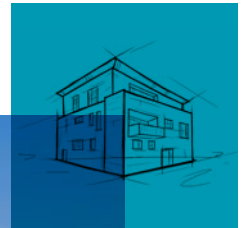


Is your roof ready for solar panels?

Solar panels on flat roofs with
non-combustible ROCKWOOL insulation





Introduction & background

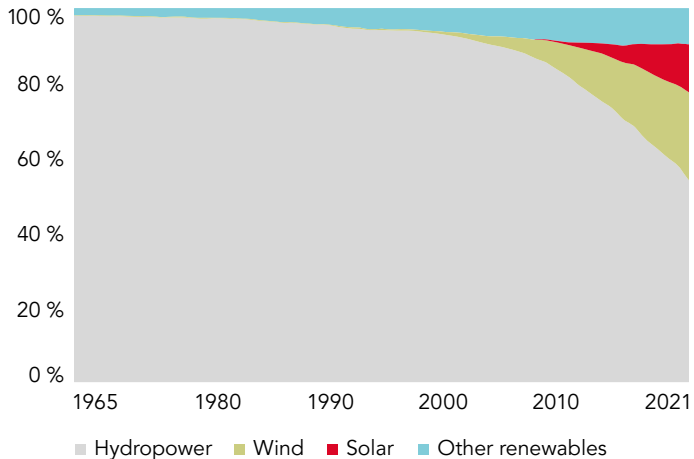
The world around us is changing faster than ever before, and there is a growing understanding that we need to take action to reduce our energy consumption and use renewable energy whenever we can.

One proven way to reduce energy is to insulate buildings to create comfortable living and working spaces – and at ROCKWOOL, this is something we’re very good at.

Another way is to ensure that the remaining energy we do use is renewably sourced from solar, wind and hydro power rather than from fossil fuels. Some of these methods, such as solar power, can have a direct impact on the way we build and the materials that we use. Here, ROCKWOOL insulation can play an important role. Fire resilient by nature with no added chemical flame retardants, it can help protect both people and properties.

Dating back many decades, the global renewable energy landscape was driven primarily by hydropower, reaching a level today where there is little further room to grow. Especially over the past 20 years, wind and solar power have become serious players and are expected to grow substantially in the years to come.

When it comes to the built environment, solar power is by far the most commonly used renewable source. It is an excellent way to produce clean energy directly where it is needed.



Source: BP Statistical Review of Global Energy. OurWorldInData.org/renewable-energy
Note: "Other renewables" refers to renewable source including geometheramal, biomass, waste, wave and tidal. Traditional biomass is not included.

Legal landscape & timeline

On a global scale, the call for renewable energy resources is changing – especially in Europe where the legal landscape is shifting rapidly to enforce its use. Many initiatives at national levels drive the increased use of renewable sources. Some are regulatory whereas others are private initiatives, some have short timeline; others have longer lead times. As positive as these initiatives are, this scattered approach can add complications when requirements and timelines start to vary among member states.

To create uniform guidance, the REPowerEU initiative and the EU Solar Energy Strategy were established. One of their shared goals is to phase-in legal obligations to install solar energy installations

on buildings. The resulting EU proposal includes having solar panels, also known as photovoltaic panels or PV panels, installed on the roofs of the following buildings:

- All new public and commercial buildings with a roof size of more than 250m² from 2027
- All existing public and commercial buildings with a roof size of more than 250m² from 2028
- All new residential buildings from 2029

