

BUILDING ON THE BENEFITS OF EPS

The styrene monomer (SM) business is working in partnership with expandable polystyrene (EPS) producer Synbra to promote the market development of building insulation applications which could play a significant role in meeting European greenhouse gas emission reduction targets.

Advocating a bigger role for polymer insulation in meeting climate and energy targets



Increasing the energy efficiency of buildings through better insulation could be a key factor in meeting targets for reduced CO2 emissions.

Europe has set a series of ambitious climate and energy targets to be met by 2020, namely a reduction in greenhouse gas emissions (of which CO₂ is the main element) of at least 20% below 1990 levels, and a 20% reduction in primary energy use compared to projected levels to be achieved by improving energy efficiency.

According to the European Commission, buildings are responsible for 40% of energy consumption in the European Union (EU), more than industry or transport, and for 36% of total CO₂ emissions. The EU Roadmap for moving to a competitive low carbon economy by 2050 highlights the need for further improvements to the energy performance of buildings and for further innovation in this area.

THERMAL EFFICIENCY

More effective insulation is one of the easiest routes to improved building energy efficiency, both in new build constructions and in the renovation of existing buildings. Governments across Europe recognise this and provide subsidies and grants to enable construction companies, businesses and homeowners to improve the thermal efficiency of their buildings.

Taking measures to insulate the walls and roofs of the EU building stock could result in a substantial cut in CO₂ emissions through reduced energy use, while also lowering fuel bills.

The chemical industry has an important role to play in this as it supplies the key raw materials for two widely used forms of high performance polymer insulation – expandable polystyrene (EPS) and polyurethane foams – both of which have strong thermal characteristics and energy efficiency/life-cycle credentials. →

Insulation Materials

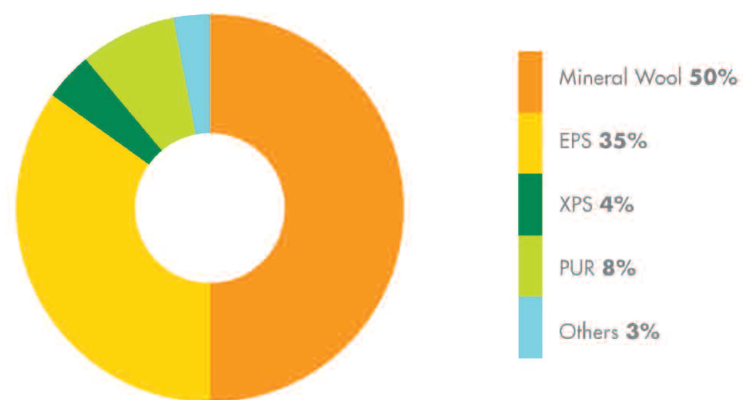


Figure 1: EPS has a smaller share of the insulation market compared to mineral wool despite the inherent flexibility and environmental advantages of the polymer-based material.

Members of the Shell Chemicals Styrene Monomer Commercial team in Europe (from left) Jan-Willem van de Velde, Ronald Koch and Eva Hatzidemou with Synbra's Jos Verstegen, (CFO), Rik Dobbelaere, (CEO) and Jan Noordegraaf (MD).



“ THE FACT THAT OUR PRIMARY RAW MATERIAL FROM SHELL COMES FROM THE MOST ENERGY EFFICIENT PROCESS FOR MAKING STYRENE ENHANCES OUR CASE FOR EPS. ”

Jan Noordegraaf, Managing Director, Synbra Technology bv.



Lightweight EPS insulation panels can be used in the construction of both domestic and commercial buildings.

According to industry body Plastics Europe, the CO₂ saved through increased energy efficiency delivered by EPS insulation during its working life is around 200 times the amount of CO₂ created by its manufacture. The primary feedstock for EPS is styrene monomer (SM) although the finished foam is over 95% air.

The durability of the polymer material ensures that EPS insulation properties are delivered over a long in-service life and, finally, end-of-life solutions for recycling and energy recovery can enhance its overall value.

These properties have made the construction sector an increasingly important market for EPS, accounting for over 70% of total demand in Europe. EPS can be used to insulate roofs, floors

and walls either as part of composite panels, moulded sheets or natural bead form for cavity fill. Its relatively low cost, light weight and ease of handling are also ideally suited to simpler, more efficient building techniques.

MARKET INNOVATION

In recent years innovation in the market has led to new types of 'grey' EPS, with further enhanced thermal efficiency due to the addition of small amounts of graphite to the polymer, and also foam with enhanced fire retardancy qualities.

Despite this, EPS has a lower market share of the insulation market compared to traditional mineral wools (see Figure 1) which have attracted wider government support and subsidy. Industry players believe this is largely due to the lack of understanding, appreciation and effective communication of the environmental credentials and flexibility of EPS compared to other materials.

This was the view of Dutch EPS producer, Synbra Technology bv, which has been a Shell SM customer from nearly 40 years and has a reputation as an innovator in the sector. Recently it has started an initiative to raise the profile of EPS insulation and its differentiated properties.

SCIENTIFIC STUDY

In 2010, the company commissioned a scientific study into the environmental performance of different types of building insulation.

“We believe EPS has a bigger role to play in building energy efficiency but stakeholders, decision-makers and consumers need more clarity and stronger messaging around the material's inherent environmental advantages,” says Jan Noordegraaf, Synbra's Managing Director.

