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IS A ROOFTOP PV INSTALLATION FIRE-SAFE?

GOVERNMENTS NEED TO DEFINE THE TARGET.

The revised EPBD is putting solar on Europe's roofs at speed, but the fire rules those roofs are graded against were never written for panels.

Rooftop PV is changing how Europe's roofs behave in a fire

Rooftop solar sits at the center of Europe's energy plans. In March 2026 the Commission set out a package to cut energy imports and lower bills through homegrown clean power.¹ The revised Energy Performance of Buildings Directive makes solar an obligation: new public and non-residential buildings above 250 m² from the end of 2026, then existing public buildings, major renovations, new homes and roofed car parks.^{2,3}

Putting solar on this many roofs is right for the energy transition. It also changes the fire risk on those roofs. A PV installation is not simply added weight. It brings new sources of ignition, and it changes how a fire spreads once it starts. A panel sitting above the roof can reflect heat and flame back down onto the surface, so the finished roof assembly, not the panel or the roof on its own, decides how a fire develops.⁴

A new technology with new fire behaviour, and the rules have not caught up

We have seen this pattern before. When electric vehicles arrived, they burned differently from petrol cars, and fire services and regulations had to adapt to a fire they were not built for. Rooftop PV is the same kind of shift. A review for the UK Building Safety Regulator found that panels trap heat and redirect flame onto the roof, and that

Key Insights

Rooftop PV is becoming a fire-safety issue at regulatory scale. Under the revised Energy Performance of Buildings Directive, solar will go onto a large and growing share of Europe's roofs.

PV changes how a roof fire behaves, not only whether one can start. A panel above the roof can reflect heat and flame back down onto the surface, so the finished assembly, not the panel or the roof on its own, decides how a fire develops.

Existing roof classifications answer a different question. They grade a roof against a fire coming from outside, with no panels above it. They do not say how a PV roof should behave when a fire takes hold in the gap beneath.

The targets that need defining are the ones roof classification already uses: how far fire may penetrate the roof, how far it may spread sideways, how much smoke it produces, how long it may burn, and whether the fire service can still intervene. PV changes the conditions, so those targets need setting for the PV case.

Governments should set those targets now, as interim expectations, so projects, approvals and insurers work to one standard while formal test methods catch up.

across the experimental studies it consolidated, flame spread accelerated by as much as a factor of 38 compared with a roof without panels, where the gap beneath the panel fell below a critical height. Current classification tests, it noted, assess the roof covering in isolation and do not capture how PV changes the fire.⁵ This is not a distant risk. In February 2024 the solar array on the roof of Lidl's distribution centre in Peterborough, England, caught fire, and more than fifty firefighters attended before it was brought under control.⁶ A rooftop-PV fire's

consequences can reach beyond the fire itself: smoke can enter and contaminate neighbouring buildings without direct flame contact, firefighting water and later rain can damage the building below through a breached membrane, and operations can be interrupted. Roofs like this are going up across Europe now. The safety rules need to catch up with technology.

Existing roof classifications answer a different question

Europe already classifies roofs for fire, under the BRoof system, which grades a roof covering against a fire from outside and above, on a roof with no panels. It does not define how a PV roof assembly should behave when a fire starts in the gap beneath the panels. A roof can hold a valid classification and still leave the real question open: will this assembly, panels included, behave safely in a credible fire?

Without an answer, Europe may rely on a costly American approval scheme

When public regulation does not set the target, the people who design, own, insure and build these roofs still have to decide what counts as safe. Today the most credible answer on the market is FM 4478, an approval standard that tests the PV system together with the roof it sits on, rather than judging a material on its own.^{7,8} FM 4478 is a sound test. The difficulty is what it costs and who can reach it. An FM approval covers one specific build-up, so the assessment, reported at upwards of €50,000,⁹ has to be repeated for almost every supplier and design. Larger firms can carry that. Many small and medium manufacturers cannot. And it is an insurer's private route, developed in the United States, not a European regulatory one. Europe could reach comparable assurance far more efficiently. Where a product or product variant is covered by a documented and

defined field of application showing the required fire behaviour is maintained, worst-case or class-based assessment can reduce the need to repeat the full system test for every design, instead of billing every supplier for the same system test. Changing the material class might change how the roof behaves in a fire, and that is exactly what a defined target would test for.

The question to answer first: what must a PV roof survive?

Before choosing any test or material rule, governments should answer one question: what must a completed PV roof assembly be able to survive to count as fire-safe? The test methods, the classifications and the material requirements should follow from that answer, not stand in for it.

The answer builds on what the Broof classification already handles for ordinary roofs, and adds what rooftop PV makes newly important:

- how far fire may penetrate down into the roof build-up;
- how far it may spread sideways, from one panel to the next, and whether fire could cross fire-safety boundaries within the roof construction; and
- how much smoke it produces, how long it may go on burning, and whether the fire service can still intervene before life safety and property are at risk.

