	£20.63m	£29.64m	£41.29m	£2.40m	£3.44m	£4.80m
Regulators	Annual	£6.14m	£8.50m	£10.79m	£0.71m	£0.99m	£1.25m
Total	Total	£32.38m	£46.93m	£64.11m	£3.76m	£5.45m	£7.45m

Additional personnel requirements

4.8. The analysis estimates a need for 6-10 Full Time Equivalent (FTE)¹⁵ additional regulatory staff. These estimates are included as a guide and will be subject to further review once the regulatory approach has been determined. The estimates include 2 to 3 FTE in a central team (oversight, competency, policy, analysis, coordination), 2 to 3 FTE inspectors, 0.5 to 1 FTE specialist engineers, 1 to 2 FTE fire officers and 0.5 to 1 FTE other local authority (planning environmental health).

¹¹ Equivalent Annual Cost (EAC) over a 10-year appraisal period

¹² These annual costs exclude the costs of undertaking fire and structural remediation works to address faults with existing buildings.

¹³ These costs exclude any additional fees or charges from the Regulator to recover the cost of enforcing the building safety regime

¹⁴ The regulator costs are expected to be partially offset by income from fees and charges raised from regulated parties.

¹⁵ if 65% utilisation rate is applied

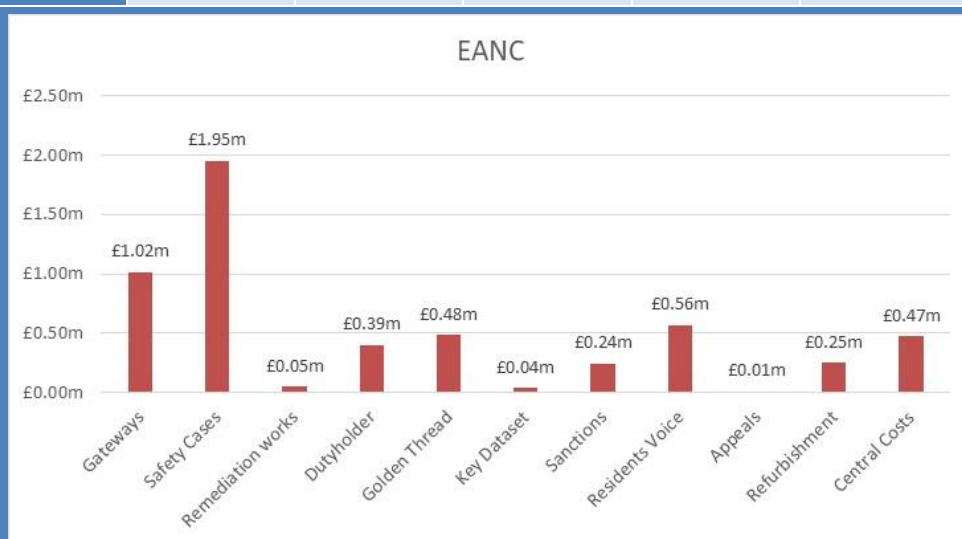
Breakdown of costs by element

4.9. Table 4.2 shows the breakdown of costs by element:

- Safety cases are expected to give rise to the largest proportion of costs - £1.4m and £2.8m per annum (central estimate of £2.0m);
- Gateways account for the next largest share of costs - £0.6m and £1.4m per annum (central estimate of £1.0m);

Table 4.2: Category 1 Buildings – breakdown of cost by element

	NPV (10yr)			Annual Cost (EAC)		
	Low	Mid	high	Low	Mid	high
Gateways	£5.25m	£8.75m	£12.26m	£0.61m	£1.02m	£1.42m
Safety Cases	£11.61m	£16.79m	£24.12m	£1.35m	£1.95m	£2.80m
Remediation works ¹⁶	£0.11m	£0.40m	£0.85m	£0.01m	£0.05m	£0.10m
Dutyholder	£2.54m	£3.39m	£4.10m	£0.29m	£0.39m	£0.48m
Golden Thread	£2.67m	£4.16m	£5.15m	£0.31m	£0.48m	£0.60m
Key Dataset	£0.25m	£0.31m	£0.37m	£0.03m	£0.04m	£0.04m
Sanctions	£1.65m	£2.07m	£2.48m	£0.19m	£0.24m	£0.29m
Residents Voice	£3.61m	£4.84m	£7.26m	£0.42m	£0.56m	£0.84m
Appeals	£0.02m	£0.04m	£0.08m	£0.00m	£0.01m	£0.01m
Refurbishment	£1.70m	£2.13m	£2.55m	£0.20m	£0.25m	£0.30m
Other Regulator Costs	£2.96m	£4.05m	£4.89m	£0.34m	£0.47m	£0.57m
Totals	£32.38m	£46.93m	£64.11m	£3.76m	£5.45m	£7.45m



¹⁶ The costs presented in the table are for remediation works that result from additional policy requirements that go beyond Building Regulation requirements.

