



# EURACTIV

## BUILDING DECARBONISATION

SPECIAL REPORT | DECEMBER 2021

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# BUILDING DECARBONISATION

SPECIAL REPORT

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*Reducing emissions from the built environment has become a top priority in the fight against climate change as buildings currently gobble up 40% of Europe's energy consumption – most of it fossil fuels.*

*In this special report, EURACTIV looks at the European Commission's latest proposals to improve the energy performance of buildings.*

# Contents

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EU's new buildings law aims to renovate 15% least efficient homes	4
EU warned against watering down climate ambition in buildings law	7
Economist: Carbon trading is 'a right first step' to decarbonise buildings	10
EU confronted with lack of skilled labour to support building renovation wave	16
Seizing the opportunity: three foundations for a smart and affordable building decarbonization	18

# EU's new buildings law aims to renovate 15% least efficient homes

By Frédéric Simon | EURACTIV.com



The EU's "focus on the worst performing buildings prioritises the most cost-effective renovations and helps fight energy poverty," said EU climate chief Frans Timmermans, who presented the proposal on Wednesday (15 December). [European Union, 2021. Source: EC - Audiovisual Service]

The European Commission has proposed the introduction of minimum energy performance standards for the 15% worst performing buildings in Europe, which would be rated "G" on the EU's energy performance scale, whether they are residential or not.

The proposal is contained in the the EU's revised Energy Performance of Buildings Directive (EPBD), which the Commission presented on Wednesday (15 December) as part of a wider package of legislation aimed at halving the EU's greenhouse gas emissions by 2030.

"Its focus on the worst performing buildings prioritises the most cost-effective renovations and helps fight energy poverty," said EU climate chief Frans Timmermans, who presented the proposal.

By 1 January 2027, all commercial or public buildings would need to reach at least class "F" on the EU's energy efficiency scale, and then class "E" by 1 January 2030.

Residential buildings – individual houses or apartments – would be given more time, with a requirement to reach class "F" by 1 January 2030 and class "E" by 1 January 2033.

These ratings would be based on a harmonised European scale, with the worst performing "G" class corresponding to the 15% least efficient buildings and the "A" class corresponding to zero emission buildings.

It won't be a rigid system though, as every EU country will define its own energy performance scale based on common EU-wide parameters. "On that basis, each member state will define what are its own 15% worst performing buildings," a senior EU official explained.

Continued on Page 5

Continued from Page 4

And EU countries will be free to decide the “trigger points” for renovation – such as when an apartment is sold or put out for rent.

According to the Commission, focusing on the worst performing buildings will alleviate energy poverty and benefit the poorest households who cannot afford to renovate their homes and currently pay the highest proportion of their income on heating.

“We know that the worst performing buildings are the ones that are most frequently occupied by low income households,” said a senior EU official at a press briefing on Tuesday (14 December).

“And therefore by targeting these worst performing buildings, and channelling financing and technical support where it is most needed, we are ensuring that building renovation efforts address energy poverty at the source,” the official said.

### **‘CHANGE OF PARADIGM’ FOR PROPERTY OWNERS**

For property owners, this is a major change meaning that every building will have to be renovated by 2033 at the latest, no matter whether they are public or private, residential and non-residential, rented or not.

“This is a change of paradigm and the first time the EU will go that far in setting a direct obligation for EU citizens and businesses to renovate their homes and properties,” said Emmanuelle Causse from the International Union of Property Owners (IUPO).

“This goes beyond what has been done in the UK and France so far, where

the standards apply only to rented properties,” Causse told EURACTIV. “No distinction are made anymore for multi-apartment buildings,” she pointed out, saying those need much more time to be renovated – around 4 to 6 years in France.

According to the European Commission, the new EPBD standards will support the EU’s “Renovation Wave” [that was presented last year](#), with the aim of renovating 35 million units.

But according to property owners, the number could be higher. There are approximately 131 million residential and non-residential buildings within the EU, according to the IUPO. So if 15% of them are rated “G” and another 15% are rated “F”, this means at least 40 million buildings across the EU will have to be renovated by 2033, IUPO calculated.

“This is a Herculean task” Causse said, drawing attention to the lack of skilled labour to deliver on the objective.

“Many member states are already facing a shortage of construction workers – especially skilled workers,” Causse remarked. “And if the deadline seems far away, taking into account the time to adopt and transpose the directive, it will at best leave at best eight years to achieve this objective,” she told EURACTIV.

### **UP TO €150 BILLION OF EU FUNDING AVAILABLE**

The European Commission is conscious that massive efforts will need to be made. But it is also confident that sufficient capital will be available, both through private and public funds.

“It’s clear that this will require significant investment,” the senior EU official explained. “But the good news is that there are also unprecedented means that are being put forward,” the official added, saying “up to €150 billion” could become available from the EU budget to implement minimum energy performance standards between now and 2030.

EU public money would come from sources such as the European Regional Development Fund, the Cohesion Fund, and the EU’s €800 billion coronavirus recovery fund. The official also cited soon-to-be updated EU state aid rules that will allow national governments to finance building renovation efforts.

Other parts of the EPBD proposal relate to digitalisation and transparency, including the creation of a “renovation passport” that will allow homeowners to keep track about the different stages of renovation of their building.

### **FOSSIL FUEL HEATING PHASE OUT BY 2040**

But one of the most controversial aspects was left out of the EPBD revision – the idea of banning the sale of new fossil fuel boilers, which is supported by countries such as Luxembourg.

The European Commission has no right to ban heating technologies and has to “respect the division of competences between the EU and the member states,” Timmermans explained.

“We are leaving this decision to the member states, in particular considering that they have very

Continued on Page 6

Continued from Page 5

different starting positions” when it comes to their energy mix and types of heating infrastructure in place, said Kadri Simson, the EU’s energy commissioner.