“We wanted to generate credible data to allow us and other players in the styrenics value chain to convey these benefits more effectively.”

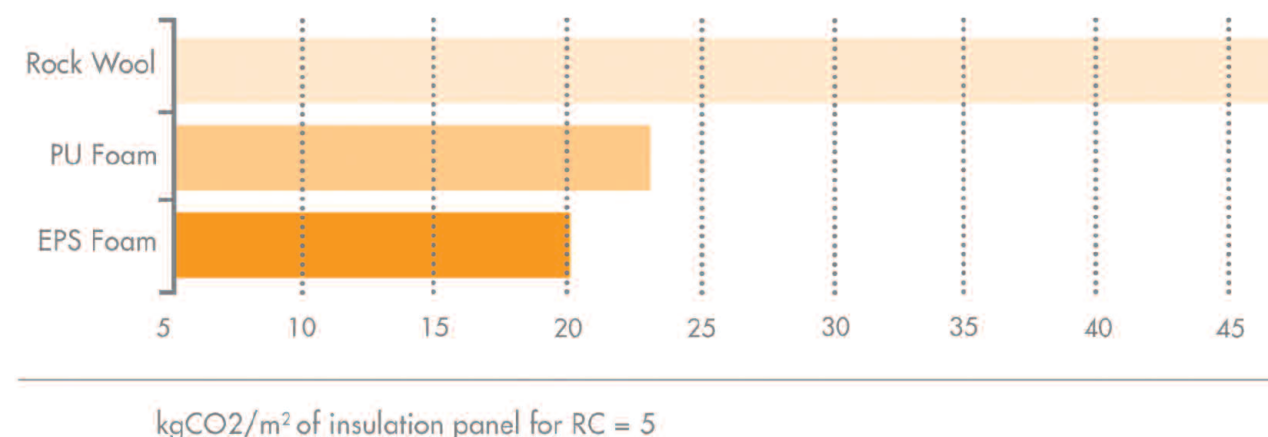


Figure 2: EPS production results in less than half the carbon footprint compared to mineral wool.

The study coincided with Shell's own project to better understand and calculate, using a robust methodology, the well-to-gate carbon footprint of its chemical portfolio including SM, to support customers' product marketing and advocacy.

But it was during a presentation to Synbra's management on the outlook for styrenics value chains that the idea for wider cooperation and in the promotion of EPS insulation was hatched.

“We have had a good relationship with Synbra over many years and have worked with them on a range of operational issues,” says Eva Hatzidemou, Commercial Manager for Styrene Monomer, Europe/Africa.

“This was a natural way to extend our close partnership in this area of mutual interest.”

RAISING THE PROFILE

“Insulation is an important and growing market but we both recognised that the somewhat fragmented EPS value chain collectively has not done a good job in promoting the credentials of EPS compared to the competition,” she says.

“We are happy to support customers in efforts to raise the profile of EPS through partnership and sharing of chemical product data.”

Industry forecasts suggest the EPS market will grow at around 3.5% per year over the medium

term although greater momentum in the insulation sector could lead to significantly higher growth.

The independent authors of the Synbra study carried out a holistic environmental evaluation and life-cycle analysis of all three materials used in mainstream insulation applications.

They made direct comparisons between EPS and mineral wool by calculating the equivalent carbon footprint of the two materials. The findings show a clear advantage for EPS, having less than half the carbon footprint of mineral wool for the same insulation value and area (see Figure 2).

The calculation in the study was for EPS generally, but Synbra believes its products may have an additional advantage due to its relationship with Shell. Virtually all of its styrene comes from the Shell Moerdijk facility via its proprietary SM/PO process technology, which Shell believes is up to 30% more energy efficient than other styrene manufacturing routes.

“The fact that our primary raw material comes from one of the most energy efficient processes enhances our case for EPS,” says Noordegraaf.

The calculation basis of Synbra's study has been compared against Shell's own verified carbon footprint methodology. The data for SM used to produce the study's findings for EPS has also been validated against Shell's own SM carbon

footprint calculation, averaged across its global manufacturing operation, and checked by Shell's CO₂ and Energy Efficiency team.

“The styrenics industry can use the findings of this study to improve the perception of EPS and large producers such as Shell, with prominent positions in industry associations and stakeholder engagement, have an important role to play,” says Herbert Le Lorrain, Strategy Manager for Styrene and Aromatics.

ADVOCACY STRATEGY

“We are already active in addressing regulatory issues impacting the styrenics value chain and engaging with industry bodies around the CO₂ properties of EPS is a logical extension of that effort. We are building the key findings of the study into our own advocacy strategy and our senior leaders' engagements at an industry level.”

Improving the insulation of buildings, as part of a package of energy efficiency measures, will make an important contribution to the success of wider emissions reduction efforts. If the styrenics industry is able to convey the benefits of EPS insulation effectively, then players throughout the EPS value chain will be able to play a key role in delivering these solutions.

“The benefits of EPS in combating one of Europe's biggest environmental challenges are clear within the industry. It is now up to us and other stakeholders in the chemical industry to make these clear to regulators and wider publics,” says Hatzidemou. “We are proud of our long partnerships with companies such as Synbra, and of our joint efforts to promote energy efficiency.”



EPS beads produced at Synbra's manufacturing facility in the Netherlands before they undergo further expansion and fusion into foam panels.

For more information on styrene visit: www.shell.com/chemicals/sm