4.10. Annex B provides a further breakdown of the cost methodology for each of the elements identified in Table 4.2

Average cost per building

4.11. The average cost per building is estimated to be:

- New Build project – £167,000;
- Major Refurbishment project – £40,600;
- Pre-occupied building, per annum - £28,100.

Table 4.3: Category 1 Buildings costs per building			
	Per New Build	Per Major Refurbishment	Per occupied building (annual)
Gateways	£ 135,100	£21,600	£ -
Safety Cases	£ -	£ -	£ 9,900
Remediation works	£ -	£ -	£ 10,000
Dutyholder	£ 20,500	£ 17,100	£ 700
Golden Thread	£ 7,900	£ 1,500	£ 1,800
Key Dataset	£ -	£ -	£ 200
Sanctions	£ 2,600	£ 300	£ 700
Residents Voice	£ -	£ -	£ 3,000
Appeals	£ 900	£ -	£ -
Refurbishment	£ -	£ -	£ 1,800
Central Costs	£ -	£ -	£ -
Total average per building	£167,000	£ 40,600	£ 28,100
Average per flat	£2,400	£600	£400

Category 1 Buildings – other remediation works

4.12. In addition to the direct costs of the policy, the assessment provides an indicative estimate of the cost of remediation works, likely to be identified by the process of preparing and reviewing safety cases. The types of works include façade remediation, cavity barriers, fire stopping, fire door replacement, sprinkler retrofit and replacing timber on balconies.

Table 4.3a: Category 1 Buildings – estimated cost of remediation works identified by Safety Cases						
	NPV (10yr)			Annual Cost (EAC)		
	Low	Central	high	Low	Central	high
Estimated cost of remediation works identified by Safety Cases	£22.38m	£33.23m	£48.99m	£1.88m	£2.79m	£4.11m

Category 2 Buildings

- 4.13. The number of buildings in scope is estimated to be between 13,000 and 37,000. This is a considerable range because there is no accurate data on the stock of buildings which encompass converted houses to 6 storey blocks of flats.
- 4.14. The number of flats is estimated to be approximately 130,000 based on the most recent dwelling stock estimates. This number is derived from published data of the number of flats in Wales¹⁷¹⁸, and therefore provides a reasonably robust estimate for the analysis.

Table 4.4: Category 2 Buildings – Number of Category 2 buildings and flats in scope		
	Low Building Number Estimate	High Building Number Estimate
Building number	13,000	37,000
Flats	130,000	130,000
Average number of flats per building	9	3

Total costs for Category 2 Buildings

- 4.15. Total annual costs¹⁹ of the Building Safety Regime for Category 2 buildings are estimated to be between £10.2m and £23.1m (central estimate of £16.6m).

Breakdown of costs by element

- 4.16. Table 4.5 shows a breakdown of Category 2 building costs, by element:
- Producing an annual fire risk assessment is anticipated to account for the largest proportion of cost;
 - Providing information to relevant authorities in event of fire is expected to account for the second largest share of the costs.

¹⁷ [The Housing Stock of the United Kingdom](https://files.bregroup.com/bretrust/The-Housing-Stock-of-the-United-Kingdom_Report_BRE-Trust.pdf): https://files.bregroup.com/bretrust/The-Housing-Stock-of-the-United-Kingdom_Report_BRE-Trust.pdf

¹⁸ [Welsh Housing Conditions Survey](https://gov.wales/sites/default/files/statistics-and-research/2020-02/welsh-housing-conditions-survey-headline-results-april-2017-march-2018-update-570.pdf): https://gov.wales/sites/default/files/statistics-and-research/2020-02/welsh-housing-conditions-survey-headline-results-april-2017-march-2018-update-570.pdf

¹⁹ Equivalent Annual Costs (EAC)

