EUROGYPSUM
THE VOICE OF THE EUROPEAN GYPSUM INDUSTRY

Towards Water Resilience with Gypsum

The European gypsum industry's journey towards reducing its water footprint

This document is an introductory roadmap, presenting the European gypsum industry's current water footprint and the journey towards increasing its water resilience.

The gypsum industry is an enabling sector and is actively improving its water footprint through:

Avoiding water withdrawals throughout manufacturing and installation of dry-lining plasterboard solutions.

Improving water efficiency.

Striving for a circular use of water by reusing and recycling it.

Prioritising non-potable water sources to reduce environmental impact.

A clear and supportive economic and policy framework is needed to maximise the industry contributions to reducing water consumption.

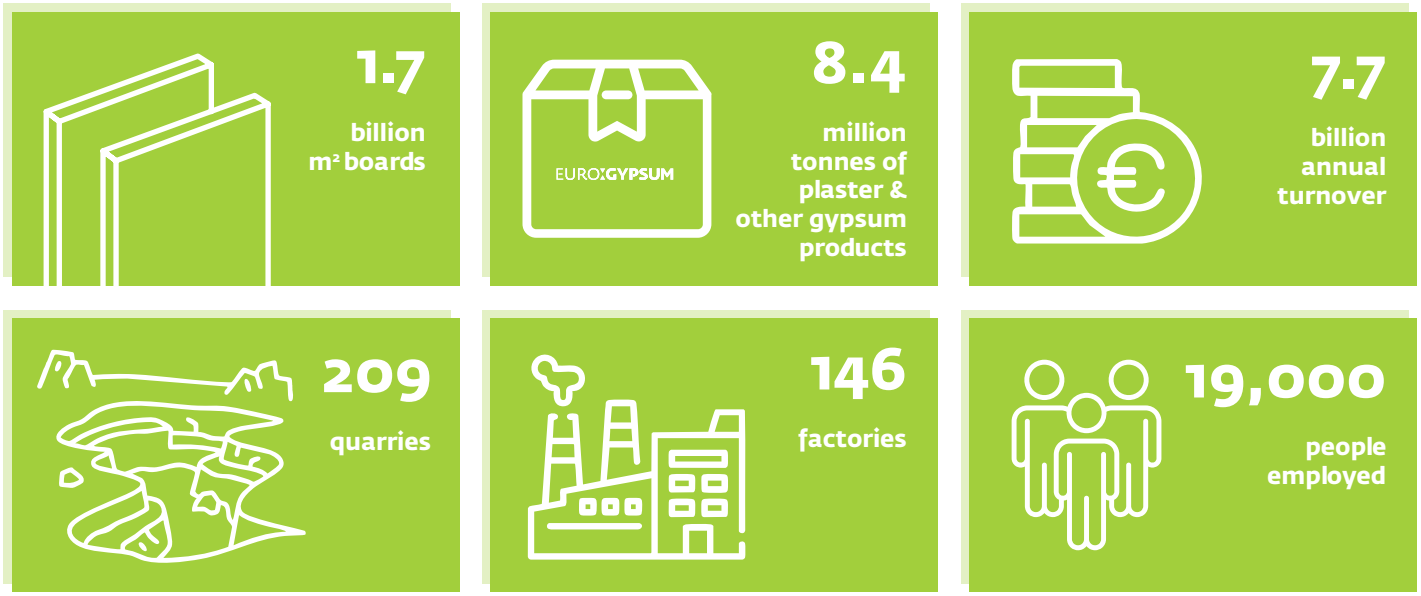
1. Gypsum: an essential mineral for building solutions

Eurogypsum is the European association representing the construction industries, with large and small companies who source and manufacture gypsum products, such as plaster, plasterboard or gypsum blocks.

Gypsum is a mineral sourced domestically, with a history and tradition anchored in Europe's landscapes and architectural heritage. Thanks to domestic production and the global leadership of European countries such as Spain, Germany and France, the European gypsum manufacturers are actively contributing to the EU's open strategic autonomy. Given the local nature of the industry, operations are carried out in a wide range of environments, where water availability can vary significantly. Gypsum products manufacturers are therefore sensitive to a responsible water management and to the reduction of the overall water consumption.

