

# How to Upscale Deep Renovations using Financial Mechanisms: Insight from Best Practice Jurisdictions on Incentives and Drivers

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**Sean** Hello everyone. I’m Sean Esterly with the National Renewable Energy Laboratory, and welcome to today’s webinar, which is being hosted by the Clean Energy Solutions Center in partnership with the Global Performance Building Network. Today’s webinar is focused on how to upscale deep renovations using financial mechanisms: insight from best practice jurisdictions on incentives and drivers.

One important note of mention before we begin our presentations is that The Clean Energy Solutions Center does not endorse or recommend specific products or services. Information provided in this webinar is featured in the Solutions Center’s resource library as one of many best practices resources reviewed and selected by technical experts.

I just want to go over some of the audio and webinar features; you do have two options for audio. You may either listen through your computer or over your telephone. If you do choose to listen through your computer,

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please go to the speakers option in the audio pane and if you choose to dial in by phone please select the telephone option in the audio pane and a box on the right side will display the telephone number and audio PIN that you should use to dial in. And panelists, just a reminder we ask that you please mute your audio device any time you are not presenting. If anyone is having technical difficulties with the webinar, you may contact the GoToWebinar's Help Desk at the number displayed at the bottom of the slide. That number is 888.259.3826.

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Today's webinar agenda is centered around the presentations from our guest panelists Sophie Shnapp, Rod Janssen, Adrien Bullier and Robert Sahadi. Hopefully Adrien can join us. He's having some technical difficulties. We certainly hope to see him on the line shortly.

**Heather**

Sean we have Adrien now. Sorry to interrupt.

**Sean**

Oh, very good. These panelists have been kind enough to join us to ask the critical question of how financing schemes develop to support and leverage the large investments needed to "go deep" in renovations. Two leading regions, the European Union and the United States, have been invited to present their innovative methods of using finance as a way to upscale deep renovations.

Before our speakers begin their presentations I will provide a short informative overview of the Clean Energy Solutions Center Initiative. Then, following the presentations, we will have our Question and Answer session moderated by energy efficient expert Rod Janssen, followed by some closing remarks and then a brief survey.

This slide provides a bit of background in terms of how the Solutions Center came to be formed. The Solutions Center is one of 13 initiatives of the Clean Energy Ministerial that was launched in April of 2011 and is primarily led by Australia, the United States, and other CEM partners. Some outcomes of this unique initiative include support of developing countries and emerging economies through enhancement of resources on policies relating to energy access, no-cost expert policy assistance, and

peer to peer learning and training tools, such as the webinar you are now attending today.

There are four primary goals for the Solutions Center. The first goal is to serve as a clearinghouse of clean energy policy resources. Second goal is to share policy best practices, data, and analysis tools specific to clean energy policies and programs. The third is to deliver dynamic services that enable expert assistance, learning, and peer to peer sharing of experiences. Lastly, the Center fosters dialogue on emerging policy issues and innovation around the globe.

Our primary audience is energy policy makers and analysts from governments and technical organizations in all countries, but we also strive to engage with the private sector, NGOs, and civil society.

One of the marquee features that the Solutions Center provides is the no-cost expert policy assistance known as “Ask-an-Expert.” The Ask an Expert program has established a broad team of over 30 experts from around the globe who are available to provide remote policy advice and analysis to all countries at no cost to you. For example, in the area of Buildings we are very pleased to have Cesar Trevino, Leader of the Mexico Green Building Council, serving as one of our experts. If you have a need for policy assistance in Buildings or any other clean energy sector, we encourage you to use this valuable service. Again, the assistance is provided free of charge. To find out if the Ask-an-Expert service can benefit your work please contact me directly at [sean.esterly@nrel.gov](mailto:sean.esterly@nrel.gov) or at 303-384-7436. We also invite you to spread the word about this service to those in your networks and organizations.

In summary, we just encourage you to explore and take advantage of the Solutions Center resources and services including the expert policy assistance, the database of clean energy policy resources, subscribe to the our newsletter, and participate in webinars like this one.

Now, I'd like to provide brief introductions for today's panelists.

The first speaker today is Sophie Schnapp. Sophie is a Policy Analyst with the Global Research team at the Global Buildings Performance Network.

Then helping to moderate the question answer session today is Rod Janssen. Rod is an Independent Energy Consultant and editor of the blog “Energy in Demand.”

Following Sophie today for presentations, we will hear from Adrien Bullier. Adrien works at the European Commission on the Intelligent Energy Europe and Horizon 2020 Energy Efficiency Programmes on financing for energy efficiency and renewables, notably in buildings. Adrien will be providing the European region perspective today.

And our final presenter today is Robert Sahadi. Robert is the Director Energy Efficiency Finance Policy at the Institute for Market Transformation where he leads IMT's work to develop and expand energy efficiency financing solutions for homes and commercial buildings. Robert will be providing the U.S. perspective in today's webinar.

So now with those brief introductions I would like to hand things over to Sophie. Sophie, just a reminder to...

## Sophie

I'm here I think. Hello there. Thank you very much for being here today for our fourth and final webinar of the series. I know some of you have woken up very early and some of you have stayed up late. It's a great honor to have you all on board. I'm going to talk to you about a very hot and pressing topic, that is how can we finance energy renovations and this is going to take insight from best practice jurisdictions on incentives and drivers. Thanks, next slide please.

Our policy on this at the Global Building Performance Network and here we conduct global research, but have also got a regional presence. We work in the USA and Europe and China and India and are now working more and more in Southeast Asia. Next slide please.

So we have an overall real strategy and goal at the GBPN. This is really to follow a scenario by which buildings will reduce their energy by 30% globally by 2050. This is a huge challenge but we feel that with the support of like-minded experts we can get there. Next slide please.