Table 4.5: Category 2 Buildings – breakdown of costs by element						
	NPV (10yr)			Annual Cost (EAC)		
	Low	Mid	high	Low	Mid	high
Register buildings and provide key dataset	£1.02m	£2.00m	£2.99m	£0.12m	£0.23m	£0.35m
Producing an annual Fire Risk Assessment	£47.82m	£77.72m	£107.61m	£5.56m	£9.03m	£12.50m
Promoting building safety	£3.50m	£6.91m	£10.32m	£0.41m	£0.80m	£1.20m
Ensuring works within the building do not compromise compartmentation	£3.62m	£7.14m	£10.66m	£0.42m	£0.83m	£1.24m
Providing and maintaining fire safety equipment	£6.21m	£6.21m	£6.21m	£0.72m	£0.72m	£0.72m
Provide information to relevant authorities in event of fire	£23.14m	£38.05m	£52.96m	£2.69m	£4.42m	£6.15m
Additional Audits of Buildings by FRS/Environmental Health	£2.19m	£5.16m	£8.14m	£0.25m	£0.60m	£0.95m
Total	£87.51m	£143.20m	£198.89m	£10.17m	£16.64m	£23.11m

4.17. Annex B provides a further breakdown of the cost methodology for each of the elements identified in Table 4.5.

Cost of remediation

4.18. In addition to the direct costs of the policy, the assessment provides an indicative estimate of the cost of remediation works, likely to be identified by the Fire Risk Assessment. The types of works include façade remediation ²⁰, fire door replacement, sprinkler retrofit and replacing timber on balconies.

²⁰ Façade remediation only assumed on blocks of flats

Table 4.6: Category 2 Buildings – cost of remediation works likely to be identified by the fire risk assessment						
	NPV (10yr)			Annual Cost (EAC)		
	Low	Central	high	Low	Central	high
Cost of remediation works identified by the Fire Risk Assessment	£40.75m	£83.21m	£125.67m	£4.73m	£9.67m	£14.60m

Average annual cost per building and per flat

4.19. For Category 2 Buildings, the average annual cost per building is estimated to range between £580 and £750; and the average cost per dwelling is expected to range between £80 and £180.

Table 4.7: Category 2 Buildings – Number of Category 2 buildings and flats in scope; average cost per building, per leaseholder		
	Low Building Number Estimate	High Building Number Estimate
Average Annual cost per building	£750	£580
Average Annual cost per dwelling	£80	£180

Costs of additional requirements for dutyholders in all building work

4.20. There will be additional requirements for dutyholders in all building work where building regulations are triggered. The analysis estimates:

- Transition costs, with an NPV of between £0.4m and £0.7m²¹ (central estimate of £0.5m);
- Annual on-going costs with an EAC²² of £0.5m to £0.8m (central estimate of £0.6m).

Table 4.8: Wider Dutyholder Role – All buildings							
		NPV (10yr)			EAC		
		Low	Mid	high	Low	Mid	high
Industry	Transition	£0.44m	£0.54m	£0.65m	£0.05m	£0.06m	£0.08m
Industry	Annual	£4.34m	£5.42m	£6.50m	£0.50m	£0.63m	£0.76m
Total		£4.77m	£5.96m	£7.16m	£0.55m	£0.69m	£0.83m

4.21. These costs include one off familiarisation costs for some firms including; familiarising with the new requirements, amending scopes of services and contracts

²¹ Present Value over a 10-year appraisal period

²² Equivalent Annual Costs (EAC)

and having systems in place so that their work can be delivered in accordance with building regulations.

- 4.22. The costs that will arise annually as a result of this policy are assumed to fall on all dutyholders identified under CDM²³ now undertaking additional work to ensure compliance.
- 4.23. The calculations assume that on average:
- Principal designers and principal contractors will require an additional 0.5hrs per project to gather the relevant information and ensure work complies with building regulations:
 - Designers and contractors will require an additional 0.25hrs per project.
- 4.24. The calculations also assume that additional time of 2hrs will be required for the person (client), for whom the work is being carried out for:
- To undertake additional competence checks and challenge the systems and arrangements of those they appoint to ensure they can demonstrate compliance with Building Regulations.
- 4.25. The above average time allowances reflect a broad range. The actual time required will vary based on the type of project. For example, the analysis allows for more time per dutyholder for more complex projects such as a block of apartments²⁴ and less time for projects such as single dwellings.