Gypsum is a mineral used for sustainable construction, mainly to produce building boards, such as plasterboard or gypsum fibreboards, as well as building and decorative plasters. Gypsum-based products are essential elements of lightweight systems used for interior partitioning, lining and ceilings in new construction and renovation. They provide affordable solutions for safe and comfortable buildings, with outstanding acoustic, thermal, fire protection and air quality performance.

The European gypsum industry in figures



In the case of plaster manufacturing, it is a dry process that involves no direct use of water. It is worth noting that water is used during the installation phase.

However, other gypsum-based products manufacturing processes, e.g. for plasterboard, require more water. Indeed, water is an integral and fundamental raw material for the production of plasterboard. In 2023, the **average water consumption to produce 1 m² of plasterboard was around 5.4 litres.** To offer a comparison, 450 million EU citizens use on average 64.8 billion litres per day. The water consumption by the European gypsum industry, amounting to 9.18 billion litres per year, compares to 3 hours 24 minutes of EU consumption.

Thus, the water used in plasterboard manufacturing is relatively modest. Moreover, plasterboard – also known as drywall – is an essential component for dry construction solutions. Indeed, plasterboard is part of lightweight systems that require negligible amounts of water to install. Using these low embodied carbon solutions not only helps **avoid unnecessary water use on construction sites**[1], but also supports flexible, adaptable building designs.

For the purpose of this introductory Roadmap, we will focus mainly on the water consumption in plasterboard production.

*1. You can consult EPDs of our products at this **link** or this **link**.*

2. From quarry to board: mapping our industrial needs

Gypsum rock naturally contains water as part of its crystal structure, in the form of calcium sulphate dihydrate ($CaSO_4 \cdot 2H_2O$). To make gypsum-based products, this water is partially removed through heating — a process called calcination — which transforms gypsum into calcium sulphate hemihydrate ($CaSO_4 \cdot 0.5H_2O$), a form that contains less water and can later rehydrate and harden when mixed with water.

DID YOU KNOW?

Extracting gypsum **does not require water.** Mining is usually carried out in a dry environment. However, water can infiltrate the soil in different ways, widely varying from area to area. If water is present when extracting, it needs to be pumped out. It can be then used to spray quarry roads to settle down the dust. Groundwater or rainwater can also help in creating ponds or wet areas that become perfect temporary biotopes for flora and fauna. In this picture, taken at sunrise in a quarry, you can see several individuals of *Cinocia cinocia* in the wetland.

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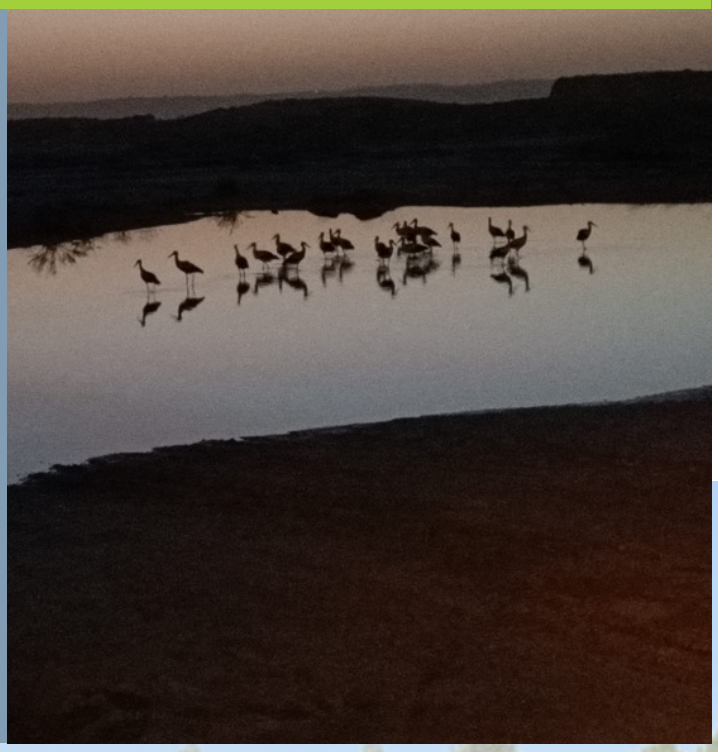
Josuhé Ureña Bocanegra, San Martín de la Vega (Spain), 2024



© Jacobo González, Soneja (Spain)

Once the rock has been crushed and calcined, additives and water are added, creating a slurry to help form the plasterboard. The amount of water added is crucial not only for the fluidity of the slurry, hence the board's uniform thickness, but also for the boards' thermal and acoustic properties and their mechanical strength. The slurry is then laid between two layers of recycled paper, forming plasterboards. The boards are cut and go through the drying process. This way, water molecules in excess evaporate, leaving a robust and lightweight construction solution[2].