Just to give you a bit of background on why we are hosting this webinar series, basically we, over the past three years, have been undertaking a series of research on deep renovations basically with the end goal to upscale deeper renovations. We've gone over a series of different reports. Initially we looked at what a deep renovation is and we tried to define this and harmonize this definition across the ocean. We then looked at developing a set of state of the art criteria for an energy renovation policy package and have looked at 12 different best practice policy packages in the US and the EU. We have then produced material to make an attractive policy tool online where you can play with different aspects of the tool and see the different criteria that we have developed. Okay, so next slide please.

So this webinar series sets up to explain how countries have practically implemented best practices, what challenges and opportunities they have faced, the key lessons learned, and some key success drivers that have enabled countries to upscale and go deep with renovations. We have invited you to listen to this because we'd like to know how these can be transferred to different regions around the world. Next slide please.

As I mentioned before, this is the fourth and final webinar of the series and I really hope you get some useful information and insight out of it. Thank you very much and I will pass you over.

**Sean**

Okay, we are turning things over to Adrien now.

**Adrien**

Alright, let's see if this is working. Okay, I'm going to try to fill my screen. Is that working right?

**Sean**

Very good. We can see it.

**Adrien**

Great! It's been quite a struggle so I'm happy about that. Hi everybody. My name is Adrien Bullier. I work with the European Commission on two programs, one replacing the other, so Intelligent Energy Europe and Horizon 2020 on specifically financing and energy efficiency, renewables, and buildings is a large part of what we try to address. I'm not going to go into the details of the European policy because I wasn't allocated that much time but you probably know that we have an objective of 20% energy savings by 2020 and we've just agreed on new objectives of 27% by 2030 and basically buildings are a large part of what we are trying to address and energy efficiency because that is where a large potential is. I'm not going to make the whole argument also on why deep renovation and what deep renovation should be but I will try to go directly on the issues that are linked with financing for deep renovation, which are quite large.

Basically when we look at project developer side of the building sector we are working with, for example, we've launched the Covenant of Mayors, which is a financial agreement with mayors from Europe and all over the world with more than 6,000 signatories now. And they are saying basically that we are planning to retrofit a lot of buildings to meet the 2020 targets of the EU, meaning they all agreed we'd get to 20% energy efficiency on at least our own emissions and get to 20% renewables in their territory. They're all saying we have tons of projects but we're looking for the money. Then when we talk with the financial sector we've got people that tell us, well, money's not so much of a problem. We've got actually a lot of money that we'd be happy to spend on energy efficiency but where are the projects? That's a key issue that we're trying to address. Usually by saying, we need to have some innovative financing schemes that would address that. We need to use ESCOs and so on. Truth is rarely pure and never simple. The issue that we see here is that we have a cultural gap. It's really a misunderstanding because when we are talking about a project we're not talking about the same thing on both sides. Basically on a project, developer side, it's something that is a technical approach. It's tailored to fit the needs of the building to get to as much savings as you can do using state of the art technology. Most of the time you'll talk about energy payback times and that's where it stops. When you say no financing, usually that would mean subsidy. On the other side of the fence when we're talking about an investment project in the financial

sector, technically it's a black box. It doesn't really matter. What matters is you want to look at the cash flows. You want internal rate of return. You want to look at your return on equity. You want to look also if there are risks on that and what the transaction costs are and if there is standardized product that I could sell again when I need, so it is liquid, and so on. What we are facing here is a cultural gap and what we're trying to address and what we think is needed to address and that's what we're trying to do with public funding are several things. The money that we have available is split into several parts. We have first two big pots of money that are national funding from our member states and then money from the European level called the EU structural and investment funds. We're increasingly trying to use that money to really address the issues of the financial sector. We're trying to do that with dedicated credit lines, usually soft loans lowering the interest rate. We're trying to do that with risk sharing schemes, so providing guarantees for energy efficiency investment and in a number of cases providing equity in energy efficiency investment schemes. On the other side, so looking at the project developer side, we're putting our money in a program that we're working on. We're putting money in project development assistance, so trying to build a pipeline of projects that would be bankable for the financial sector. We're putting money also in facilitation of the energy performance contract market and in the setting up of local financial schemes. The idea of addressing both sectors is to flatten out the... basically so far we're trying to match squares and circles. The idea of addressing the financial sector on the one hand and the project developer side on the other hand is to try to have something that can match in the future. Along with that we think that we need to organize a number of activities that with liaison between both sectors that would allow to benchmark investment that would allow to raise the awareness of investors. We think there is a great deal to be done on that. That would basically organize dialogue at the national level to double up roadmaps and identify what is needed to evolve and overall capacity building on both sides. Financial sector needs to understand better what energy efficiency is and the project developers need to understand better how the financial sector works. That is what we are trying to do mostly with Intelligent Energy Europe and Horizon 2020.

Now more specifically turning to deep renovation, I think technically it is a challenge. However, it is being overcome in increasing number of countries. Taking the example of France, we now have 100,000 dwellings, 580,000 square meters of commercial buildings are either labeled or just reaching the target of a low energy retrofit standard, which I would consider as a deep renovation so it is becoming a reality. But when we talk about finance, banks and investors don't look at energy savings as a credible business. One of the key issues is we don't have a track record, is what they say, and that leads to higher cost of capital because you cannot assess the risk. So either you give a higher cost of capital to hedge the risk or you have strong requirements on the balance sheet of the building owner. Problem being that in a lot of cases, especially looking at the

housing sector in Western Europe, homeowners are rather highly indebted and they are not able to take on much more debt. You also have, from the financial sector side, the consideration that all those investments are not standardized. They will always be different from one project, from one building to another, and that entails high transaction costs.