At the same time, the EPBD proposal provides “a clear legal basis in case European countries want to ban fossil fuel boilers,” Simson added, saying that “some member states are considering this”.

More importantly, the Commission has chosen “a dual system” combining the creation of a dedicated carbon trading system for transport and buildings in addition to energy performance standards, Timmermans said. “And the combination of the two gives the right incentives in the right places,” taking into account national circumstances, he explained.

Moreover, EU member states will be required to spell out strategies for eliminating fossil fuels from heating as part of newly-introduced National Buildings Renovation Plans to meet their climate goals.

“These plans will need to include roadmaps for phasing out fossil fuels

in heating and cooling by 2040 at the latest, along with a pathway for transforming the national building stock into zero-emission buildings by 2050,” the Commission said in a [statement](#).

### ELECTRIFICATION ‘IS THE WAY TO GO’ FOR HEATING

And in terms of heating technology, the EU executive is convinced that electric solutions such as heat pumps are the best option.

“We believe really that electrification is the way to go in terms of decarbonisation of buildings as the most cost efficient pathway,” a senior EU official said. “So we’re not necessarily looking for instance, into hydrogen for heating of buildings.”

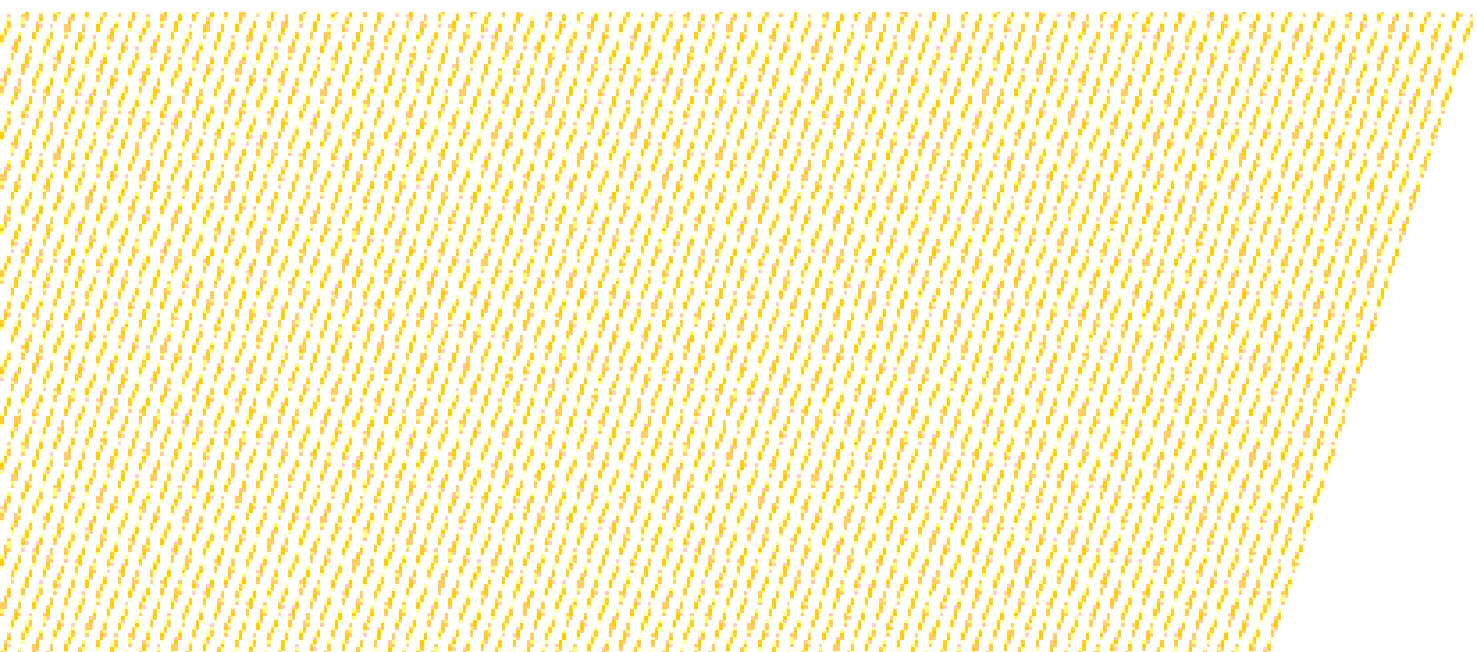
Not everybody agrees, however. Supporters of hydrogen-ready boilers and green gases in heating say they can help decarbonise the heat sector by complementing electric solutions like heat pumps and energy efficiency measures in buildings.

“We do expect heat pumps to form the backbone of Europe’s new heating

system,” said Stephan Kolb, regulatory affairs director at Viessmann, the German manufacturer of home heating appliances.

But he pointed out that a heating system relying solely on heat pumps would require massive amounts of additional electricity and grid reinforcements, especially to manage winter heat demand peaks.

“We believe that, in many countries, well-dosed volumes of gaseous energy carriers will be needed to complement a backbone of heat pumps,” Kolb told EURACTIV in emailed comments. “‘Well-dosed’ in a sense: much less than today’s natural gas volumes, as a result of electrification and envelope upgrades.”



# EU warned against watering down climate ambition in buildings law

By Kira Taylor | EURACTIV.com



Europe's buildings are in desperate need of renovation, but there are now fears that the latest legislative push to increase energy efficiency is being watered down [Erik Tanghe / Pixabay]

There are growing concerns that the European Commission is considering to water down a key piece of legislation that would drive emissions reductions in buildings ahead of its publication this week.

The revision of the Energy Performance of Buildings Directive (EPBD) is due to be proposed on 14 or 15 December as part of a decarbonisation package aiming to bring Europe's gas sector in line with its climate goals.

But while many [praised a draft version of the text which circulated](#)

[last month](#), EURACTIV has learnt that a new draft has lowered the ambition, including on minimum energy performance standards and renovation plans EU countries would need to create.

