Patrick Ryan Associates

Recladding & Sustainability

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Overview

This article follows on from the Embodied Carbon Emissions summary issued in March 2023 and looks at the relationship between the need for the fire recladding of buildings which require remediation work and the impact this is potentially having upon the environment.

With the recent release of a new report on climate change by a scientific body advising the UN on rising temperatures, it now seems that avoiding the world from warming by more than 1.5C is unlikely, with this figure likely to be reached by 2030. It is suggested that coming back down from this mark as quickly as possible, is where the focus should be. This places ever more importance upon our collective responsibility to reduce carbon emissions.

The government's long-term strategy to reach net zero carbon emissions by 2050 is a major milestone in the effort to mitigate the effects of climate change. As a crucial aspect of this strategy, net zero buildings will play a significant role in reducing carbon emissions and promoting sustainable living and the building façade plays a vital part in this. It is important that we make every effort to consider the impact upon the environment and ensure that the emphasis continues to be placed upon sustainability as well as building safety.

Introduction

In the March 2020 budget, the government announced that it would provide £1.6 billion from 2020 to 2021 through a new Building Safety Fund. This would fund the remediation of unsafe Aluminium Composite Material (ACM) and non-ACM cladding systems on residential buildings 18 metres and over in both the private and social housing sectors.

On the 10th of February 2021, Robert Jenrick, then-Secretary of State for Housing, Communities and Local Government, announced additional funding of £3.5 billion for the removal of combustible cladding on high-rise blocks of 18 metres and over.

On 10 January 2022, Michael Gove, Secretary of State at the Department for Levelling Up, Housing and Communities (DLUHC), said the next phase of the Building Safety Fund (BSF) would open later in the year "to drive forward taking dangerous cladding off high-rise buildings, prioritising the government's £5.1 billion funding on the highest risk." The Fund opened for new applications on 28 July 2022 for eligible buildings without a funding solution in place.

In July 2022, the government reopened the £4.5 billion Building Safety Fund and the Department sent a letter to all responsible entities that applied for the Building Safety Fund in June to July 2020. This provided information about the reopened BSF and what action they may need to take.

A question that is on everyone's mind is how many buildings require remediation? Within this article, we are trying to understand, based on current available data following the BSF applications, the number of buildings which require remediation work and the impact this is potentially having upon the environment.

All the data shown has been updated as of 31st of January 2023. The total number of buildings is highly likely to increase over the following months.

Building Safety Fund Registrations

Remediation of ACM Cladding

Based upon the data collected, Table 1 shows the number of applications of buildings over 18m that havebeen identified with ACM cladding.

Table 1: Buildings identified with ACM cladding unlikely to meet Building regulations.

	31 January 2023	31 December 2022	Monthly change
Social sector residential	160	160	0
Private sector residential	233	232	+1
Student accommodation	56	56	0
Hotels	31	31	0
Publicly owned buildings	8	8	0
Total	488	487	+1

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1136704/Building_Safety_Data_Release_January_2023.pdf

We conclude that as of 31st January 2023, 488 buildings identified with ACM cladding and unlikely to meet Building regulations, had been registered.

Remediation of Non-ACM Cladding

In accordance with the BSF requirements, a product that is not ACM would fall under this category. Typical examples of types of cladding or products on buildings that would fall under this category would be:

- Timber cladding (supported on timber battens)
- HPL cladding
- EPS render insulation
- Timber decking
- Sandwich panels (filled in with flammable insulation)
- Phenolic (or other flammable) insulation behind existing cladding (aluminium, stone, terracotta, brickwork)
- Retrofitting of cavity barriers

Table 2 shows the number of applications of buildings over 18m identified with non-ACM cladding.

Table 2: Registrations.

	Total private sector registrations	Total private sector buildings (estimate)	Total social sector registrations	Total social sector buildings
London	1,634	1,884	192	214
Rest of England	1,196	1,345	30	31
Total Registrations	2,830*	3,229	222	245

https://www.gov.uk/guidance/remediation-of-non-acm-buildings?=6#builing-safety-fund-registration-statistics

We conclude that as of 31st January 2023, 3,229 buildings have been identified with non-ACM cladding and that they require some sort of remediation.

Remediation Progress

Table 3 tracks the progress conducted on these buildings, based on the BSF applications.

Table 3: Remediation progress of buildings proceeding to application.

	Remediation started **	Remediation complete: awaiting Building Control sign off	Remediation complete	Total started or completed
Private Sector	162	64	4	230
Social Sector	69	14	0	83
Private Sector ACM and Non- ACM cladding	23	15	7	45
Total	254	93	11	358

https://www.gov.uk/guidance/remediation-of-non-acm-buildings?=6#builing-safety-fund-registration-statistics

There are a total of 358 buildings where remediation has either started, completed, or completed awaiting building control sign off. This leaves an estimated 3,359 buildings in the private sector which are still in need of remediation where it is presumed that no work has yet been started.