²³ The Construction (Design and Management) Regulations, 2015:

<https://www.legislation.gov.uk/uksi/2015/51/contents/made>

²⁴ That are out of scope of the more stringent regime

5. Annex A: Benefits Methodology

Appraisal period and discount rates

- 5.1. The benefit estimates set out in the assessment have been calculated over a 70-year appraisal period. This includes benefits experienced in the 10-year policy implementation period (equal to that used to estimate costs) and benefits that may persist over the lifespan of a building, assumed to be 60 years. This is to capture all the benefits and reflects the Green Book guidance on 'persistence' of benefits. For example, benefits associated with residents' engagement are likely to last for the 10-year policy period (and for a brief period thereafter), while improvements in the construction quality of new builds will likely last the lifespan of the building.
- 5.2. For the first 30 years of the appraisal period, a discount rate of 3.5% has been applied to costs and non-health related benefits and 1.5% to health-related benefits. For the subsequent 40 years, 3% and 1.29% discount rates have been applied respectively. This is in line with guidance in HM Treasury's Green Book - Appraisal and Evaluation in Central Government²⁵.

Reducing the risk of fire incidents

Overview

- 5.3. It is expected that the Building Safety Regime proposals will reduce the risk of fire spreading within and across in-scope buildings and therefore the human and material costs of such fires. This section sets out the methodology used to estimate the scale of this benefit.
- 5.4. In essence, this analysis rests on estimates of the risk of fire incidents in the counterfactual, the expected cost of such incidents, and the extent to which the Building Safety Regime proposals will mitigate this. This can be summarised as follows:
- 5.5. Expected avoided costs of fire incidents of type *i* in year *j* = (I) Expected frequency of fire incidents of type *i* in year *j* in the counterfactual * (II) Expected cost per fire incident of type *i* in year *j* * (III) Expected percentage reduction in fire incidents of type *i* in year *j* caused by the activity of the Building Safety Regulator.

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf

- 5.6. The results are summed across types to calculate the annual impact, then discounted and summed over time to give the present value benefit over the appraisal period.

Expected frequency of fire incidents in the counterfactual

- 5.7. We examined published statistics and a series of case studies to understand the historical frequency of fires of varying severities in in-scope buildings. Through a combination of statistical analysis²⁶ and judgment, we then made initial high, medium and low estimates of the frequency with which fires of a range of severities would be expected to occur in the absence of the Building Safety Regime proposals.
- 5.8. The historical evidence we referred to is unlikely to fully capture the impact of recent developments in this area, including policy measures already taken that have the effect of reducing the risk of fire in in-scope buildings. The impact of each of these measures on the risk of fires has been considered and a judgment made of the aggregate impact of these measures on the expected frequency of fires. This judgment was then applied to the frequency estimates based on the historical data discussed above to derive high, medium and low estimates of the frequency with which fires of varying severities would be likely to occur if the Building Safety Regime proposals were not introduced.
- 5.9. This analysis does not account for any future trends in the frequency of fire ignitions. The frequency of fire ignitions could, for example, be affected by changes in the quality and safety of household appliances used in flats, but it was not considered proportionate to model the profile of this technological change. The frequency of fires could also be affected through increased homeworking, as a result of COVID. It is not yet clear whether this will result in an increase or decrease and hence, it is too soon to attempt to model COVID impacts on frequency change.

Impact of fire incidents

- 5.10. Through case studies and industry knowledge, and taking into account developments following the Grenfell tragedy (e.g. the introduction of waking watch in some high-risk buildings and changes to FRS policies regarding evacuation), high, medium and low estimates have been made of the expected impact of fires of varying severities in in-scope buildings.
- 5.11. Impacts considered include casualties and fatalities (valued using DfT Transport Appraisal Guidance figures²⁷), mental health impacts, property loss, demolition and operational costs.