Another issues, and that is looking from the building owner's side, looking at the long-term payback. Now most people would say that a deep renovation in Western Europe would easily have a payback time of 20 years. It could be lower in some parts of Eastern Europe with colder climates and rather high, low labor costs, but still we are looking at somewhere between 15 and 30 years. However, it seems to be an issue mostly when you look at energy savings because nobody asks about the payback time of their new bathroom or kitchen. Now what I am trying to say is the more we will be able to integrate into the calculations the green value of the building, that is also generated by the improvement in comfort, the improvement in health, the productivity of staff, and so on, the more we will be able to overcome this issue of the long-term payback. I'm not going to deal with that issue but I would highly recommend to look at the latest publications of the International Energy Agency, for example, dealing with this.

Financing deep renovation, I think, will need to develop financial models that really make the best use of public money, which you know is pretty scarce at the moment, to leverage in the private finance as opposed to the current practice where mostly deep renovation is financed by grants. Another thing that we need to have is models that will overcome the aversion to debt with the owners and that is that aversions is linked to issues and their balance sheets, especially for corporations. The time horizon of detention, because you might not want to own a building for 20 years, in many cases there is incentive between the tenant and the landlord. What I am going to try to show in the time that allocated to me is I think we need to combine different pieces of the puzzle that we already have with vision on deep renovation with the willingness to make deep renovation. We need to combine public support on the supply of finance, so to lead through soft loans and guarantee schemes. With public support drives the demand of energy efficiency in investments and buildings and that means project development assistance, support to the aggregation and standardization of small investments and in the middle between demand and supply of finance is where we need to develop innovative financing schemes that would bridge the gap. Here we develop three examples which are energy performance contracting, on-bill finance, and on-tax finance.

For the first one I would present is energy performance contracting in the US. In the EU we simply tend to call that EPC, which is a pretty well known mechanism. This is the normal financial flows of a retrofit project. What happens in EPC is you have an energy service company that comes in and invests directly. That is what I'd call third party investment. They

provide the finance itself or they facilitate access to finance, meaning it would be the building owner taking on usually a load. What happens then is the ESCO does the works and once you start saving energy, a large majority part of this savings are taken by the ESCO to repay the upfront investment. At the end of the contract cost savings are for the building owners. That's a very nice picture but for deep renovation it's actually more complicated. How do we use that for energy, for deep renovation, where you have a payback time of 20 years or more? Well the first thing you can do is extend the contract duration to allow payback of deep renovation. The second lever is you could also have an extra contribution from the building owner or from the tenant, who knows, linked to grants or to the green value of the building. The third value that we have is to lower the cost of capital to reduce the contract duration because contract duration is very much linked to the interest rate that the ESCO or the building owner would pay.

Having said this, I think there are many limits to EPC. The first limit, I mean, we generally had confusing on the market actors. When we talk about ESCOs, at least in Europe, it doesn't necessarily mean Energy Performance Contracting. EPC is usually seen to focus on low hanging fruit. That is in many cases linked to the client's demand rather than the ESCOs demand but it is also because traditional energy service companies have been focused on heating and ventilation and air conditioning, whereas in deep retrofits most of the investments, so the key players, would rather be construction companies rather than those that label themselves as ESCOs. So, EPC project retrofit is not necessarily carried out by people who call themselves ESCOs. Another issue that we see with energy performance contracting is the fact that procurement is much more complicated. Basically procuring an EPC from buyers is rather easy and straight forward but when you start talking about the building envelope it is terra incognita. Nobody really knows really, in most buildings, what's in the wall for example because the plans have been lost. It's been refurbished 15 years ago. Nobody's left and so that was there at the time and so on. You also have much stronger interactions with safety regulations. You can get fire hazard, user interaction, natural light, maintenance in housing; it's much different than changing the HVAC equipment. Procurement therefore becomes more complicated and if you want to do things right in many cases a competitive dialogue would be the most adapted procedure but it's much heavier on the client side and also on the bidder's side. That's also an issue.

Then we have a bunch of financial issues coming back to back. Basically the energy savings would probably not repay all of the costs of the retrofit in the contract duration. You could argue, is that really a problem though because you could also say that it's contributing to repaying part of the cost and the rest would be repaid anyway. If you do refurbishment of your building you would normally have to repay anyway.



High transaction costs for EPC linked procurement and also to the implementation of measurement and verification lead to a focus on large buildings. We also have basically, because you have a guarantee on the savings may be a very nice thing for the client but it comes at a cost because you have a risk with the ESCO but it means that they charge that risk. Another issue is that many physical incentives are targeted on buildings and owners but not accessible to ESCOs. The last point that I would like to highlight is off balance sheet accounting depends very much on the member states in Europe and also if the nature of the measures that are implemented. Last thing, the one thing I've learned in the building sector is there is no good contract without a good client and to sign an energy performance contract with a private partner; you need to be a pretty good client. So we need to assist the building owners here.

How do we do that? How do we support the development of the EPC market? Well, if you've got a building owner that doesn't know anything about performance contracting those number of steps that they need to go through, which are audits, performance requirements, specifications of what they want and don't want, they need to know what the legal framework is—whether it be a contract and so on, and they need to procure. What we are trying to do with what we call market facilitation is basically assist building owners. Market facilitation is a concept that has been developed by the IES, by the IES task force on competitive energy services. You can look at that if you want to know more.

Another thing that we are trying to do to basically help level the risk and reduce transaction costs is pool different buildings together. Instead of doing one building at a time, you would do ten of them in order to have a higher investment and reduce transaction costs. An additional way to do this is to bundle together different building owners, which is more complicated but still increasing the amount of the investment and reducing the transaction costs.