We need to take into account that on the 13th of April 2022, the Government announced an agreement with developers to contribute a minimum towards cladding remediation on their buildings. With that in mind, the above figure may not be an entirely accurate reflection as we do not have data for the buildings that have been funded privately.

Building Safety Programme

EWS1 requirements (Buildings>18m)

Back in March 2021, the DLUHC (previously known under the name MHCLG) had conducted indicative analysis on the cladding coverage of residential buildings.

Table 4: Over 18m/more than 6 storeys

	Total residential buildings	Buildings assumed to not require an EWS1 process due to there being no cladding in place (%) (from table1)	Number of buildings assumed to not require an EWS1 process	Total dwellings in buildings assumed not to require an EWS1 process	Total leasehold dwellings in buildings assumed not to require an EWS1 process
Private	6,000	34	2,000	115,000	115,000
Social	6,000	34	2,000	115,000[a]	32,000[b]
Total	12,000	34	4,000	230,000	147,000

https://www.gov.uk/government/publications/building-safety-programme-estimates-of-ews1-requirements-on-residential-buildings-in-england/building-safety-programme-estimates-of-ews1-requirements-on-residential-buildings-in-england

Based on the above table, it was found that a total of 8,000 buildings over 18m, required an EWS1 form/PAS9980 assessment.

Based on the number of BSF applications, we can say with a certain degree of confidence that at least 4,000 buildings above 18m will require some sort of remediation.

But what about the buildings between 11-18m?

EWS1 requirements (Buildings 11-18m)

DLHUC had also carried out an indicative prediction of the buildings between 11-18m that required an EWS1 form/PAS9980 assessment. These numbers are reflected in table 5.

Table 5: 11-18m

	Total residential buildings	Buildings assumed to not require an EWS1 process due to there being no cladding in place (%) (from table1)	Number of buildings assumed to not require an EWS1 process	Total dwellings in buildings assumed not to require an EWS1 process	Total leasehold dwellings in buildings assumed not to require an EWS1 process
Private	38,000	34	13,000	245,000	245,000
Social	38,000	34	13,000	245,000[a]	39,000[b]
Total	76,000	34	26,000	490,000	284,000

https://www.gov.uk/government/publications/building-safety-programme-estimates-of-ews1-requirements-on-residential-buildings-in-england/building-safety-programme-estimates-of-ews1-requirements-on-residential-buildings-in-england

Following a similar pattern of considerations and of what we know so far for the buildings over 18m, we can estimate that a total of 50,000 buildings between 11m – 18m will require some sort of remediation.

Costs of re-cladding works (£)

How can we estimate the costs?

For this task PRA looked at their portfolio of fire re-cladding jobs with over 55 blocks, across 30+ different projects and averaged out the value of the projects.

Table 6: Value of re-cladding projects PRA are currently involved in.

N°	Job Description	Value of the project
01	Replacement of NON ACM Cladding	>£30m
02	Replacement of NON ACM Cladding	>£6.5m
03	Replacement of NON ACM Cladding	£1m
04	Replacement of NON ACM Cladding	m
05	Replacement of NON ACM Cladding	
06	Façade Consultancy Replacement of NON ACM cladding	
07	Façade Consultancy Replacement of NON ACM cladding	?
08	Replacement of ACM cladding	?
09	Replacement of NON ACM Cl	?
10	Replacement of NON ACM	>£4m
11	Replacement of NON A	>£2.5m
12	Replacement of NO	>£2m
13	Replacemen	£1m
14	Replacemer ng	£2-£5m
15	Replace dding	>£3m
16	Repl Cladding	>£2.5m
17	R CM Cladding	>£1.5m
18	N ACM Cladding	£17m
19	NON ACM Cladding	>£50.000
20	t of NON ACM Cladding	>£6m
21	ent of NON ACM Cladding	>£4m
22	placement of ACM Cladding	£10.000-£20.000
23	eplacement of NON ACM Cladding	>£1.5m
2	Replacement of NON ACM Cladding	-
25	Replacement of NON ACM Cladding	>£3m
26	Replacement of NON ACM Cladding	>£1m
27	Replacement of NON ACM Cladding	>£4m
28	Replacement of NON ACM Cladding	>£40m
29	Replacement of NON ACM Cladding	>£2.5m
30	Replacement of NON ACM Cladding	>£4m
31	Replacement of NON ACM Cladding	>£2.5m

Average Value per project = £4m

To be as accurate as possible, we eliminated from the calculation the 3 most expensive and the 3 least expensive jobs.

As of March 2023, and with the above considerations, Patrick Ryan Associates has an average project value of £4m per project across the replacement of ACM and non-ACM cladding.

Environmental Impact

Embodied Carbon emissions

Let us try to understand the environmental impact right now.
For this task we calculated the embodied carbon emission on three typical projects with an average cost of £4m.