"This is so watered down. It's really unambitious, and it's going to make our life in the Parliament really hard. It essentially means we'll have an uphill battle," a European Parliament source told EURACTIV.

**PUSHBACK ON RENOVATING EXISTING**

## BUILDINGS

Existing buildings have proven the most difficult to decarbonise, with only 1% of them undergoing renovation on average every year.

To boost renovation rates, the EU executive planned to introduce minimum energy performance standards that would require buildings sold or rented to reach the energy efficiency class E for a transaction to take place after January 2027 and class C by January 2033.

Continued on Page 8

Continued from Page 7

However, according to several sources, these were criticised by The Regulatory Scrutiny Board – a group of Commission officials and external players who check the legality of EU legislation.

They were concerned that the minimum energy performance standards breached the subsidiarity principle – a rule laid down in the EU treaty requiring decisions to be made as locally as possible.

The European Commission did not convincingly show the need for measures to be adopted at the EU level, according to the board. Alongside this, they said that barriers to renovation are specific to each EU country, so should be tackled on a national level.

These worries were echoed by Viessmann, the German manufacturer of home heating appliances. “Too narrow definitions risk infringing on the subsidiarity principle granting member states the right to for example choose their own energy mix,” said Alix Chambris, vice president for global public affairs and sustainability at Viessmann.

“A decarbonised building stock in Sweden, Germany or Spain for example will differ greatly in the heating technologies and energy carriers used,” Chambris told EURACTIV in emailed comments. “Legislation, including the EPBD, has to give a clear direction on the speed and scale of targets but must allow for different roads on how best to get there,” she said.

Despite this, the European Commission is still trying to propose minimum energy performance

standards – particularly for worst performing buildings – as an obligation and with a clear timetable for enforcement.

“The EPBD revision can stimulate buildings renovation rate and depth,” says E3G, a climate think-tank. “Mandatory Minimum Energy Performance Standards (MEPS) can be a policy flagship and send a clear signal to investors, suppliers and installers,” it adds, saying: “It is key that renovation is deep enough so that vulnerable households don’t get trapped in slightly better but still poorly performing buildings.”

However, they may now have to make the wording vaguer in order to get the legislation through.

According to sources following the process, the European Commission is now looking at an approach that would mean most public and residential buildings which have an energy efficiency class below F would need to undergo deep renovations by 2030 at the latest.

Both the year and the energy class are still subject to change and it is yet to be seen what the criteria for exemptions will be.

If the requirement to renovate anything below class F remains, however, it means significantly different levels of renovation across Europe.

“Only requiring the renovation of G class buildings would lead to very uneven results,” said Brook Riley, head of EU affairs at Rockwool, a building materials supplier.

“According to government data

available for Belgium, Germany and Italy, it would mean renovating around a third of their buildings,” he told EURACTIV. “This is the sort of scale which is needed to tackle greenhouse gas emissions and high energy costs. But for France, for example, it would only mean renovating 7%, and for the Netherlands, 4%.”

Alongside this, there is the issue that energy performance certificates, which show how energy efficient a building is, vary dramatically across Europe, warned Riley.

Currently, it is up to European countries to define the energy performance requirements for each class, but the new legislation may bring in more harmonisation, including a template for this, and shorten the lifetime of energy performance certificates to five years.

“When we speak about a G or an A class building it has to mean the same thing across the EU, otherwise it is very hard to plan and carry out large scale renovation programmes,” he told EURACTIV.

## RENOVATION ACTION PLANS

The European Commission is also planning to introduce building renovation action plans, which would replace the unsuccessful long term renovation strategies.

These will help EU countries plan how to bring their buildings in line with net zero emissions by mid-century. They would include milestones for renovation and a clearer picture of the country’s building stock.

Continued on Page 9



The plans were initially welcomed for adding teeth to the EU's failed long-term renovation strategies. But there is a concern that the reporting obligations, including identifying weaknesses and solutions to barriers to renovation, have been removed in a newer draft.

"All the good reporting obligations that they put in, so what member states are doing to phase out fossil fuel in heating and cooling – most of that is gone," a Parliament source told EURACTIV.

"The benefit of the building renovation action plan was that there was just going to be a lot of data that the member states would have to put in and this would give us a clearer picture – that is all taken out. There is now a roadmap every five years on how you're decarbonising. We were shocked and worried when we saw it," the source said.

### GREENS HIT BACK

Amidst warnings of the legislation being watered down, Green MEP Ciaran Cuffe wrote to the European

Commission to emphasise the need to ensure Europe's building stock is in line with its climate ambition.

The revision of the EPBD looks in danger of falling short, Cuffe warned lawmakers on 1 December, saying: "Unfortunately, I fear that the text that is currently being drafted by the Commission is weak in its scope and in its ambition."

In his letter to the European Commission, Cuffe emphasised the need for minimum energy performance standards that cover public, residential and non-residential buildings and trigger action "before 2030 and for all buildings, especially those in energy classes E, F and G".

These worst performing buildings are often home to vulnerable households and renovation could pay off for many reasons, including costs, energy consumption and health impacts.

"Delaying action to 2030, and only covering part of our homes or limiting to the F and G classes is just not enough: If we are to reach our

climate and energy targets, the EPBD holds the key to reduce our energy consumption and climate impact in a timely manner," he argues.

At Viessmann, Alix Chambris agrees and insists that intermediate targets be put in place in order to encourage energy efficiency renovation of the building stock well ahead of 2030.