Still looking at energy performance contracting, one of the things we see emerging right now—actually in France—is third party investment operators. It is based on the fact that deep renovation EPC is not happening because we have lack of demand or building owners are not capable of setting up a deep renovation EPC and also because the private sector has a low appetite for financing long-term EPCs. They are happy to take on a contract, which is design, build, and operate for 20 years but financing for 20 years in the current context of developing the private sector is not very well seen. That's why you've got a number of regions in France that are creating public operators that would be acting as third party investors and they would double up projects. They would provide the financing for deep renovation through energy performance contracting and then outsource the management of the EPCs to basically private construction companies and ESCOs.

There are two examples that I will show here quickly. The first one is in the Isle de France region, so Paris region, where they've developed an operator for condominiums with equity from the region and a bit from the private sector. It's basically acting as a third party, as a trusted third party, for condominiums. So doing the audits and technical specifications for deep renovation they are aiming at 50-80% savings. They'll do the financial engineering for each household and then they will work as the EPC provider. Basically what they do is lead a consortium and they actually sub-contract the works—the engineering, the works and the maintenance through the private sector. They keep their role to the financing. This is a scheme that is expected to deliver about 100 million euros in the next three years basically.

How does this work concretely? Basically they are working with a number of local facilitators so energy agencies, associations working with condominiums, that would provide them with projects where people are already ready to go into renovation projects. Then they will have a first phase of the contract where they do design of the measures and design the financing plan. Once that is delineated by a general assembly of homeowners they would implement the contract and that could be through an EPC, so basically guaranteed savings with third party investment or not and that would depend on cases and on each homeowners needs or it could be based on operation and maintenance contracts with shared savings. As I was saying, they would basically sub-contract most of the activities in the contracts and in financial terms the money...they would act as an aggregator of money so that they are basically gathering money from the grants and the tax incentives that are available for homeowners, they would not get them themselves but the homeowners would. Also, usually homeowners can have soft loans in a number of cases and they would complement that with their own money that would be repaid through the energy savings—the money coming from their equity and long-term loans with the idea that they are able, due to the scale, to better negotiate low interest rates. Potentially they could use some structural funds money but I'm not going to get into details here.

The other scheme that I'd like to present is in Rhone Alps, which is France again. Here they are developing an in-house ESCO to do deep retrofit of public buildings. It is basically a public local company that does a leasing contract with the local authority. It is completely on the balance sheet of the local authority. Then they will...they are subcontracting the operational part of the EPC to the private sector. It is basically a back-to-back contract of the operational part of the EPC but they are providing the finance due to the fact that they are better able to set up the contract and provide the financing. They are targeting deep renovation again. Once again, the reason for these schemes to exist is deep renovation. It is interesting that in both schemes they are planning to cover the reimbursement of investments to 50% of the savings but not much more. Here they would basically refinance themselves through forfeiting. That

means that they would assign the claim to the local authority directly. They're working on a business plan of 50 million Euros in the next two years now. This is not updated yet but they have already four contracts just starting now.

Apart from energy performance contracting we have also solutions that deal with disconnecting debt from the building owner. The idea behind this is you can actually attach the debt to the building, not to the owner. So there are two key models here.

**Sean**

Hi Adrien, sorry to interrupt. We are going a little over time. Do you think you could wrap up so we can move on to the next presentation in the next minute or two?

**Adrien**

Yeah, if you give me two minutes then I'll finish debt. So basically we've got models that are used to attach the investment to the building, either to the meter or the property. One of them is being rolled out in the UK, the other one in the US. The key point that I wanted to make here is they are not targeted on deep renovations but they could perfectly be used to implement deep renovations if that is the ambition of the scheme from the start, which for example what another region in France is trying to do now, is to use a sort of base scheme to achieve deep renovation and their target here is 1,000 homes over the next two years.

I had an overview of what we can do with finance with building renovation but I'll skip that. A key point that I wanted to make is that we need to achieve large scale and we need to achieve standardization. That is why one of our focuses at the moment is on project development assistance, so creating a large pipeline of projects because that's the only way to solve the chicken and egg issue that I was referring to in the introduction.

Last point and I will finish here. We are creating in Europe an energy efficient renovation scheme. They are around and they will be increasingly around. We are trying to use more and more of the EU money to invest, particularly in the deep renovation of buildings. We're also working with the energy efficiency financial institutions group. We published a report in April of this year and we are working on a final report on buildings and industry. It should be published in the coming three months. A lot of the learning is what I am presenting today, also the need for standardization and the need to use public money. I will stop it here. Sorry if I was a bit too long but I am happy to take more questions.

**Sean**

Great, thank you Adrien and at this point we will move on to Bob Sahadi's presentation.

Good morning. I'm going to give a perspective on what is happening in the US and in the residential markets. Basically a lot has been happening, particularly in the last year. Most of you realize that the US housing and financial markets were in a state of disarray for the 5 or 6 years prior to this year. Now that, hopefully, is largely behind us and people are starting to focus more on the financial opportunities and energy efficiency. But these are just some of the first early steps. There are certainly much more to go. Also, benchmarking codes, housing policy, consumer demand, technology—all of these things are pushing forward the demand for residential property improvements or certainly buying new homes that have energy efficiency features. We are taking a two-pronged approach, which is let's utilize the financial instruments that already exist in the US that are very strong. We have very large mortgage markets for both single and multifamily that are mostly federal government oriented. In the multifamily space we also have banks, insurance companies, real estate investment trusts and others that are financing real estate development and improvement.