As the process demonstrates, excessive use of water is not in the interests of the industry. If the slurry contains too much water, it negatively impacts the formation process. Therefore, plasterboard plants have been striving for many years to reduce water consumption to the optimal level.

Optimising water usage in plasterboard manufacturing can help reduce drying time and energy input, leading to more sustainable production. On the other hand, improving energy efficiency in drying lowers the energy needed during heating and overall water consumption. This synergy between water and energy means that reducing water use contributes to lowering carbon emissions as well as to operational cost savings.

DID YOU KNOW?

Plasterboard comes in a variety of types, each engineered to meet specific performance needs – and water content plays a crucial role in defining their properties. The most common is **standard plasterboard**, used for interior walls and ceilings. For enhanced fire protection, **fire-resistant boards**—typically pink and more porous—contain a higher water content to help slow heat transfer. In bathrooms and kitchens, green **moisture-resistant boards** are ideal–they are especially formulated to resist humidity and prevent degradation. For acoustic comfort, **sound-insulating boards** feature a denser core to reduce noise transmission, while **impact-resistant boards** are designed for extra durability in high-traffic environments.

Thanks to its adaptable composition, plasterboard is a versatile solution that can meet a wide range of building needs – and water is a key ingredient for its production.

Copyrights: Knauf, Fos-sur-Mer

2. It is called plasterboard, but it is commonly referred to as gypsum board, because the reverse reaction of calcination has occurred.

DID YOU KNOW?

Close to 100% of our industry's water discharge accounts for domestic use, i.e. for the plant to provide the basic needs for its staff.

TREATED WASTE WATER

SURFACE WATER

PRO
WATER

Finishing & packaging

5

MANUFA
Industria

Drying

Temperatures in the dryer are usually at around 200°C

4

Evaporation during drying: 4 litres/m²

Condensation & Internal water treatment

Mixing and ac

DISCHARGE OF WASTEWATER FOLLOWING TREATMENT

GROUND WATER

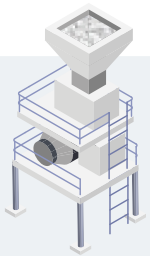
THIRD-PARTY WATER

SANITARY WATER

CESS
R TANK

ACTURING
l Cleaning

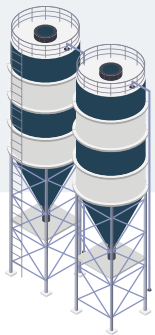
1



Gypsum Calcination

Stucco preparation

2



Stucco hydration:
1,4 litres/m²

3

g stucco
dditives

3. Providing value to society: decreasing our water withdrawal and discharge

In industrial processes like plasterboard production, **water withdrawal**[3] refers to all water used in manufacturing (sanitary and industrial). Some of that **water** is later **discharged**[4], i.e. it is released back into the environment. For our industry, it is paramount that any water discharge does no significant harm (DNSH) to the environment. Finally, **water consumption**[5] equals water withdrawal minus water discharge. Understanding these terms helps us measure how much water we use and how we can reduce our impact.

1. Avoid water withdrawals

At a time when water scarcity is a reality in several parts of Europe and extreme weather events like floods and droughts increase, the European gypsum industry is conscious that the best way forward is to avoid consumption of this precious resource. After all, the best water is the one we don't use! A clear opportunity comes from innovation: developing lighter gypsum boards by adjusting product formulations to require less water during production. Such innovation will require updates to product standards, ensuring that lower environmental footprint and quality performance go hand in hand. Our industry is committed to reducing water withdrawals and further optimising the processes to lower our overall water footprint across the full life cycle is a key step towards this direction.

2. Circular use of water

A further path towards water efficiency is working towards a circular loop of water within our processes. For instance, when gypsum is first calcined, the steam released could be reused or recycled back into the manufacturing process. Currently, around 4 l/m² are necessary to form plasterboard and this water is evaporated in the drying process. While a portion of this water is already recovered, the industry aims at further improving recovery rates. Achieving a fully circular water loop, however, involves significant technological investment and innovation. These solutions are not yet widely cost-effective, but targeted financial support for research could help accelerate progress. Ultimately, a circular loop of water would not only boost circularity of water but of our solutions too.