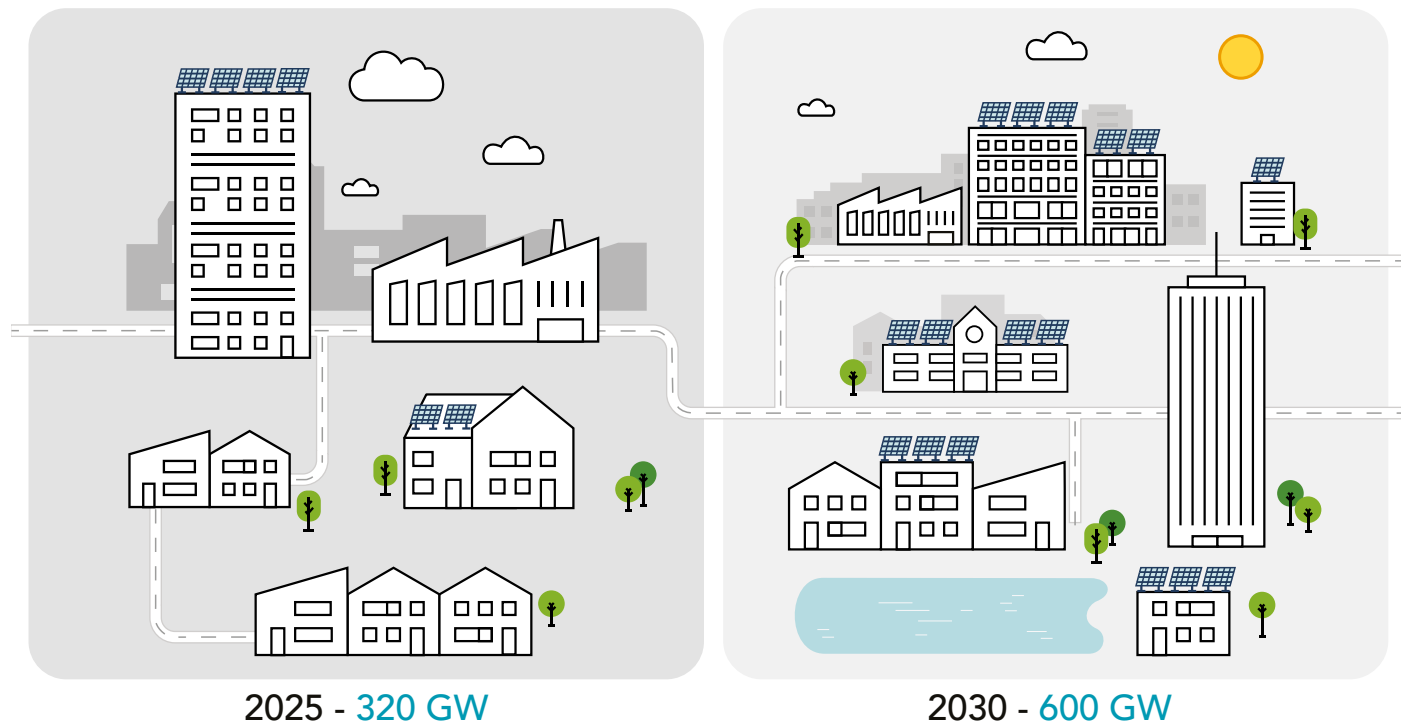
The obligation to install solar panels is only one part of the whole strategy, which also includes such measures as decarbonising industry, diversifying and changing the gas supply, and considering hydrogen power.

Solar power market trends

Wind and solar energy account for approximately 40 percent of the renewable energy market, with solar power growing most rapidly.

By the end of 2020, the global installed solar power capacity was at approximately 800 GW. The installed capacity increases at a rate of approximately 140 GW per year. In Europe, the installed capacity at the end of 2020 was at around 136 GW.

The new initiative coming into place aims to boost the annual installed capacity substantially — to 320 GW in 2025 and a further acceleration to 600 GW in 2030. To put the solar power market into perspective, one modern day nuclear power reactor produces 1.5 GW annually.



Risks associated with solar panel (PV) installations on flat roofs

Fire risk

One of the main risks linked to solar panel installations, especially on flat roofs, is fire safety. A recent study completed by the University of Edinburgh highlights several risk areas:

■ Solar panels can act as an ignition source for flat roof fires

It is more specifically isolators, inverters, combiner boxes, fuses and connectors that potentially serve as ignition sources. Such an event could be due to poor workmanship or a lack of sufficient maintenance in combination with the weather (UV, wind, rain) impacting the system components.