²⁶ Modelling the occurrence of larger scale (and less frequent) fire incidents as a Poisson process

²⁷ £2.0m per fatality and £230k per casualty (2019 prices) – Table A 4.1.1. TAG Databook

- 5.12. Combining the estimated frequency of fire incidents in the counterfactual with the estimated impact of each type of incident gives an estimate of the expected impact of fires over the appraisal period in the absence of the Building Safety Regime proposals.
- 5.13. Potential future changes which could affect the impact of fire incidents, such as emergency services' response to fires, changing demographics of residents of in-scope buildings, and changes in the ability to treat the physical and mental harm caused by fires have not been modelled

Effectiveness of the Building Safety Regulator in preventing fire incidents

- 5.14. It is then necessary to make an assumption on the extent to which the Building Safety Regime proposals will reduce the risk of fire spread in in-scope buildings (and how this would vary over time). In the absence of data relevant to these specific circumstances, judgments were made as to reasonable high, medium and low estimates of risk reduction. Feeding into this judgement were estimates of the rate of new building and refurbishments that will be subject to the Building Safety Regime proposals (and so the proportion of the total building stock that these will make up), and the anticipated profile of safety case reviews and subsequent remediation works in the existing stock.
- 5.15. As discussed above, this impact assessment estimates benefits that will arise from a 10-year policy period as a result of safer buildings. Some of the benefits are expected to persist over the life of a building (typically 60 years) and as a result, a proportion of the benefits are anticipated to persist (for example, benefits resulting from improved build quality will persist for the lifespan of the relevant building). Conversely, for various reasons one would expect that the impact of the actions of the Building Safety Regulator during the policy period on the frequency of fires is likely to decline as the end of the appraisal nears (that is, the quality of engagement with residents and the safety benefits resulting from this may decline over time if it were no longer mandated).
- 5.16. However, given that the regulatory regime introduced by the Building Safety Regime will have a number of interconnected aspects, the effects of which might be expected to persist for different periods of time, it is disproportionate to attempt to quantitatively disentangle the effect of each of these aspects on the evolution of the expected frequency of fires over the appraisal period. Therefore, assumptions as to the rate at which the impact of the Building Safety Regulator on the expected frequency of fires will decline over the appraisal period have been based on judgment, having regard to the range of aspects of the functions of the Building Safety Regulator, the profile of the building stock over time and so on.

Avoided costs of resolving systemic issues

- 5.17. The use of unsafe building products or practices in the construction and refurbishment of buildings can make them unsafe and subject to risk. In some cases,

this can occur across a wide portfolio of buildings (when poor practice is systemic), and when identified, the issues need to be addressed through remediation, incurring potentially substantial cost (cost of putting in place interim protection measures, cost of investigation, cost of remediation works etc.). These costs are in addition to the costs incurred if these products or practices result in a fire or structural incident. For example, the installation of ACM cladding on buildings has, in addition to the human and wider costs caused by fires, led to significant expenditure required to mitigate the risk posed by such cladding (for example, waking watch) and ultimately to remove and replace the cladding.

- 5.18. It is expected that the Building Safety Regime proposals will reduce the probability that unsafe products or practices are used in buildings constructed or refurbished during the policy period. This would mean that costs of mitigating or remediating the systemic use of such products or practices would be avoided, representing a benefit to society.
- 5.19. It is assumed that this benefit will only apply in respect of new in-scope buildings and buildings undergoing major refurbishments (the Building Safety Regulator cannot retrospectively prevent past systemic poor construction in the existing stock, although it can identify and mitigate the risks posed by them).
- 5.20. We cannot know the exact nature and scale of future potential systemic issues, therefore in this assessment we have assumed a future issue would be similar in terms of number of buildings effected and scale of cost to that of the ACM issue (i.e. affecting 3.4% of the stock, at an average cost of £3.5m per building²⁸). Therefore, in the counterfactual, it is assumed that 3.4% of new buildings or those undergoing major refurbishments would be subject to issues that would later (over the next twenty years) require mitigation and remediation (it should be noted this approach of making an estimate based on a single historical example is subject to significant uncertainty).
- 5.21. It is not certain that the Building Safety Regime proposals will prevent, at the time of construction or refurbishment, all future potential systemic issues. For example, problems with certain materials or construction processes, currently deemed compliant, may only be identified after buildings start failing. Reflecting this, it is assumed that the Building Safety Regime proposals would reduce the risk of such issues arising in new buildings or buildings subject to major refurbishment during the policy period by 60%. This is based on a judgment. Due to the lack of evidence to support a specific range or confidence interval on this estimate of risk reduction, sensitivities of +/- 30%, applied to the mid-point estimate of the benefit value, have been tested. This same approach was taken with respect to the benefits discussed in the following sections

²⁸ The estimated cost per building was based on industry knowledge and a set of three case studies.