Their estimated average embodied carbon emissions are as follows:

- Project 1 = 500 ton CO2e
- Project 2 = 500 ton CO2e
- Project 3 = 550 ton CO2e

The three projects included a mix of various types of cladding, such as render, timber, terracotta, rockpanel and brickwork. This selection was based on the likelihood of the type of cladding commonly identified on our projects.

We can estimate that, based on an average cost for a project of £4m (for buildings >18m), an average of 500 ton CO2e in embodied carbon emissions will be emitted into the environment.

Unfortunately, we do not have any data for buildings with a height between 11-18m to support our assumptions but for the purpose of this exercise, it has been estimated that a reasonable average cost would be £1.5m per building.

It has also been estimated that an average of 200 ton CO2e in embodied carbon emissions per building will be emitted into the environment.

Summary and conclusion of results

To try and und understand the overall results, we need to summarise everything:

- No. of Building >18m = approximately 4,000
- No. of Buildings 11m-18m = approximately 25,000
- Average cladding value (buildings >18m) = £4m
- Estimated average cladding value (buildings 11-18m) = £1.5m
- Average embodied carbon emissions (buildings >18m) = 500 ton CO2e
- Estimated embodied carbon emissions (buildings 11-18m) = 200 ton CO2e

The embodied carbon emissions will be as follows:

- Buildings over 18m = 2,000,000 ton CO2e
- Buildings 11-18m = 5,000,000 ton CO2e

Ways of reducing Embodied Carbon Emissions

There are ways to reduce the embodied carbon emissions on these schemes. Some of these include:

- Specify low carbon products
- Choose local suppliers and manufacturers
- Repurpose materials (secondary support system, flashings, brick)
- Reduce waste & recycling

But will this suffice? My personal opinion is no! These works must be carried out and there will always be embodied carbon emissions that cannot be ignored.

As such we do not believe that focusing on the embodied carbon emissions is the correct approach. What we need to be focusing on, with these projects, is how to offset the carbon emissions by considering the operational carbon emissions. The best way to achieve this is to improve the thermal performance of our buildings to the maximum that is achievable, without creating additional issues such as condensation.

How to offset CO2

In our previous article on Embodied Carbon Emissions, using our 69 Park Lane, Croydon project as a case study, we identified that the U-values play a huge role in the overall carbon emissions. A summary of these results can be seen below in Table 7.

Table 7: Case study – 69 Park Lane carbon emissions

	Partial Replacement	Full replacement
U-value	1.4 W/m2K	1.0 W/m2K
Embodied CO2 Emissions	1328 Ton	2000 Ton
CO2 Emissions due to electricity per year	286 T CO2e per year	204 T CO2e per year
CO2 Emissions due to electricity in 20 years	17160 T CO2	12240 T CO2

From the above results, a 40% decrease in thermal performance has a worse environmental impact in the overall scheme (assumed 20 years), even though the embodied carbon emissions are better. In the above case, a 1.0 W/(m2*K) potentially creates a 5,000 ton decrease of CO2 (in operational carbon emissions) during a 20 year span. If we had to consider the life expectancy of our buildings (typically 60 years) we would be looking at potentially saving 15,000 tons of CO2e.

Considerations around the possibility of offsetting U-values

Of course, just saying "Improve the U-values" is easier said than done. There are several considerations that need to be taken into account which include:

- Push the façade forward. This is the best way to achieve improved thermal performance.

- Planning issues
    - The client may want to avoid going through a planning application process
    - The planning authorities are too restrictive in this aspect
      To overcome this, the Government needs to allow for refurbishments to include extra insulation without having to go through an application process to push forward the façade
    - Usually, residential blocks are built on private land. Pushing the façade forward does not normally impact any neighbouring buildings
    - Clashes with other façade elements
    - Like to like solution – this is no longer sufficient
- Building control to be flexible
    - We are currently working under the ethos of not making the situation any worse. Perhaps we need to change our ethos to "the situation must be improve"
- Improving the U-values will help to meet the zero carbon targets set for 2050.
- It will definitely reduce the resident's energy bills
- Careful condensation evaluations are to be made, preferably by a façade consultant
- Everything is driven by cost
    - We can easily specify high performant insulation (Calostat - 10x more expensive)
    - Specify stainless steel support for a rainscreen cladding (more expensive than traditional aluminium secondary support system)
- Raise awareness with the client
- An M&E engineer is highly recommended to be appointed in the recladding schemes to assist with the environmental aspects.

Even though the numbers might look scary at the outset, it is easy to see that there are ways in which these issues can be overcome. Every project is different; therefore, the evaluation will be different and must be approached carefully. A strong design team is essential to drive the project forward.

As professionals in the industry, we all need to change our mindset and look at the overall best solutions that are achievable for our clients.

I hope you found this article useful and please do feel free to contact us should you have any questions.

For more information about the services provided by **Patrick Ryan Associates**, please contact us.

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