2.1 Reuse water

An example of potential water reuse in the manufacturing process lies in the more widespread application of condensing techniques and technologies. Deploying these technologies is extremely expensive, leading to a gap between research and application of the technology on the ground. Support for such investments is indispensable to close this gap.

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3. The sum of all water drawn into the boundaries of the undertaking from all sources for any use over the course of the reporting period. (Commission Delegated Regulation (EU) 2023/2772 of 31 July 2023 supplementing Directive (EU) 2022/2464 of the European Parliament and of the Council as regards European Sustainability Reporting Standards [2023] OJ L 320/1, Annex II, ESRS E3).

4. The sum of effluents and other water leaving the boundaries of the organisation and released to surface water, groundwater, or third parties over the course of the reporting period. (Commission Delegated Regulation (EU) 2023/2772 of 31 July 2023 supplementing Directive (EU) 2022/2464 of the European Parliament and of the Council as regards European Sustainability Reporting Standards [2023] OJ L 320/1, Annex II, ESRS E3).

5. The amount of water drawn into the boundaries of the undertaking (or facility) and not discharged back to the water environment or a third party over the course of the reporting period. (Commission Delegated Regulation (EU) 2023/2772 of 31 July 2023 supplementing Directive (EU) 2022/2464 of the European Parliament and of the Council as regards European Sustainability Reporting Standards [2023] OJ L 320/1, Annex II, ESRS E3). Water consumption includes, for instance, water a) evaporated during the drying process, b) bound into products, such as gypsum slurry in plasterboard, and c) used in cleaning or cooling and not returned to the source.

2.2 Recycle water

Recycling water entails the use of water post-treatment. Throughout some stages of plasterboard manufacturing, grey waters can be generated, for instance during slurry preparation or equipment cleaning. This wastewater is still relatively clean and, with the appropriate water filtering system, it can be recycled and used again in the manufacturing process. Further research in water recycling is necessary to lower the costs of such actions and to increase the efficiency of water treatments in industrial activities.

3. Use of alternative water sources

Beyond the quantity of water used, our industry believes that resource efficiency should also consider the quality of the water used. Indeed, potable water should be used for activities that require it, e.g. for drinking or cooking. Ideally, potable water should only be used for domestic use – think of common kitchen and services in the workplace – and it is not needed for the industrial processes. Resource savviness also passes through this acknowledgement and the willingness to reduce the use of more precious water sources and find alternative ways to obtain the quantity needed. Substituting water sources acknowledges this hierarchy of needs and aims to more closely align our uses to the range of sources available. An example would be harvesting rainwater and/or stormwater: while this strategy needs to be mindful of not depleting the local soil, it is a great solution especially in places with extreme weather events.

4. Case study of France: application of best practices

In the EU, France represents quite a unicum when it comes to water policy. Not only the polluter pays principle stimulates industries to act, as there are financial consequences to pollution caused, but the country has been expanding its legal framework to facilitate the reuse of non-potable water sources. This approach encourages industries to invest as well as local policymakers to help the realisation of important water projects.

Etex, Saint-Loubès plant (France)

Etex has been operating the plasterboard plant in Saint-Loubès, close to Bordeaux (France), and it has been reflecting on how to reduce its use of potable water in its industrial processes since 2010. By creating 3 basins to collect water from manufacturing and rainwater, the consumption of potable water decreased by 60% from 2011 to 2018. Mindful of the summer droughts deeply affecting the region, Etex analysed how to supply its plant with the treated water from the town's wastewater treatment plant. The authorisation from the Gironde department made Etex the first company to use this method to reduce its water consumption and one of the few industrial companies in France to include the use of treated urban wastewater in its process. The project has allowed Etex to use up to 75% of recycled water in its processes as of 2024.