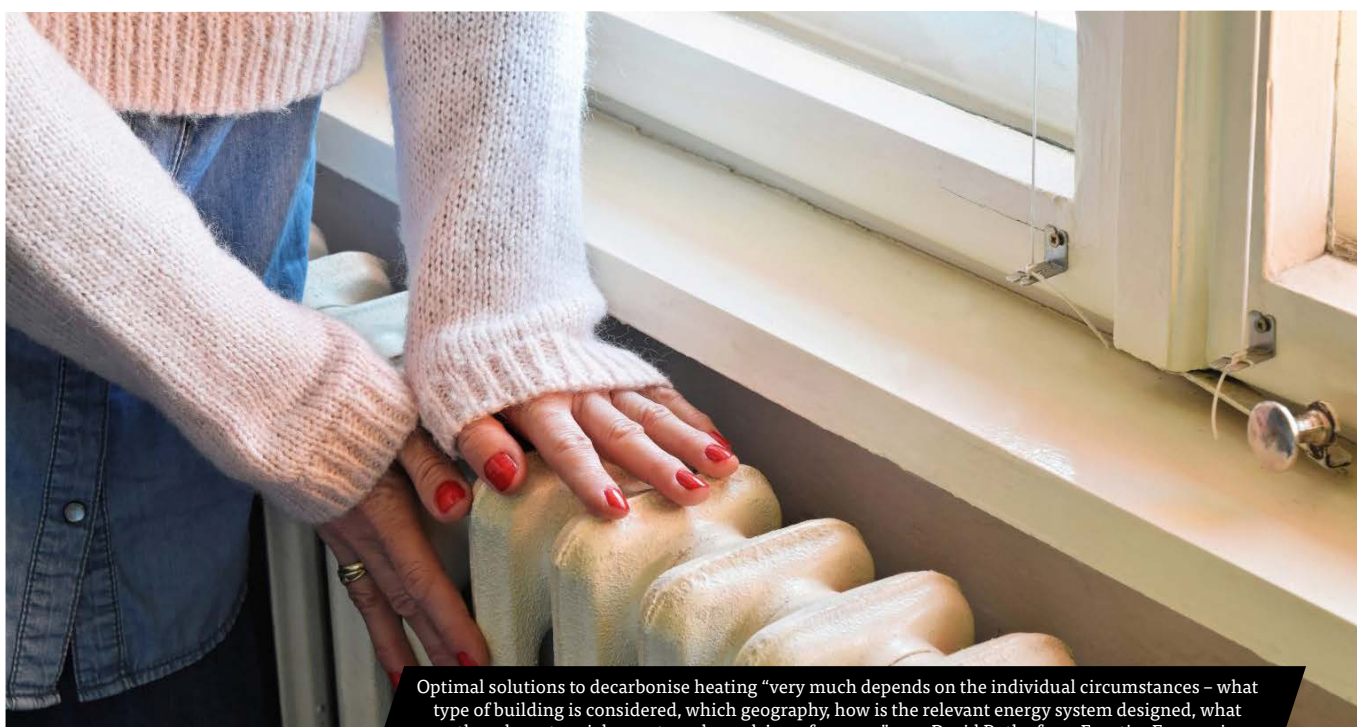
"Intermediate targets are key to create the necessary momentum and provide monitoring tools to ensure member states can stay on track towards decarbonising buildings," Chambris said.

"This could be even strengthened with a clear intermediate EU-wide target for 2030 for example in line with the Renovation Wave goal of reducing emissions from buildings in the EU by 60% in 2030 (vs 2015)."

## INTERVIEW

# Economist: Carbon trading is 'a right first step' to decarbonise buildings

By Frédéric Simon | EURACTIV.com



Optimal solutions to decarbonise heating “very much depends on the individual circumstances – what type of building is considered, which geography, how is the relevant energy system designed, what are the relevant social aspects and people’s preferences,” says David Bothe from Frontier Economics. [Zvone / Shutterstock]

Moving parts of the building sector under a separate carbon trading scheme, like the European Commission has proposed, “is a right first step” to address the complexity of the heating sector, which is spread across millions of buildings, diverging climates and local circumstances, David Bothe told EURACTIV.

However, any such move needs to be balanced by social considerations, warned Bothe, who cautions against making housing “a luxury good” as a

result of decarbonisation efforts.

*David Bothe is the director in Cologne for Frontier Economics, a microeconomic consultancy firm. He spoke to EURACTIV’s Frédéric Simon.*

*Disclaimer: Frontier Economics have worked for Viessmann in the past but the views expressed in this interview are Frontier’s independent perspective.*

## INTERVIEW HIGHLIGHTS:

- The heterogeneity of the

heating sector rules out ‘silver bullet’ solutions like electrification. Rather, a wide mix of technologies will be needed depending on the local circumstances.

- A unique feature of the heating system is that it is temperature-driven, which requires scaling infrastructure to meet peak demand during exceptional cold periods that may occur once every 20 years.
- In countries like Germany, the electric system hasn’t

Continued from Page 10

been built to supply heating applications in households. Moving to a higher share of electrification in heating therefore often requires costly extensions to the power system.

- Electricity provided for heating currently falls under the EU ETS, while natural gas used in heating is not. Bringing both under a single umbrella would ensure a level playing field and allow more decentralised decision-making based on the merits of each solution at a local level.
- One reason why heating is so difficult to de-fossilise is because it has a huge social component: access to housing is a basic human right and cannot become a luxury good.
- Analysis by Frontier Economics shows that heating applications can form a valuable part of the future hydrogen demand and that electric heat pumps are not always the most optimal solution for every household.

**Heating and cooling in the building sector represents 40% of carbon emissions in Europe and needs to be brought down to net-zero by 2050, under the EU's climate law. According to your analysis, what are the different pathways to reach climate neutrality in that sector? And what must be done this decade in order to stay on the path to net zero?**

Restructuring the heating sector certainly poses one of the biggest challenges in the energy transition, mainly for two reasons.

First of all, there is heterogeneity,

even on a national level. Take a country like Germany, where you have a very diverse housing stock with very different energy efficiency standards and infrastructure connections of the premises. At the European level, the differences get even bigger because you have different climates and different energy systems.