■ Solar panels can radiate heat back to the roof structure

When a fire occurs beneath installed solar panels, the heat would be radiated back to the underlying construction, which would add to the fire load, increasing the fire spread and intensity.

■ Solar panel fires on flat roofs are difficult to extinguish

Fire fighters can have issues reaching the actual fire as it is partially covered by the panels. Their own safety can also be compromised if the roof integrity fails and also when it is not possible to turn off the power being generated by the solar panels, raising the electrocution risk.

As solar panels are not considered to be part of the building structure in many countries, they are not included in the fire regulations for buildings. This also means that there are no standardised fire tests for solar panels.

Mechanical load risk

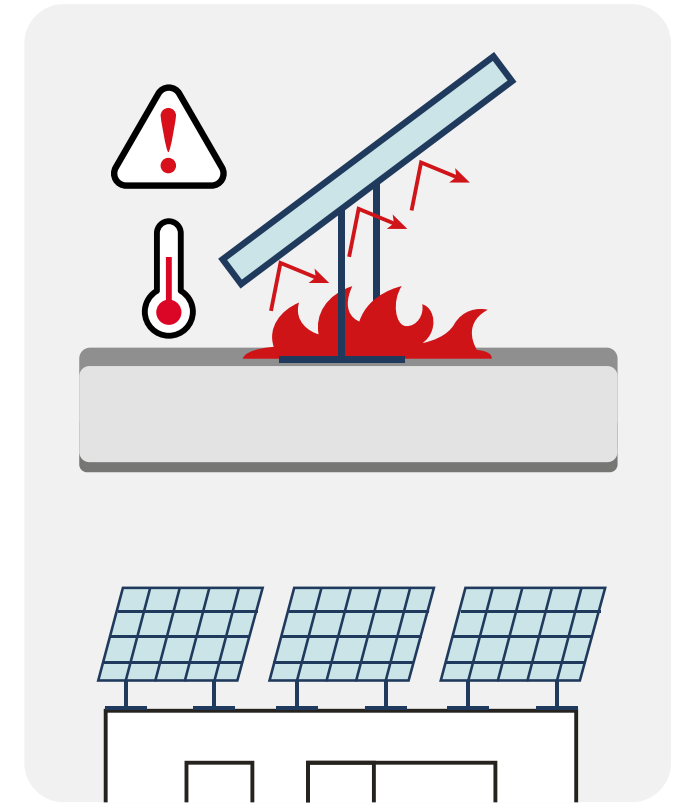
Installing solar panels on flat roofs can also increase the risks associated with mechanical loads on the underlying roof construction.

■ Potential damage to the roof membrane

The structure that supports the solar panels is placed on the roof construction as a point-, line- or area- load and has the potential of deforming or even damaging the roof membrane or underlying insulation layer.

■ Wind displacement

Particularly in coastal areas and on high buildings, strong winds mean that solar panels might need



additional fixings or ballast on their support frames to keep them securely in place. This can add to the total weight or dynamic load on the roof and needs to be considered during the design.

■ Snow accumulation

After snow fall, the additional weight on the panels needs to be transferred through the support structure. If the snow slides from the panels and gathers within the walk-areas between the solar panels, this can impact the roof construction as well as the support structure.

The mechanical loads impacting the integrity of the roof structure need to be carefully considered when designing a new roof or retrofitting an existing one.



Installation risk

During the installation process, extra care needs to be taken to ensure that the roof is not damaged.

■ Storage

Storing solar panels and materials on top of the roof before installation can impact the integrity of the roof membrane and result in severe long term damage to the whole construction.

■ Placement

Installing solar panels means extra work taking place on top of a finished roof. Once again, this can result in damage to the roof membrane, affecting the entire building.



ROCKWOOL flat roof solutions & benefits

Solar power is becoming increasingly common, with more roofs being equipped with these installations. Local initiatives by building owners drive the current market, and it is set to further grow with EU member states updating the existing regulation or preparing new ones coupled with the long-term goal of having solar power integrated into many of our buildings and flat roofs in Europe in the future.