Other avoided costs

- 5.22. The additional scrutiny of plans and construction works due to the Building Safety Regime is expected to result in reduced defects both during and at the end of construction and reduced latent defects identified during occupation. This will result in the avoidance of costs incurred to remedy such defects. Following the introduction of the proposed regime, reducing defects that are typically identified and resolved during construction are assumed to have an average cost saving of £37,500²⁹ per new building whilst defects identified at the end of construction are assumed to have an average cost saving of £40,000 per new building and avoiding latent defects identified during occupation are expected to lead to a cost saving of £37,500 in rework costs per building.
- 5.23. Other indirect benefits to the construction industry are estimated to arise from:
- Reduced design rework costs, as a result of Planning Gateway one requirements. It is assumed that greater design certainty following planning consent being granted will reduce design rework during the detailed design stage. Such costs are assumed to be avoided in 10% of new buildings, saving 75 hours of work per building on average.
 - The requirement for pre-approval of works by the Building Safety Regulator at Gateway two is expected to reduce construction rework costs. The requirement to have approval for works before they commence is expected to avoid instances where products or systems that are not approved are installed or delivered to site and subsequently have to be replaced. This is assumed to apply to 15% of new buildings with an average saving of £80,000.
 - The requirement for a digital record at Gateway three has the potential to reduce asset management and invasive survey costs. An accurate record of building layouts and installed systems products is expected to facilitate more efficient asset management, with 37.5 hours per annum per new building assumed to be saved in asset management time, while one invasive survey per new building is assumed to be avoided every five years, at an average cost of £5,000.
 - Safety cases combined with other aspects of the Building Safety Regulator's operations will improve early identification of faulty balconies and windows. This will enable the cost-effective replacement of such features before an incident occurs. Given the exceptional nature of such an incident, this is assumed to apply to 0.002% of the building stock.

²⁹ These figures are based on subsidiary assumptions as to the number of such defects that would be expected in the counterfactual, what each one would be expected to cost, and how many would be avoided as a result of the Building Safety Regime proposals. These assumptions are in turn based on a combination of case studies and judgment

- Similarly, safety cases combined with other aspects of the Building Safety Regulator's operations are likely to identify wider structural issues within buildings enabling these to be addressed before a major incident occurs, such as a full or partial building collapse. The avoidance of such major incidents is assumed to apply to 6 in every 10,000 buildings, with a saving per building of £11.4m.
- Improvements to product testing and declarations of product performance could lead to time saved in analysing test results and establishing the performance of products at the building design stage. This is assumed to apply to all new buildings and major refurbishment products, with time savings of 3.75 and 7.5 hours, respectively.
- Product marking could lead to time savings in product checking during both the construction process and safety case review.

Wider benefits

- 5.24. Potential wider benefits of the proposals have been identified in the form of providing a spur to innovation and increased export potential.
- 5.25. Based on a combination of live project experience and judgement, it has been assumed that the Building Safety Regime will encourage and nurture innovation in the construction technology industry resulting in a 1% reduction in costs passed on to UK consumers (after building up for four years). It is further assumed that such innovation will drive a 1% increase in total UK architectural and construction industry services exports.
- 5.26. The value of these benefits were calculated for England and Wales, in the England IA. A small proportion of the value will theoretically be attributable to Wales. This has not been calculated however at this stage.

6. Annex B: Cost Methodology

Category 1 Buildings

6.1. The additional cost of the proposals has been estimated using the following steps:

- Estimate stock of buildings in scope, number of new build and number of major refurbishments per annum.
- Estimate the additional time/cost per building required to prepare or undertake the regulator requirements