So the heterogeneity certainly rules out aiming for a single 'silver bullet' technology – we will instead have to accept a wide mix of technologies, which has to be adapted to the individual, national, regional and even local circumstances.

A second specific challenge of the heating sector is more technical: it's capacity requirements. Because heat demand is largely temperature-driven, we're dealing with strongly correlated peak demands, during short or exceptional periods. For example, when we have a very cold winter, e.g. once in any 20 years, the system still has to be able to meet the capacity demand from all users simultaneously.

And this is unique to the heating sector compared to other sectors like mobility where you get stronger portfolio effects across larger groups, which smoothens demand.

**So that is typically related to peak winter demand, right?**

Yes. And not only regular winter demand, but also extreme scenario, like those 1 in 20 year occurrences. And providing capacities just for very seldom situations is from a commercial point of view often challenging.

**That's why we have capacity mechanisms in Europe – backup power**

**plants, usually gas or coal-fired, are being remunerated for keeping on standby, just in case of a demand peak...**

In a way. We could try and ration peak use via prices, but that might be politically unacceptable and therefore not credible in some countries. We also still lack the technology to manage peak demand most efficiently. And this applies to any part of the energy system, not only for energy generation but also for network capacities or for storage.

**In terms of decarbonisation pathways then, what are the consequences of this? Does it mean a regional approach to heating decarbonisation is the optimal way forward?**

Any pathway will have to include various components, a bit like building blocks.

One component, certainly, will be energy efficiency – that is, reducing the overall heat demand. But you have to be aware that efficiency always comes as a cost as well – it requires investments, not only monetarily, but also in terms of embedded carbon emissions for the implementation of efficiency measures such as improved insulation.

Therefore more efficiency is not always better, but rather there is an optimal level for these efficiency measures, which generates the highest return on investment.

Another main component will be the de-fossilisation of the energy pathways which supply the heating applications. For gas applications, you could think about moving towards low carbon molecules like hydrogen, synthetic methane or biogas.

Continued on Page 12

Continued from Page 11

Similarly on the electricity side, we will have to move towards a system increasingly based on renewable electricity, including solutions to cover peak demand, because in the long term we can't rely on fossil backup generation there.

So it will be a combination of efficiency measures and de-fossilisation of the energy sources. Where the balance lies very much depends on the individual circumstances – what type of building is considered, which geography, how is the relevant energy system designed, what are the relevant social aspects and people's preferences.

As a consequence, we should keep as many technology options available as possible. The challenges in the heating sector are so huge, and we have to de-fossilise the sector so fast, that we cannot afford to have long debates on whether to rule out one or the other technology at the EU level.

We rather need to leave member states and ultimately consumers with all the options so they can work out what the best

**Countries have different heating and cooling infrastructures in place: district heating systems are quite common in former communist countries, Northern European countries like Belgium and the Netherlands have gas, while others like France are more electrified. How can regulators at EU level approach such diversity – are there common features or standards that can apply to all?**

In an ideal world, indeed, a single incentivisation mechanism across

all these technologies could be established, which would allow for a fair technology competition.

Moving parts of the building sector under a second emissions trading scheme (ETS2), like the European Commission has proposed, is a right first step. Currently, we have a distorted playing field, for example because electricity provided for heating falls under the EU emission trading scheme, while natural gas used in heating is not part of a similar system but rather subject to the various national regimes. So unifying the various energy carriers in heating under one single ETS would be an important step forward.

**That is the main argument in favour of the second ETS, I suppose – it would allow us to manage the diversity and the complexity of the heating system, which is distributed across millions of homes...**

Yes, exactly. Because the heating sector is so diverse and complex, we can't rely on central EU decision-making on a technology level – efficient technology choices will likely have to be a balance between individual and local or national considerations.

No central agency will have all the required information about the particular situation in a specific building, its connections to the energy grid, preferences of the occupants, etc. So we have to create a mechanism to coordinate all these decentralised decisions towards a common aim, which is de-fossilisation. And economic incentive structures, like the current ETS, have proven that they can ensure such coordination

of complex heterogeneous systems across sectors.

There are a lot of potential pitfalls with regard to the practicalities and we don't yet know the details how the ETS2 is going to be designed and implemented, but the general idea to incentivise decentralised decision-making, based on an overarching pricing system, is a step in the right direction.

**The downside, of course, is the social aspect: a second ETS for buildings will automatically push up the cost of fossil-based heating fuels for those who can't afford to switch to a clean heating system.**

Indeed, one reason why heating is so important and so difficult to de-fossilise is that it has a huge social component. Access to housing is a basic human right and so we have to be very careful not to let it become a luxury good.

De-fossilisation essentially means switching from quite cheap and at least for the time being abundant fossil fuels to an energy system based on renewable fuels, which will imply additional costs. So everything else equal will make the de-fossilisation of heating more expensive.

Therefore, we have to find ways of mitigating the impact, for instance by applying redistribution mechanisms. I gather this is the intended role of the Commission's proposed Social Climate Fund. Otherwise, we risk to lose the social acceptance of these measures and potentially the social support for the whole climate protection objectives.

Continued on Page 13

Continued from Page 12

***In the European Union, there is an intense debate going on at the moment about the role of gas versus electric solutions like heat pumps in the transition to carbon neutral heating. What is your perspective on this as an economist?***

From an economics perspective, it is important to always consider the whole system when comparing technologies. Energy supply is based on a complex system, which includes energy generation, transport, storage, distribution, and end applications like heating appliances.

Often in discussions, technologies are compared based on single parameters at a certain level in the value chain such as conversion losses, efficiency, energy costs, and so on. And even though all of these parameters are important, they must always be seen in the context of the wider energy system.

For example, electric heat pumps on average have a very high energy efficiency, which can potentially massively contribute to the decarbonisation of the heating sector. But then we do not all live in average houses. More recent buildings are better suited for heat pumps than older less insulated buildings.