On the single-family side a lot is happening in just the unsecured space. There was a statewide effort out of Pennsylvania that moved into a few other states called WHEEL. It provides \$15,000 residential improvement loans for retrofit for existing homes. They had problems initially because there was a seed capital on the states and that seed capital had pretty much subscribed to and so they could not leverage their fund anymore. Finally this year, because of the success of the products there and their good loan performance they've been able to get a hundred million dollars for secondary market investment offerings. So that program seems to be on its way.

The federal government through the Federal Housing Administration developed something called Power Saver Loans, which provides up to \$25,000 for retrofits of existing homes—under \$15,000 it's unsecured, over 15 it's secured. The program has probably suffered in that many of the lenders in the US, some mortgage system, are not enthused because they are smaller loans. They take additional work but there has been some success in some markets.

Probably the big goal that we're working on is here is this multi-trillion dollar US housing market that's largely controlled by the Federal Government through the FHA through organizations like Fannie Mae and Freddie Mac, which many of you have probably heard of, to get them to include this in their underwriting standards. We've done a lot of work in this respect. Their first statement when you approach them on this is this is more of a liberalization of underwriting and this is what got us into the trouble a few years ago. We commissioned a study with the University of North Carolina, which is very well respected in these areas, and came out that default risk for homes that were energy rated over the last 10 years were 32% lower, which is highly significant. So this is what got us in the

door in terms of incorporating energy efficiency into the underwriting process.

There have been these small programs of energy efficient mortgages that will finance cost effective energy improvements but these have been very clumsy. We're trying to streamline them. We're trying to disseminate that information out to lenders, as there is a greater demand for them at this point.

Probably what is needed in the US is a legislative push. There is something called the SAVE act, which has been kicking around the US Congress. For those of you outside of the US you may have noticed that our Congress has been stalemated along political lines. The SAVE Act is incorporated in a larger energy efficiency bill that has a very high level of bi-partisan support so there is an expectation that this could be approved early next year. This would just mandate that energy efficiency be included in all single family underwriting within the US. This would do two things. It would provide additional value for those cost effective savings in a home. People could get extra value or extra proceeds to be able to do those improvements. Then, so as the borrower not to be penalized because the borrower may be taking on an additional \$75 a month or \$100 a month, whatever the number is to finance the improvements. This then moves up their monthly debt, which then is a negative in terms of them qualifying for the mortgage, whereas the SAVE Act would say that you factor in the energy savings against the additional debt cost. Should that be positive, you add that to the borrower's income so it could be the difference of qualifying or not. So we're very hopeful that this would come and this would be a major breakthrough.

On the multifamily side there is a huge opportunity here. The average age of US multifamily housing stock is 40 years old. There were a lot of programs back in the 1960s and 1970s that built this housing. A lot of it was very energy inefficient, as was most development during that period. There's a number of market players involved but the Federal Government is also a big player here because much of this is public housing, government financed housing, rate subsidized housing and so there's some possibilities of having even greater financing sources.

What we have found is there seems to be financing available but one of the major issues is technical assistance. I think the preceding presentation really showed that there is quite a bit of work if one is to do a deep retrofit of an affordable multifamily building. We're talking about evaluating the building, coming up with design plans, installation, managing it, financing it. This, many times, goes beyond the ability of an affordable multifamily owner to be able to do. One of the things we are working on is seeing if we can perfect within local markets one stop shopping whereby there's technical assistance. If there are grants, there's consolidation of grants and financing all in the same source otherwise it becomes too great of a management issue for some of the building owners.

Along these lines the federal government and Fannie Mae came out with a new program called Green Preservation Plus, which allows an additional 5% on the proceeds of a multifamily building that would be energy improved. An additional 5% in terms of relief of the debt service coverage requirement. We think this has a lot of possibility. Maybe it's not a super deep retrofit but we feel that, you know, 5% on a \$5 million building is \$250,000, which could potentially buy a new HVAC and do some lighting and possibly doing some ceiling of the structure, of the shell so to speak. Another breakthrough that has happened in the multifamily space has been the EPA Energy Star score or we call it the portfolio manager. The original tool, which many of you may have heard of, was designed for commercial buildings and it never quite worked as well for multifamily but in the last year a number of multifamily investors, such as Fannie Mae, Freddie Mac, the Federal Government, provided tens of thousands of their property utility scores and other building characteristics so that they were able to build an exclusive multifamily Energy Star score. We think that this is going to be something that is going to be very very well received in the market.

As I mentioned, benchmarking is starting to take off in the US. The usual US suspects are already there, meaning the cities and states that have more greener population in terms of their interests—Washington DC, Boston, California, Seattle Washington, Austin Texas. You can see the map here but 10 other cities are coming online this year. We're thinking this is becoming a major aspect within cities and states across the US as everybody wants to have their building not only be as energy efficient from the point of view of the environment but also in terms of economic competitiveness.

Along with the large national kinds of financing platforms, we are also working on various specialized finance mechanisms that might work at the state and local level. These are things such as loan loss reserves that can help provide additional support for energy projects that banks and others might find to be more on the marginal side. Energy service agreements, which I think was covered in the previous presentation are certainly there but generally for larger projects, what is called the MUSH section—Municipal, Utility, Schools, and Hospital sectors and then something called tax increment financing, and tax abatement, which are tools that cities have traditionally used for a number of reasons be that economic development or housing. They can be used for energy improvement whereby you're taking the additional value of the building and you are not taxing it for a number of years or you are using tax dollars to finance improvements. On-bill financing is something I'll talk a minute about. Green banks have been set up in a few states to provide not only technical assistance but green financing. Then something that has received quite a bit of publicity is called PACE, which is generally a state or municipal bond or first mortgage that is used to pay for the energy improvements.