Fire safety

In recent years, high-profile fire incidents have led to increased scrutiny of the fire safety of our buildings, resulting in many countries strengthening their requirements for the fire properties of building materials. The lack of standardised fire regulation for solar panels on flat roofs poses great uncertainty for building owners, architects and insurance companies. Fire safe constructions can help limit the fire spread, giving peace of mind to building owners and to those who use those spaces.

Our ROCKWOOL non-combustible stone wool insulation is fire resilient by nature, withstanding temperatures of over 1000 °C, containing fire and preventing its spread.

In fact, many insurance companies recommend the use of non-combustible insulation materials in conjunction with solar panel installations, with some large companies and building owners insisting that ROCKWOOL roofboard insulation be used in such cases.



Mechanical performance

The load resulting from solar panels and eventual accumulated snow is transferred to the roof structure through the support frames. The most commonly used frames are those that transfer the load through rail profiles, which is known as line load distribution. Alternatively, the substructure can be fully supported by tiles to create a full load distribution, or by using small feet or pods, to create a point load distribution.

Our ROCKWOOL PV-ready flat roof products come with support load information specific to the support method used, allowing maximum design freedom.

Depending on the location, size and height of the building, wind can cause issues with solar panel installations. Particularly problematic for the roof edges of high buildings or on structures in coastal regions that typically experience stronger winds, this can lead to the underlying construction being damaged. In line with building traditions, a wind-safe fixing method needs to be selected.

Our ROCKWOOL non-combustible roof insulation is designed to work flexibly with different fixing methods.

To ensure optimal functionality, solar panels require occasional maintenance. Their layout could also need alteration in the case of other roof installations being installed, such as AC equipment or extra skylights.

Our ROCKWOOL flat roof boards come with the necessary mechanical properties to accommodate the solar maintenance needs. In the case of roof alternations the insulation is easily removed, replaced or cut to size.

Installation security

Solar panels are not entirely new to the flat roof market, meaning that many of the ROCKWOOL flat roof boards available have been adapted to meet these specific needs. However, there is an increased focus on performance and safety, both during the installation of solar panel arrays as well as over the lifetime of a building.

When solar panels are installed, additional materials are placed on the roof and extra care needs to be taken to avoid damage to the underlying construction. While installation experience is still increasing, there is a need for extra focus and even precaution measures to be taken to ensure that the roof membrane and insulation is protected from damage.

A protective layer on top of the roof membrane, for example rubber mats or wooden planking, will avoid membrane damage from pallets or other storage materials. This also avoids long term damage due to water penetration into the underlying roof construction or even the rooms below.

Extra attention to keep the work area clean and tidy while installing, such as removing sharp objects and small metal pieces, will help avoid potential damage to the roof construction.

“ROCKWOOL non-combustible insulation is the natural choice for flat roofs with solar panels”.

Roger Peeters, Group Product Manager

ROCKWOOL A/S

Hovedgaden 584
DK-2640 Hedehusene Denmark
CVR No. 54879415

Tel: +45 46 56 03 00

www.ROCKWOOL.com

More information

[More information can be found on our website.](#)

Contact your local ROCKWOOL offices to acquire detailed product proposal and installation advice.

At the ROCKWOOL Group, we are committed to enriching the lives of everyone who comes into contact with our solutions. Our expertise is perfectly suited to tackle many of today's biggest sustainability and development challenges, from energy consumption and noise pollution to fire resilience, water scarcity and flooding. Our range of products reflects the diversity of the world's needs, while supporting our stakeholders in reducing their own carbon footprint.

Stone wool is a versatile material and forms the basis of all our businesses. With approx. 10,500 passionate colleagues in 38 countries, we are the world leader in stone wool solutions, from building insulation to acoustic ceilings, external cladding systems to horticultural solutions, engineered fibres for industrial use to insulation for the process industry and marine & offshore.

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