Moreover, in many countries like Germany, the electric system hasn't been built to supply heating applications in households. Moving to a higher share of electrification in heating therefore often requires extensions to the power system – we need to build additional network infrastructure, additional storage facilities as well as additional energy generation capacity. And all of

these components come at a cost, monetarily but also with regard to the carbon impact of building these new infrastructures.

So in order to make a fair comparison of various technologies, we also have to take into account where we can rely on existing infrastructure and where new infrastructure would be required. Such a system-wide analysis can lead to results whereby technologies that are physically less efficient because of higher conversion losses might still be more economically beneficial from a system perspective because they can rely on existing infrastructure.

In addition, we have to also consider the time dimension – we have less than three decades to defossilise heating entirely in order to meet our climate goals. We simply don't have the time and resources to build an entirely new infrastructure and should focus on re-using what's already there as much as possible. Otherwise, there is a significant risk that we will simply run out of time and be too late.

***What are the implications of this in terms of peak demand management? Does that mean relying on gas for peak demand, and electricity for baseload?***

That's exactly one of these economic questions, which would need to be answered from a system perspective.

One could for instance envisage a dual fuel or hybrid heating system based on both, electric and gas supply. As an advantage, such hybrid applications might in average circumstances make use of the high

efficiency of electric heat pumps, while in peak situations switch to gas and avoid expensive peak electricity demand.

The costs would nevertheless be also higher, not only because of higher investments in the end application itself but also because of the requirements to maintain two different networks connected to the premise. So while there might be situations where this is an optimal solution, the evaluation has to be done on a case by case basis and always taking into account the system-wide effects and costs.

Let me give another example: In Germany, the future power generation will more or less exclusively come from wind and solar, which means you have to implement a backup technology for dark winter periods. One option will be converting excess renewable electricity into hydrogen, storing it, and reconverting it to power when needed – that is Power-to-Gas and Gas-to-Power as an energy storage solution.

But from a system perspective you can ask: if we have this Power-to-Gas element in the system anyway, wouldn't there be cases where some of this gas could then directly be shipped to the end application and used there and avoid the need to reconvert it to electricity? Our analysis in recent studies showed that such a mixed system, where some of the gas is directly used is more cost-efficient than a system with is based on 100% electrification.

Where the optimum is, that's certainly an economic question that depends on what the costs are, what

Continued on Page 14

Continued from Page 13

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infrastructure is available and which technology options will be developed in the future.

So right now I doubt that we can make decisions, what the optimal solution will be in 10-20 years.

**So you think there will be a case in some places for hydrogen-fuelled boilers?**

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I think that is certainly one of the options we should offer subject to a fair technology competition. We will then see how large the share of this technology will be in the end.

**There are discussions going on at the EU level about mandating new gas boilers to accept a 20% blend of hydrogen and some even argue for boilers to be 100% hydrogen-ready. Would that make sense in your view? I mean, some people compare green hydrogen to champagne because it is so scarce and expensive. So would that make sense economically?**

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The champagne discussion – is hydrogen a premium fuel that should only be used in premium energy applications – is at the end of the day only a question of supply and demand.

I honestly find this debate quite strange – I think it's the first time in history that we try to develop a new technology by particularly debating about where it should not go.

The hydrogen economy is at an infancy stage. It would be a shame to start this sector based on the assumption from the outset that it's going to be a luxury product in the long run. Ideally, we will be able to make hydrogen ubiquitous and more like table water to everybody.

If it turns out to be scarce and more like champagne, then certainly it wouldn't go to low-value applications, and some heating applications might be among them – but we should let markets decide this taking into account all system-wide effects.

If we really want to push the development of a hydrogen economy, additional demand seems to be helpful to incentivise investments in production and infrastructure from which ultimately the whole energy sector will benefit.

Our analysis shows that heating applications can form a valuable part of the future hydrogen demand and thereby might help to accelerate the build-up of this new sector.

**Do you believe a ban on fossil gas boilers would make sense?**

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First of all, these bans on technologies like boilers, or combustion engines, always puzzle me. Because ultimately it's not the end application that creates a problem, it's the fuel type.

A gas boiler, if it's run on biogas or synthetic methane, doesn't create the same negative climate impact as its fossil counterpart. So, from a climate protection perspective there is no reason to ban it. We have to take much more of a lifecycle view in these decisions: the installation of new boiler always come with a cost and additional emissions.

And in this regard, replacing workable end applications just because they don't fit new building standards creates carbon emissions in itself because new heating appliances have to be manufactured, transported

and installed.

So in my view, there is no need to ban any end application. If we want to de-fossilise the sector, we have to tackle the fuel and the fuel consumption. For me, pricing mechanisms and price signals based on scarcity are better instruments.

Because, with a hard ban, there will always be cases where consumers don't really have any alternative right now. And for those consumers, the ban will come at a disproportionate cost to their budget, which might allow for much more greenhouse gas savings when invested in other areas.

**Most people in the industry seem to agree that electric heat pumps will eventually form the backbone of the future heating system in Europe. Yet, the proportion of installed heat pumps in Europe is still tiny compared to fossil fuel solutions and the price is still extremely high compared to fossil fuel applications. How can regulators at the EU level accelerate the switch?**

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I'm not an engineer but my understanding is that heat pumps, in order to be most efficient, require an adjustment to the building in itself – with regards to insulation, temperature deltas, etc.

So, in this regard, the pickup rate of heat pumps might not particularly be constrained by the exchange of the heater itself, but rather the availability or the renovation of buildings, which would allow for an efficient application.

**You mean an electric heat pump would not work efficiently in a building that is not well insulated?**

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Continued on Page 15

Continued from Page 14

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The heating efficiency of heat pumps deteriorates a lot when there is a high temperature delta. For instance, the efficiency of air-water heat pumps is significantly below average during cold winter days, particularly if the insulation standard of the building does not allow for low flow temperature in the heating system.