On-bill financing, this is where the utility generally is providing the upfront capital to finance the energy improvement and then the payment comes back through your utility payment. The hope is that it's a net positive or at least a neutral that you're getting the energy improvements. Although you're paying for those energy improvements your utility bill is somewhat lower and makes up for the fact that you've had to finance something there. So there are two aspects to this. There's on-bill financing where the utility is providing the financing and then there is something called non-bill repayment where there would be a third party, generally a bank, where they would be doing the financing and the utility would just be collecting the payment through the utility bill.

As I mentioned, green bank—they are providing low-interest, long-term financing. They are leveraging public funds. They are providing technical assistance. They are trying to get in there and get into that middle area where there seems to be demand for energy projects. The financial markets are there but they are not, at this particular point in time, as well educated or willing to get in there, so the green banks become very productive intermediaries. Probably two of the better ones are the New York Green Bank and the State of Connecticut Clean Energy Finance and Investment Authority.

Then there are a number of sort of additional efforts that are taking place to, you know, bolster this market. On the single-family side the realtors who sell the existing housing have something called a Multiple Listing Service, which is the database that tells you all of the characteristics of a home. There's been this major effort to list the green features of a home. Then certainly on the appraisal, our standard appraisal report in the US really has very scant space for anything related to energy efficiency. There has been this addendum created to capture that information. Something that is a very recent nature that we are very potentially excited about here is the US banks have to adhere to something called the Community Reinvestment Act, which means they have to invest a certain percentage of their lending in communities that are at income levels at 80% of the area, a median income, or below. This has generally been for housing or community development and now they are inviting the aspect that it could be for energy improvements. This could tap a very huge amount of capital.

Then in summary here, I think benchmarking is gaining momentum. We mentioned all these 10 cities and another 10 on the way, states, counties, and we are also seeing investors starting to say that if you have a building that is located in a city that has benchmarking then you have to submit your benchmarking scores before you can be refinanced. We think this is going to be integrated into the financial system. Thirty-one states plus the District of Columbia have PACE legislation. PACE has been a very intriguing, exciting, concept but it's been very slow to get started. Although in the last year there's been a number of projects and a number more on the way so I think next year at this time we'll have a very attractive story to say there. On-bill financing is either implemented or

soon to be in 23 states and I would say the same thing about that. There are a few good examples but there are a lot more in the pipeline. Then the probably big story is that commercial banks get greatly more involved in energy efficient finance and we can integrate energy efficiency into those federal programs for mortgage finance. I will take questions when we get to that part. Thank you.

**Sean**

Great, thank you very much for the presentation and now we will turn things over to Rod for the question and answer session.

**Rod**

Thank you Sean and thank you both of the speakers. My name is Rod Janssen and I have my own blog called Energy in Demand. In Europe in the buildings directives when energy reforms and building directives were being negotiated, I represented the European Council for an Energy Efficient Economy in Brussels as we were trying to help push it along. So I've had a long involvement, plus I've been involved in the Global Performance Network since its beginning. So, I've been quite involved in the whole building scene both in Europe and globally. Those presentations, I thought, were excellent and what I'd like to subtract and they really covered the wide range of things. Bob mentioned the fact that disarray in the US until this year, and the last five or six years. I think there's been big disarray everywhere. In Europe the buildings directive that we currently was negotiated in 2010 and it almost stumbled right at the end because of no one knew what to do in terms of renovating buildings. Everybody knew we had to but the repertoire in the European Parliament almost had the whole thing collapse because she wanted to see financing included. What we see from Adrien right now is such a wide pallet of things that have come up in the last couple years. I think things are starting to come together. What we've seen from Bob, I mean, I'm impressed with both your presentations and in terms of just showing how things have changed in quite a short period of time.

Now let's just go back to what we're trying to prove here. We're talking about upscaling and we're talking about deep renovation. Those are sort of the two themes of this webinar and I have a question for both Bob and Adrien. I'm not sure how they're going to answer but that's why we have questions. I want to know with the current mechanisms that you've both presented, is it possible to really upscale? I mean, can we really push things? Just for example, let's say right now we're doing...renovating 1% of our building stock. Can we take it to 3%? Is that possible? Also, we've had this...whether we're using Fannie Mae or types of things, whether we're using structural funds in Europe or other things, do you have any feel of whether the consumer is really interested in these things? I mean what is the consumer reaction to this? I mean, I go to my store where I buy my goods to repair my house. I can get a loan from the Home Depot type of thing, the home based type of shop, to replace my kitchen and Adrien mentioned kitchen. But, I can't get it to renovate my house and so we've got a bit of a disconnect there. I'd like to hear just these couple little issues from both Bob and Adrien before we open it up to the general audience.



**Robert**

This is Bob. Yeah, I think the possibility to go to 3% is certainly possible. On the new construction side, over the last few years, over 30% of new homes are energy rated homes. So I think we're seeing a lot of progress there. I think we'll continue to see that number grow and certainly if something called the SAVE Act passes or as codes become much more stringent. All of your new building stock, probably 5 or 10 years out, will be energy efficient. I think you point to probably the greater opportunity and the more difficult, which is the existing housing stock, particularly single family in the US. I think part of, you know, there's been programs that have not been subscribed as well as their designers may have intended. And I think part of the issue is we are trying to take energy efficiency out of the normal financing cycle to the extent that we introduce the energy efficiency decision as people buy a home, either new or existing, and they could be buying an existing home and they could be told, yes, you are buying this older home and you could be able to get an additional 5% or 8%, or whatever the number is, to do some needed energy improvements on this home as well as get the mortgage. I think that possibly tends to incent people but probably more so on a refinancing, which people tend to do quite often in the US as interest rates change. Now I've lived in this home for two years and I can see its energy inefficiency and now I've got an opportunity to refinance as well as possibly replace my HVAC and lighting and a few other things. So I think there could be some uptake there. Part of this innovation that I talk about is not just integrating it in the underwriting standards; it's also integrating it into the consumer information process so that as consumers go to buy a home, or refinance a home, they're given information about energy efficiency. So it becomes a very explicit decision. Yeah, I'm either interested or I'm not, as opposed to something that might not even come to mind for most consumers. So I think there is some very great potential here but quite a bit of work to get there.