© Etex, Saint-Loubès

Saint-Gobain, Val-de-Cognac Placo® plant (France)

Saint-Gobain inaugurated an innovative system for recovering and using waste heat from its plasterboard plant in Val-de-Cognac, where 30 million m² of plasterboard are produced a year. This new system led to a 14% reduction in CO_2 emissions with respect to 2019 levels as well as a 10.6% reduction in energy consumption using waste heat and eliminating the need for a 900 kW gas boiler. Most importantly, this innovative energy efficiency accomplished a reduction of almost 10% in water consumption by recovering condensate water from the dryer steam and reinjecting it into the plasterboard manufacturing process, thus reducing its water withdrawals. This is a practical example of the synergy between energy efficiency and water consumption, which also led to a reduction in CO_2 emissions. This project required a significant investment of €11.4 million, and it was supported by the French Agency for Ecological Transition ADEME, the Nouvelle-Aquitaine Region and the Adour-Garonne Water Board.

© Saint-Gobain, Val-de-Cognac

Knauf, Fos-sur-Mer Knauf plant (France)

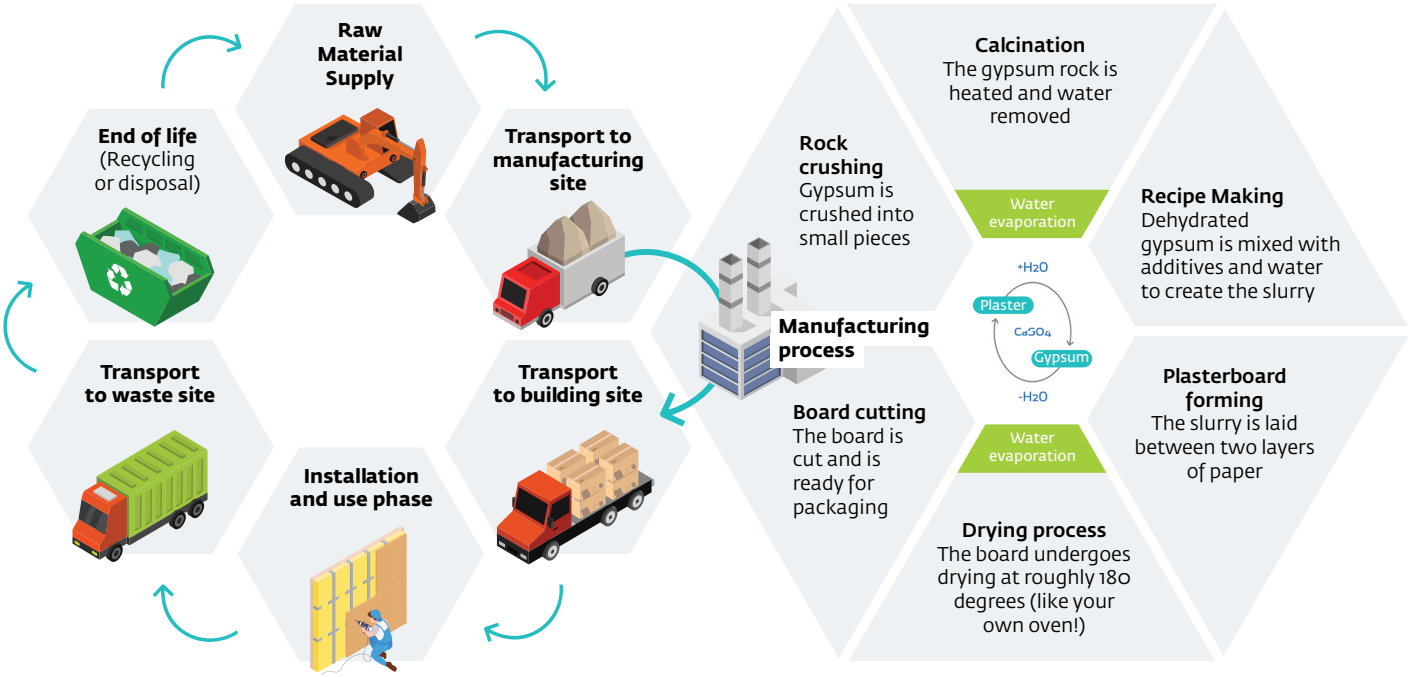
Knauf inaugurated a new plasterboard production plant in Fos-sur-Mer, near Marseille, designed to produce 30 million m² of plasterboard annually. This investment reflects Knauf's strong commitment to innovation, sustainability, and supporting local economies, even in challenging economic conditions. Aligned with Knauf's global ambition to reduce its environmental impact, the Fos-sur-Mer plant integrates the latest technologies to minimise water, energy, and greenhouse gas emissions. Compared to previous-generation production facilities, the site achieves a 15-20% reduction in water and energy consumption, as well as CO_2 emissions. In addition, the plant incorporates an advanced recycling process, reintroducing production waste and plasterboard waste from local construction sites back into the manufacturing cycle. This approach aims to include up to 35% recycled material in the plasterboard production process, significantly reducing waste generation and promoting circular economy principles.