The efficiency therefore depends a lot on the individual circumstances, which means the choice of the end application is best made by the people on the ground, in a decentralised manner. And the best incentive for decentralised decision-making is a fair and technology neutral standard.

As I already said, a common carbon pricing system like the ETS would be a good first step to encourage this.

***Heat pumps are currently much more expensive than gas boilers. Do you expect the price difference to narrow at some point? When could price parity happen in your view and what would be the drivers to make this happen?***

For a cost comparison of heating technologies, again we have to take a systemic view, and therefore not only

have to look at the costs for the end applications like heat pumps. We also need to look at the associated costs in the wider energy system to reliably provide renewable energy to the end application. So: what's the price of bringing renewable electricity to the heat pump, taking into account networks and generation, and what's the price of bringing renewable hydrogen to the boiler, taking into account the system-wide effects as well.

We have shown in various studies that there are situations where the hydrogen boiler doesn't perform worse than the electric heat pump. And others where the heat pump might have significant benefits, for instance in new buildings with high insulation.

But many of the relevant factors for such a meaningful comparison are still quite uncertain.

For instance, one important aspect for the system-cost analysis is the degree to which Europe will in the long run be dependent on imported renewable energy. It's foreseeable that we won't be 100% self-sufficient in terms of renewable energy supply and will therefore have to import some of it

from abroad.

Very likely a lot of these imports will come in the form of molecules, for example, hydrogen. In such a situation, the system-wide cost of running a heating system on hydrogen might be lower than in a situation where all of the hydrogen would be produced domestically, based on scarce European wind power for example.

Therefore it is hard to make any final judgment today about what the optimum technology mix will be in the long run. This is the reason why it's so important to be as technology-neutral as possible and keep options open.

There will be situations where hydrogen will be the most efficient solution, and there will be other circumstances where the electric heating system and the heat pump will be the much better performing option. But it's close to impossible to make a reliable central decision about this, we should therefore leave these decision to the individual stakeholders and rather focus on establishing an unbiased incentive regime which allows for a fair technology competition.

# EU confronted with lack of skilled labour to support building renovation wave

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By Kira Taylor | EURACTIV.com



Construction workers need to have better working conditions and fairer contracts to make the sector more attractive, according to the European Federation of Building and Woodworkers. [CoolKengzz / Shutterstock]

The EU's push to improve energy efficiency in buildings and reduce the amount of fossil fuel they consume could create more than 160,000 jobs in the energy and heating sector by 2030, according to the European Commission.

But there are fears that labour and skills shortages in Europe's construction sector, caused by an ageing workforce and unattractive employment conditions, will mean there are not enough people to take up the jobs vital to renovating buildings in line with Europe's climate ambition.

"The transformation towards a climate-neutral building stock will only be possible if existing jobs are transformed to include green and circular skills and if new job profiles emerge, such as specialists in deep building renovation, installers for advanced technological solutions, or Building Information Modelling managers," [according to the European Commission](#).

However, in its 2020 renovation wave strategy, the EU executive states that "already before the

COVID-19 crisis, there was a shortage of qualified workers to carry out sustainable building renovation and modernisation".

These warnings are echoed by the industry. "In all countries, we hear about serious shortages in construction," says Tom Deleu, the secretary general of the European Federation of Building and Woodworkers.

"We have an ageing workforce in many countries. This is mainly because we have seen that there's not



Continued from Page 16

enough inflow of young workers and, even when young workers enter the industry, they don't stay for long," he told EURACTIV.

For instance, in Germany in 2015, over 43% of business owners in the heating sector were older than 50. Meanwhile, the number of trainees across skilled trade sectors has been shrinking, with just 361,000 in 2015 compared to 630,000 in 1997.

The main issue for the construction industry is that it has adopted a business model focused on cheaper and precarious labour instead of training and good working conditions, which makes it less attractive for workers, said Deleu.

"This is a huge challenge in our view when you want to deliver the Green Deal and the renovation wave because this demands skilled workers, and they are lacking. So the industry needs to really pick up on this, to upskill, reskill workers and attract a lot of new workers," he told EURACTIV.

One solution he suggested was to make fair working conditions a requirement for governments and companies to receive public funds.

Public money from the EU recovery fund and other programmes is a key driver for building renovation, so including conditions like direct employment rather than subcontracting could help prevent exploitation in the sector.

## RESKILLING FOR A NEW AGE OF CONSTRUCTION

More training and reskilling of workers is also needed, particularly because the renovation wave and Green Deal require a new way of building with new materials and technology, said Deleu.

It is difficult to quantify exactly how much reskilling is needed across Europe, but Deleu estimates that 5% of Europe's workforce will need to be retrained every year – meaning a quarter of the workforce needs to be retrained over the next five years.

Reskilling is essential to creating a green building stock. [According to the European Commission](#), the design, installation and operation of circular and low-carbon solutions often require a high level of technical knowledge.

Installing heat pumps for example requires specific certification. [In France, 25% of installers have that qualification, while in Germany it is only 10%.](#)

"A priority is to upskill and increase the total number of installers if we want to at least double energy renovations across Europe," said Alix Chambris, vice president for global public affairs and sustainability at Viessmann, the German manufacturer of heating appliances.

"This is the reality check of climate goals. We need a European-wide offensive to upskill, attract and enable installers to work with new technologies at unprecedented scale and speed," Chambris said.

The revision of the energy performance of buildings directive, due to be published today (15 December), is likely to include measures aimed at reskilling workers. EU countries would need to address "the gaps in capacities, skills and education in the construction sector and energy efficiency sector," according to draft EU plans.

EU countries need to provide clear links between their plans for renovation and training in the

relevant sectors, said Seán Kelly, the centre-right Irish MEP responsible for the European Parliament's report on the energy performance of buildings directive.