**Rod**

Adrien? Thank you Bob.

**Adrien**

Am I speaking? You can hear me now? Yes, I think it's a very good question. I would split it in two. I think there is upscaling retrofit of buildings and there is upscaling of deep renovation. You would not have the same answers for both. The first one, maybe not the easier one, is upscaling retrofit of buildings in general, so shifting to a 3% retrofit rate, rather than a 1%, which is very optimistic actually. One of the key things coming out from the work with the Energy Efficiency Financial Institutions Group that I was mentioning is the lack of demand. The lack of demand, and especially when you talk about a households, I think is due to many things. I think one of the key levers that we need to work on is nobody really things about...nobody does retrofit just for the sake of saving energy. Usually it has to be integrated in more general works so we need to see how we can stick to the lifecycle of the investment and ensure that every time you buy a home or you sell it or you do major works because you want a new kitchen, you are incentivized to save energy.

Once again kitchen, bathrooms, are most of the investments that people do in their homes when they own a home is that and there is no payback on that. If you ask people why they do that they do it's because it's nice to have a good bathroom. It's nice to have a good kitchen. We need to sell not just energy savings but we need to sell also the comfort that people would get in their home and the value. Looking at the question of value actually may be one key difference with the US is we have energy certificates rolled out in all of our member states. They're usually mandatory to be displayed when you buy and when you let out a home. That is starting to have effects on the market and we can see we've had a few studies already showing on the housing market you have differences in values linked to different classes of energy certificates. That is one thing on the general driving demand.

In terms of your question was also, do we have the means to upscale finance for all of that. I think a key distinction that needs to be made. We have one approach, which is to embed energy efficiency in the existing financing instrument, so typically mortgages and making sure that mortgages can be applied and can use the cash, the cash flows from energy savings, when looking at the viability of the homeowner. That is one key thing. More and more...it will be more and more the case when we prove there is a business case and that the savings are there. I think the study that Bob was mentioning is a key study and we should have more and more of these. The other approach is to say that we need to have specific dedicated schemes for energy efficiency retrofits. And the schemes that I was showing are actually on deep renovation. Now here is a very different case because we have a market failure, I think, on deep renovation in general and that is why the schemes that I was showing are piloted by the public sector saying that we need to step in because it will not happen else. However, in all of these three schemes that are taking place in France at the moment, because that is where we have schemes targeting deep renovations at the moment, the approach is that somehow it's a transition scheme because the public sector it's not their job to upscale that to a very large scale.

**Sean**

Adrien...

**Adrien**

The potential market is so high that if you can kick start that with public intervention and then the idea is that the private sector will kick in.

**Rod**

One thing that has come up today is the role of the public sector and that has been quite useful. Look it, we've had quite a few questions coming in. Sean, I'm going to pass this over to you. I think you have access to the questions, if you'd like to raise them.

**Sean**

Sure, yeah, I can do that. Yeah, we have had a number of questions come in for all of the panelists. This one in particular was for Rob Sahadi and the question was—what would your top recommendation be for energy efficiency programs for a newly forming municipal electric utility?

**Robert**

That's a tough question. I think that a new municipal utility, certainly they could be looking at on-bill financing but we have published a guide. I think I referenced it ever so briefly in the presentation that looks at municipal financing and there may be a dozen or so programs that are being used across the United States. I think it is a function of what's being offered in your market and taking advantage of those resources. So to the extent that a new municipal utility was in a city that had a very active tax increment and tax abatement program, I might look at that. To the extent that a green bank was there, I might want to work with that. I think the on-bill financing is certainly a possibility but I just wouldn't just jump into that if there were other things in the market that I could leverage the assistance that I'd want to give. I think the city of San Antonio, you know, they have a municipal utility and they are very actively involved in energy efficiency. I think I'd look to their programs and maybe consult with them.

**Sean**

Great, thank you Bob. Now, moving on to the next question, this one is for both of you and it just asks—they note that the key barrier perceived by industry is a lack of demand from consumers. Do you see this in your opinion and in your experience as a valid?

**Adrien**

This is Adrien speaking. Definitely, yeah, yeah, this is a shared issue. That's why we are putting some efforts into project development assistance, which basically aims at helping demand. We are either generating or helping demand because it's one thing to say I'd like to refurbish my home and the other thing is to do it. Now we may lack people who actually want to energy retrofit their home, but that's another issue. If you can get people to the next step that would already increase the amount.

**Robert**

I would say certainly on new homes we are seeing consumers increasingly demand energy efficiency. A number of studies have come out from national home building organizations where prospective homebuyers are to the tune of close to 90% saying that they would want energy efficient improvements in their homes and may be willing to pay a few percent more for those. I think the consumer interest and demand is happening on the new construction side. I kind of look at it similar to the automobile industry in the US, whereas 15 years or so ago people looked at the value of a car based on its number of cylinders and its size and the kind of wood on the dashboard and now there are so many other indicators of performance such as miles per gallon, crash tests, monthly maintenance cost, residual value, so I think we are coming on the new construction side to more of a performance standard of housing. I think the difficult issue, as has been touched on a number of times during this conference, is the existing homes. There have been a number of programs that have been disappointing in terms of the number of people who have been interested. I guess I take that back to my earlier comment. You have to hit people during the normal financing cycles. It's very difficult for people to go out of cycle and to find, I'm just cruising along living in my house and now I'm going to take \$10,000 worth of improvements and figure out a way to

finance them as opposed to. I'm buying a house or I'm refinancing a home and maybe I undertake it there. I think it's a combination of ease of finance and education and access.