© Knauf, Fos-sur-Mer

5. Our journey towards reducing water withdrawal

Since 2003, efforts have been made to reduce the amount of water used in plasterboard production, resulting in a decrease of at least 5%. Today, the water needed to produce one square meter of standard plasterboard is around 5.4 litres.

At the same time, the gypsum sector has done extensive work on Life Cycle Assessment and produced Environmental Product Declarations (EPDs), covering a wide range of its products and solutions[1]. This information is critical to quantifying and understanding the water footprint of the various solutions – thereby allowing the sector to focus its resources on prioritising opportunities to reduce its water footprint in the future.

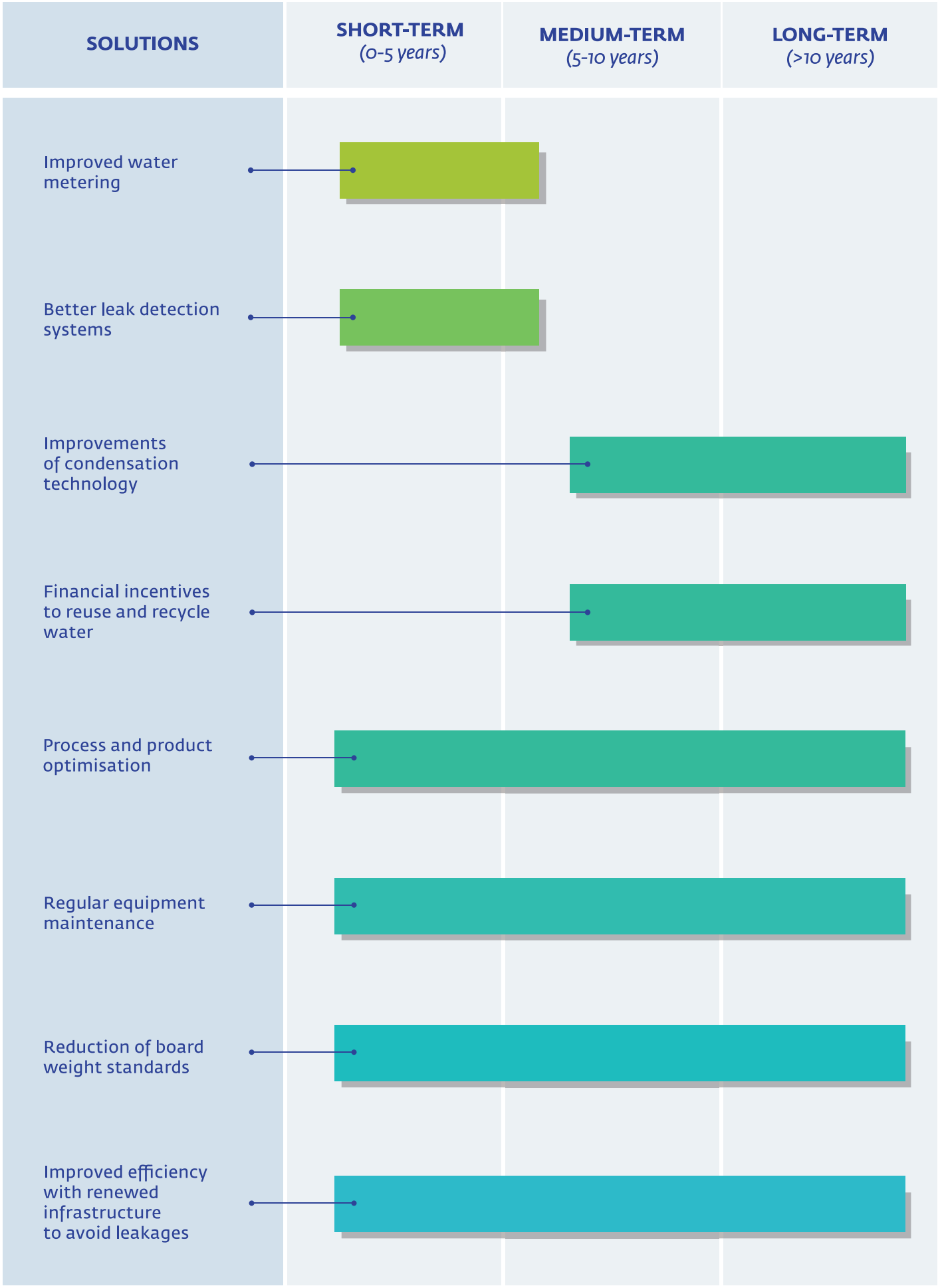


Gypsum-based solutions are key to renovate and upgrade our European building stock sustainably, thanks to their low embodied carbon and integration into energy efficiency systems.

The gypsum industry wants to be part of the solution towards the EU ambition of increasing water efficiency by at least 10% by 2030. Efforts are needed, and our ability to reduce water withdrawals and move towards a more circular water use requires the contribution from manufacturers as well as policymakers. Given water is the prime public good, no major change is possible without close cooperation with policymakers at all levels, especially the local one. For example, upgrading the outdated water infrastructure would contribute to avoid leakages, therefore reducing water withdrawals and increasing water efficiency.

Looking ahead, the gypsum industry works towards solutions to reduce water withdrawals. While working on shorter-term solutions to increase our efficiency is needed, the higher and longer-term investments are needed, to truly lower our water footprint.

6. Our solutions to efficient water management



7. Our policy asks

While our industry is going to keep working towards increasing its water efficiency and reducing water withdrawal, the unique nature of water compels us to work altogether towards the goal of reducing our water footprint. From other industry sectors to public authorities at all levels, collaboration will provide for a more efficient water network where the correct water source reaches the right users and applications. It will also allow for innovative technologies being deployed on the ground and – ultimately – a reduction in water consumption.

A. Lowering plasterboard weight standards

A lighter plasterboard will inevitably mean less water used in its manufacturing. For equal performance, plasterboard manufacturers could reduce the board weight but are bound to standards – set at national level – which impede this development. The implementation of the new Construction Products Regulation does offer the great opportunity to update standards for products like plasterboard, but it is also important this happens soon, without long delay.