"Having a qualified building workforce is essential to ensure the high levels of quality required for moving towards a decarbonised building sector and to accelerate the rate of building renovation in Europe," he told EURACTIV.

"The European construction sector faces unprecedented challenges to achieve ambitious energy-efficiency objectives, which can only be met if successful training initiatives and supporting policy instruments are put in place," he added.

The revision of the energy performance of buildings legislation should also create more harmonisation across Europe, Green lawmaker Ciarán Cuffe told EURACTIV.

"A common energy rating system across Europe could help. This might also allow for the greater mobility of workers," he said.

Every member state also needs to invest heavily in upskilling construction workers, he added.

"There's an entire workforce of gas engineers who have to learn new skills to install and service heat pumps. There's a set of skills in constructing well-sealed buildings and ensuring that they are adequately ventilated," he added.

"None of these skills are completely new to those who've worked in construction for many years, but it does require continued skills development to stay on top of the latest technologies."

PROMOTED CONTENT

*DISCLAIMER: All opinions in this column reflect the views of the author(s), not of EURACTIV Media network.*

# Seizing the opportunity: three foundations for a smart and affordable building decarbonization

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*By Maximilian Viessmann | Viessmann*



[Viessmann]

**T**he conclusions of COP26 are clear: we have to speed up to keep the 1.5°C targets within reach. That is a priority of the new German government, the guiding principle for the EU Green Deal, and also for my company: Viessmann has aligned its strategy and operations to meet science-based targets in line with the 1.5°C scenario.

*Maximilian Viessmann is the CEO of Viessmann Group*

I am convinced that the decarbonization of buildings is a

unique opportunity to reconcile climate actions with economic growth and improved quality of life: zero emissions, improved health and lower energy bills – an enticing triple win!

We will master this radical transition smartly and affordably with three foundations.

### **AMBITIOUS AND SMOOTH BUILDING RENOVATION**

Reducing emissions from buildings by 60% is a cornerstone of the Fit for 55 package. This task seems

monumental. The key is heating, as it accounts for 80% of energy use in buildings. I am positive that we can live up to the challenge without disrupting people's lives and acceptance.

The technologies are available: heat pumps, heat pump/gas boiler hybrids, solar thermal, and many more. When rolling out new renewable technologies, we have to ensure that they are sustainable. For heat pumps that means for example counting on environmentally friendly and natural refrigerants.

Continued on Page 19

Continued from Page 18

Subsidiarity cannot be overestimated. Member States need leeway to tune buildings renovation roadmaps to their specific needs. Flexibility is required to optimize the mix of reducing heating energy needs by insulation, and providing decarbonised heat with the range of technologies that fit energy infrastructures and energy carriers best. One-size-fits all sunset clauses for certain energy carriers are not useful in my view – and not needed, because the phase-out pathway can be steered by emission trading.

Different building types need different solutions: producing and integrating on-site PV is often rather straightforward for a single family home, but often more difficult for multi-family houses without access to a district heating grid. In short: we have to ensure that EU legislation allows for sufficient flexibility across Europe, when setting out top-down targets such as for zero emission buildings.

### **MUTUALLY REINFORCING ENERGY INFRASTRUCTURES**

Seasonality of heating poses a unique challenge for embedding the sector into an optimized overall energy system. The best solution is: mutually reinforcing energy infrastructures that deliver green electrons and green molecules to a diverse fleet of heat generators.

Being a member of both the European Clean Hydrogen Alliance and the German Hydrogen Council, I am aware that the need for molecules is controversial. But the benefit is intuitive: securing adequate electricity supply at all times is very tough, when shutting down firm generation while

electrifying heating and transport. Because heating demand during winter increases by a factor 3.

For illustration, for Germany it means: heat pumps become the backbone of heating. Yet every batch of 5 million heat pumps adds 12-45 GW load to the electricity grid, a recent [study](#) found. The roll out of heat pumps works best if supported by green molecules, as they deliver “stored” green energy via existing gas networks when the energy system needs it most.

The combination electrons plus molecules reduces overall system costs and energy prices for households and businesses. In short, to my opinion, the real question is not if we will have green gases in heating by 2050 but how much.

Transitioning buildings into the digital age: Smart buildings are a prerequisite for efficient energy management in a decentralised and decarbonised system. Fit for 55 provides a window of opportunity to equip buildings with smart control features at scale. This will increase energy efficiency, save time and resources in the maintenance of heating systems, make a real contribution to congestion management and more importantly: increase comfort of living tangibly.

### **A CONSISTENT AND JUST FRAMEWORK**

Predictable regulation and financing: households need affordable heating, manufacturers need certainty for billions of investments into new digital concepts and production capacities, installers need time to adapt to new technologies. To cope, we need predictable and supportive frameworks, short-lived stop-and-

go measures undermine investment certainty.

Launch a skills initiative: Fit for 55 has the potential to create more than 1 million jobs in the next decade. And yet, we are facing a dramatic labour shortage that risks derailing our ambitions. In Germany, for illustration, one third of the installers are above 50 years old, yet the number of apprentices has dropped by 40% in the last 25 years. We must attract young talent and women and support the workforce – our most important asset – by providing the right training opportunities.

Social justice: the building transition is social at heart. Ambitious decarbonization targets – while urgently needed – ask a lot from citizens that are faced with rising energy prices and the costs of energy renovation. The financing of the high upfront investments has to be secured also for those who are not well-off. It is remarkable that the Fit for 55 proposals have already created a solid foundation to balance climate ambition and affordability in a framework with a clear vision towards 2050.

On Wednesday, 15 December, Vice-President Timmermans described the task at hand as an enormous opportunity. I couldn't agree more. The building transition will pay itself back not only in reduced emissions and lower energy costs but in improved quality of life. Let's seize this opportunity together!



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