**Sean**

Next question and this is also for both of you. Have there been any best practices on the value of energy efficiency building portfolios and what policies would get institutional investors to take deeper renovation to scale?

**Adrien**

From...that's a difficult question because it very much depends on the type of buildings that you are talking about and the countries and the type of investors that you are talking about. Right now when you look at mostly the commercial buildings we have an obstacle that is linked to the valuation methodologies, which is mostly retrospectives looking at previous transactions and saying, well, I don't see a difference in previous transactions. We are slowly overcoming this obstacle because previous transactions are proving more and more that you have green value in green buildings, although that is very much linked to the new builds or really deep retrofits of commercial buildings. Then if you are talking about the perspective of large building stock managers it depends very much on what their portfolio strategy is. If you've got short term investors or people who will own building stocks for 5-10 years, which would be the case in the commercial building sector. The difference is mostly the value of sale if you've got long terms owners, like you would have, for example, in social housing sector in the public sector in general. Then you could factor in also other factors, which is also the level of rents and the level of non-payment of rents, the time it would take to rent your dwellings or offices when they go void, and so on, and that has an impact on profitability. There is no clear best practice but it's just evolutions in practices all over. It is hard to track this I think.

**Robert**

I would say that when we look at the A building stock the investors are all pretty much there. They would expect an A building to already be highly energy efficient and maybe even have a green rating, particularly in the larger metropolitan areas. I think with the older B building stock, which is more problematic, I think investors are starting to look at it from the point of view that benchmarking and codes and all these factors are starting to become more commonplace in the market. So I, at least from a defensive point of view, might be leery of buying a building that has some energy issues unless people view my portfolio as being a brown portfolio versus a green portfolio. I see slowly this aspect of now I have to pay attention to this. You are what you measure someone once said and now we are starting to measure the energy efficiencies of different buildings through benchmarking and investors have to be mindful of that. I would say that as benchmarking increases throughout the country, benchmarking will become an increasingly bigger part of the analysis of investors in terms of buying or selling buildings. I think there was a study that came across my desk that I can forward to our seminar coordinator and can send it out to the attendees.

**Adrien** Just to build on that, there are several studies on green value and in the end more and more we are talking about brown discount rather than green value, meaning that it's not so much the added value in an A class building but it's whether the loss of value in F and G class, which you would have in Europe, and that is becoming the reality.

**Sean** Thank you both again. We do have a few more questions to get to. This one asks how Europe...are there any examples in Europe taking the homeowner from being a passive consumer to an active proconsumer, meaning both producer and consumer? Adrien, maybe we could start with you on this one since they asked about the context in Europe, but then we can move on to Rob if he has any examples?

**Adrien** Well we do have a lot of examples where, well, I would not have a figure but we have millions of homeowners who have PV, so solar photovoltaic panels, on the roof that are producing electricity and one thing that I would mention also is that usually you would see that they slightly decrease their energy consumption because that increases their awareness on energy issues. So in that sense we have a lot of this. We also have a number of projects usually run at local level that try to engage a bit beyond that with households. I wouldn't have exact concrete cases to give to you but yeah, we have a number of these being run all over Europe. I am not sure that answers but...

**Rod** Hi, this is Rod. I think in terms of Europe what we're trying to do is take a much longer-term view. We've started with nearly zero energy buildings where for new buildings in 2019 for public buildings or 2021 for all buildings that they will be a net zero building. Some of them will be producing extra that they will sell to the grid or wherever. Now there's more and more work to do nearly zero energy building retrofits. That's still a fairly early stage but the work is starting to happen but I think in terms of going to a passive, and I think that's a good expression, to an active or proconsumer when the policy was approved by Parliament and Council they really took a longer-term view of it. Don't forget when I say a nearly zero energy building I am talking about all buildings inside the European Union for 2019 and 2021. We're not just in Denmark or in Spain or whatever. We're talking that these will be policies that will be implemented Europe wide. It will be a slow take up and the countries right now are required to produce their strategies, how they're going to achieve that, but it's slowly happening or maybe quite quickly. It depends on your perspective.

**Sean** Great, and I'd like to get to one last question so if we could maybe keep the responses to about a minute each. The question asks if anyone has any experiences or does anyone know of any experiences with scaling up renovation and deep renovation in emerging economies such as South Africa, South America, or Asia?

**Adrien** I don't need a minute. I just don't know.

**Robert** No, I'm pretty much the same.

**Sean** Alright.

**Rod** There's a lot of talk but I have not seen much action.

**Sean** Okay, thank you guys and that is the last question that I had from the audience. We'll move on now to the attendees' survey. For all the attendees out there we do just ask a very brief survey. It's just three questions that you can answer right there in the GoToWebinar and it just helps us to improve for future webinars. The first question is, the webinar content provided me with useful information and insight. Second question, the webinar's presenters were effective. Then the final question is—overall the webinar met my expectations.

Great, thank you everyone for answering our survey. On behalf of The Clean Energy Solutions Center I would just like to thank each of our expert panelists for joining us today and for the presentations and for our attendees for participating in the webinar. We very much appreciate everyone's time and I do invite all the attendees to check The Solutions Center website to view and download PDF versions of today's slides. Also in about a week of today's broadcast we should have the audio recording up there if you'd like to go back and listen to any of it or share it with anyone in your networks and organizations. Another reminder, we are also posting webinar recordings to The Clean Energy Solutions Center YouTube channel and with that I hope everyone has a great rest of your day and we hope to see you again at future Clean Energy Solutions Center events. This concludes our webinar.