= For new build and refurbishments – the costs are estimated per project

= For occupied buildings – the costs are estimate per annum

6.2. Table 6.1 provides further detail of the cost methodology.

Table 6.1: Category A Buildings - cost methodology	
Gateways	<p>Estimate the additional time required to fulfil the proposed requirements of the Building Safety Regime</p> <ul style="list-style-type: none"> • Gateway 1 <ul style="list-style-type: none"> ○ Client to prepare a fire statement ○ Fire and Rescue Service to become statutory consultee • Pre-application <ul style="list-style-type: none"> ○ Regulator to establish multi-disciplinary team ○ Pre-application meeting between Client and multi-disciplinary team • Gateway 2 <ul style="list-style-type: none"> ○ Client submits application to start on site ○ Client to prepare a fire and emergency plan ○ Client to prepare a change control plan ○ Review of plans by regulators and Principal Designer • During construction <ul style="list-style-type: none"> ○ Safety changes reported by Principal Designer/Contractor and reviewed by multi-disciplinary team ○ Site inspections/audits undertaken by Principal Designer and Multi-Disciplinary Team ○ Complex cases – additional review by Multi-Disciplinary Team • Gateway 3 <ul style="list-style-type: none"> ○ Principal Designer to prepare Completion certificates ○ Other submissions ○ Safe for occupation application ○ Licence review and approval <p>Delays to construction programme</p> <ul style="list-style-type: none"> • Number of extra weeks added to construction programme to accommodate Gateways estimated and costed based on lost rent/additional financing charges etc.
Safety Cases	<ul style="list-style-type: none"> • Regulator to provide support to Accountable Persons to prepare first safety case • Fire Risk Management System

Table 6.1: Category A Buildings - cost methodology

	<ul style="list-style-type: none"> ○ Accountable person to develop and maintain a risk management system for buildings in scope ● Prepare safety Case <ul style="list-style-type: none"> ○ Undertake enhanced fire risk assessment (intrusive surveys incl. within flats) ○ Prepare safety case information ○ Prepare safety case report ● Update safety case <ul style="list-style-type: none"> ○ Annual fire risk assessment ○ Updating information monthly to reflect maintenance/works or other changes ○ Updating safety case report – during and after major works or following other incidents ● Regulator to review safety case <ul style="list-style-type: none"> ○ Regulator to review safety case every 5 years ○ Prioritise high risk buildings first ○ Mandatory reviews (major works/incidents etc) ● Voluntary and mandatory reporting of fire and structural safety risks
Remediation works	<ul style="list-style-type: none"> ● Estimated type, frequency and cost of typical fire and structural remediation works that could be identified through the safety case preparation and review. <ul style="list-style-type: none"> ○ These works include balcony fire risks, facades, fire doors, cavity barriers, fire stopping, compartmentation ○ Assume work is phased over 10 years ○ Allow for counterfactual – many works may be accelerated by safety cases
Dutyholder	<ul style="list-style-type: none"> ● Building handover between Client and Accountable Person ● Building registration <ul style="list-style-type: none"> ○ 5-year re-registration ○ Time to prepare and check the registration information ● Competency checks <ul style="list-style-type: none"> ○ Checks on the competency of the design and construction teams Principal designer, principal contractor ○ Checks on competency of the Building Safety Manager
Golden Thread	<ul style="list-style-type: none"> ● Create digital record for building safety information ● Prepare accurate digitised plans for existing buildings ● Maintain a common data environment during construction ● Prepare a dataset of key building information
Sanctions and appeals	<ul style="list-style-type: none"> ● Estimate the frequency and type of intervention by regulators due to non-compliance ● Escalation process ● Appeals at key decision points
Residents Voice	<ul style="list-style-type: none"> ● Prepare residents engagement strategy ● Prepare safety information for residents ● Establish a complaints system ● Disseminate safety information
Refurbishment	<ul style="list-style-type: none"> ● Major refurbishments to go through Gateways as per new build ● Other notifiable building works <ul style="list-style-type: none"> ○ update safety case and inform regulator ○ regulator to provide oversight where deemed necessary

Table 6.1: Category A Buildings - cost methodology	
Central Costs (not allocated to other areas)	<ul style="list-style-type: none"> • Recruitment costs • Oversight/data analysis • Policy and guidance • Research • Regulator/industry competency • Communications • Concerns and advice support • Administration and co-ordination
Familiarisation Costs	<ul style="list-style-type: none"> • Training and dissemination events

Category 2 Buildings

Estimating number of buildings in scope

6.3. Figure 6.2 outlines the methods used to estimate the number of buildings in scope.

Figure 6.2: Methods used to estimate the number of buildings in scope	
<ul style="list-style-type: none"> • Estimate of number of buildings with flats (<18m) • Low estimate: 13,000 buildings • Mid estimate: 20,000 buildings • High estimate: 37,000 buildings • Approach 1: Fire service 'known' building number estimates published alongside Fire Safety audit statistics • possibly under-count if similar to England • C. 13,000 buildings with flats in scope • Approach 2: apply England average flats per building to Wales • estimate of 150,000 flats (11% of stock) – source of estimate: BRE report³⁰/Wales housing reports³¹ • Estimate building numbers by assuming <ul style="list-style-type: none"> • 15,000 flats (10%) are single flats over shops • 10,000 flats in buildings over 18m (150*75) • England estimate is average of 3.3 flats per building <18m • C. 20,000 buildings in scope (@ 6 flats per building) • C. 37,000 buildings in scope (@ 3.3 flats per building) 	