A sensible starting point is what Europe already accepts on roofs without panels. Broof cannot be run on a roof once PV is on it, but the pass levels it sets, for penetration, for spread, and for how long a roof may burn, give a defensible reference for what a PV roof should achieve too. These pass levels serve only as an illustrative reference for the roof-

safety expectations Europe already accepts, not as a direct acceptance criterion for a PV roof assembly and not as evidence that a PV roof is safe; Broof measures a roof's behaviour in an external fire, not overall building fire safety, so the interim expectations stay PV-specific. Governments can adopt these as interim expectations now, through a working group of fire authorities, regulators, fire engineers, insurers, PV and electrical-safety specialists, test houses and manufacturers, so that projects, approvals and insurers work to one target while formal methods are developed.

The OFR review points the same way. Its recommendations call for non-combustible coverings and fire-resistant construction from the outside in, better guidance on PV layout and gap heights, and new test methods that reflect how PV changes the fire. NEPSA agrees. A non-combustible cover board over the insulation is one example of a documented protective strategy for roof assemblies in general, not specific to any one insulation type and subject to appropriate testing and documentation. Where documented, such a layer can reduce heat transfer into the insulation and limit horizontal fire spread. Defining the required fire behaviour is what lets measures like this be required where the evidence shows they are needed, rather than prescribed as a blanket material rule before the target is set.

Define the target, and the rest gets easier

A defined target does the work that a stack of separate rules cannot. It states the safety objective plainly. It lets regulators compare different designs on the same basis, without favouring one material over another. It gives fire engineers and insurers something concrete to design and price against. And it spares smaller firms a bespoke private approval for every variation. Electrical safety and the behaviour of the roof then pull

together: good electrical work makes a fire less likely, and a sound assembly limits the damage when one happens. The result is fire safety that people can see, price and build to.

The pieces for this already exist

None of this asks for new science or a new institution. The fire authorities, regulators, insurers, test houses and manufacturers who would set the target already exist and already work together. What is missing is a shared reference for what a PV roof should achieve, and the decision to agree it before the roofs are built rather than after. Smaller firms have the most to gain, because a common European target spares them a private approval they can least afford.

How the EPBD's solar goals get delivered safely

This proposal works with the directive. Article 10 tells Member States to put solar on their buildings. Defining how those solar roofs should behave in a fire is what it takes to deliver that obligation well, so the rollout is fast, insurable and safe at the same time.

About Policy Briefs

NEPSA Policy Briefs offer the Nordic EPS industry's input to the policy process on specific issues and topics. They present evidence-based recommendations grounded in traceable sources, for policy and regulatory stakeholders.

About NEPSA

Nordic EPS Alliance represents Nordic EPS associations and companies. *NEPSA* promotes the sustainable use and circular integration of EPS in packaging, construction, and other applications.

Sources:

Further reading: NEPSA position paper, Europe should define the fire-safety outcome for rooftop PV before choosing the technical route (October 2026), which sets out the challenge in full and NEPSA's suggested solutions.

- 1 European Commission. 2026. "Boosting EU's Energy Independence and Lowering Costs." News, DG Communication, 10 March 2026.
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- 3 European Commission. n.d. "Solar Energy in Buildings." DG Energy. Accessed 13 July 2026.
- 4 OFR Consultants Limited. 2026. Thermal Exposure to Roofs from Fires Involving Photovoltaic Panels. Rev. R02, Project OX24065, for the Building Safety Regulator. GOV.UK, updated 13 February 2026.
- 5 OFR Consultants Limited. 2026. Thermal Exposure to Roofs from Fires Involving Photovoltaic Panels. Rev. R02, Project OX24065, for the Building Safety Regulator. GOV.UK, updated 13 February 2026.
- 6 CambsNews. 2024. "Solar panels catch fire at £70m Lidl distribution centre in Peterborough." February 2024. Photograph: Terry Harris.
- 7 FM Approvals LLC. 2021. Examination Standard for Roof-Mounted Rigid Photovoltaic Module Systems. Class 4478. December 2021. FM 4478 does not use the European EN test standards; its fire assessment applies a modified ASTM E108 test to a specific, fixed assembly, so an approval covers one particular combination of materials and changing a component generally means a fresh test.
- 8 FM Approvals LLC. 2022. Examination Standard for Single-Ply, Polymer-Modified Bitumen Sheet, BUR and Liquid Applied Roof Assemblies. Class 4470. April 2022.
- 9 Indicative market reference: reported minimum for full FM approval of a system design, based on an offer indicated by FM Approvals to EUMEPS prior to 2025. Pricing varies; the figure is indicative, not a quotation.