B. Dedicated funding to water infrastructure

In light of the upcoming discussions on the Multiannual Financial Framework, dedicated funding could be allocated specifically to improve the water infrastructure and to reward efficient consumers across all European regions. It is both a cohesion measure and an economic one, given its waterfall effects on the area benefitting from the funding.

C. Creation of and access to non-potable water networks

As mentioned, accessing less noble water sources could be a gamechanger for our industry. As such, the increased dissemination of secondary networks to access non-potable water and wastewater may allow several industry sectors to avoid putting further pressure on the already charged water network, ultimately allocating resources in a more efficient way. For instance, the Etex plant in St Loubès could easily access the secondary network, as the pipeline was close by. Financial support to these types of activities can make a second water network more easily developable in industrial/agricultural areas and would allow the storage or reuse of lower quality water.

D. Innovation in technologies

Technological innovation is a top priority in our industry. Nonetheless, more research is needed, especially aimed at a) filtering water, b) recovering water, c) recirculating water as well as condensation machineries (a reduction of up to -70% in water use would be possible with better technologies). Support via dedicated funding opportunities for such technologies that have high CapEx and/or OPEX costs, relative to low returns, would help incentivise companies to drive their commitment to efficient water management. Financial support and clear long-term targets are major tools the EU possesses to mainstream "water efficiency projects" and improve water efficiency.

E. Facilitation of industrial symbiosis

Different industry sectors have different requirements when it comes to resources, energy, and so on. Facilitating the interconnection of different value chains would enable companies to benefit from a symbiotic relationship in which one company's strengths make up for others' shortcomings. For instance, plants producing plasterboard could reuse/recycle water from other industries, that could in turn use our energy or vice versa. Optimising resources is the most future-proof way forward. To this end, a public platform mapping plants presence on the EU territory and helping to connect the dots among willing companies could be extremely beneficial.

F. Higher priority to water efficiency

Water efficiency should be given more importance in policy frameworks, with sectors seeking careful water use recognised as key contributors towards the goal. As such, demand-driven incentives are essential to create a market for water efficient solutions. In turn, this approach would also help bridge the gap between innovative solutions and their implementation on the ground.

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