Cost assumptions

6.4. Table 6.3 sets out the cost assumptions used in the assessment.

Table 6.3: Category 2 Buildings – Cost Assumptions	
Element	Assumptions
Registration Costs	1-2hrs for Accountable Person to register each building
	Average of 10 mins per building for local authority to log registration
	Counterfactual

³⁰ https://files.bregroup.com/bretrust/The-Housing-Stock-of-the-United-Kingdom_Report_BRE-Trust.pdf

³¹ <https://gov.wales/sites/default/files/statistics-and-research/2020-02/welsh-housing-conditions-survey-headline-results-april-2017-march-2018-update-570.pdf>

Table 6.3: Category 2 Buildings – Cost Assumptions

Annual Fire Risk Assessment	<ul style="list-style-type: none"> • 10% every year - high risk buildings @ Type 3 Fire Risk Assessment • 90% every 3 years – other buildings @ Type 1 fire risk Assessment
	<p>Policy</p> <ul style="list-style-type: none"> • All buildings to undertake a Fire Risk Assessment every year – Type 4 fire Risk Assessment • Assume that the Fire Risk Assessment will only need an intrusive investigation into building every 5 years.
Promoting Building Safety	<ul style="list-style-type: none"> • Cost to prepare information – 2hrs
	<ul style="list-style-type: none"> • Cost to print and share information - £100 initially, and then average of £10 every year (new residents/updated contact information etc)
Ensuring work does not compromise compartmentation	3hr to collect and share information on competent persons
	1hr to update information (assume 50% update each year)
Provide information to authorities in event of a fire	Assume need to prepare basic floor plans
	<ul style="list-style-type: none"> • Costs range from £500 for a converted house to £3500 for a 4-6 storey block of flats
Additional Audit of Buildings	Counterfactual
	<ul style="list-style-type: none"> • Based on fire safety audits undertaken by the FRS
	<p>Policy</p> <ul style="list-style-type: none"> • Assume doubling of number of audits • Assume doubling of duration of each audit (to allow for additional assessment of façade and fire doors)
Accountable person responsible for providing and maintaining fire safety equipment	<ul style="list-style-type: none"> • Assume 2 mains fitted Fire/smoke detectors and 1 battery operated carbon monoxide (CO) monitor • Assume installed when flats sold (5% p.a.) • Assume 54% of dwellings without working CO monitor • Assume 46% of dwellings without a working mains fitted smoke detector • Cost per unit £10.80 for CO monitor + 15 mins installation • Cost per unit £44 for a mains connected smoke detector + 1 hr installation per unit • Annual checks – 15 min per dwelling when flat sold
Acting on recommendations of fire risk assessment	<ul style="list-style-type: none"> • Assume fire risk assessment recommends improvements to • Facades – 15% of building > 4 storey / 10% additional to counterfactual / £500,000 per building average • Fire doors – 20% of buildings/£10,000 per building average / 10% additional • Sprinklers (retrofit) – 6% of buildings/£70,000 per building average / 10% additional • Balconies – 10% of buildings/ £60,000 per building / 10% additional to counterfactual

Wider Dutyholder Responsibility – costing methodology

6.5. Table 6.3 sets out the methodology and assumptions used to estimate the costs of the wider dutyholder responsibility.

Table 6.3: Dutyholder – Wider Responsibility – All construction – costing assumptions.	
Dutyholder checks on all building projects	Full plans checks On-site inspections As-built information checks
Profile	All building projects (except Category 1 buildings)
Familiarisation	Firms undertaking building works – 0.25hr Organisations to amend scope of works – 1hr Organisations to improve processes – 2hr Firms to introduce new processes (10%) – 2hr
Average additional time for dutyholder roles per project	Principal designer – 0.5hr Principal contractor – 0.5hr Designer – 0.25hr Contractor – 0.25hr Client – 2hrs

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