

Sean Williamson: Welcome, everyone to the webinar for those of you just signing on. We'll get started in a few minutes as we wait for more attendees to arrive. So sit tight and we'll start soon thanks.

Well, I think we get started now. Good afternoon, everyone. Hello, and welcome to 2021/2022 Better Buildings Webinar Series dedicated to bringing you the latest actionable insights from leading industry experts. This annual series is a chance to explore the topics, technologies and trends that affect your organization, as well as efforts to accelerate energy efficiency adoption.

Thank you for being here. Today's webinar, Put Your Money on It: Investing in Energy Efficiency, represents a milestone in energy efficiency financing. The webinar will preview a first of its kind study showing that financial institutions can lend money to customers across a broad range of income levels for energy efficiency improvements at low risk in support of creating a more efficient building stock in our country.

Our performance of energy efficiency lending has generally been understood to be strong. The data made available in this study significantly expands the volume and sophistication of the public evidence. Before we dive in, there are a few housekeeping points I'd like to cover. First, please know today's webinar will be recorded and archived on the Better Building Solution Center.

We will follow up when today's recording and slides are made available. Next, attendees are in listen only mode, meaning your microphones are muted. If you experience any audio or visual issues throughout the webinar, please send a message in the chat located on the bottom of your Zoom panel. Next slide please.

My name is Sean Williamson, and I'm your moderator today. I'm an energy technology program specialist in DOE's Office of Energy Efficiency and Renewable Energy. In partnership with the State and Local Energy Efficiency Action Network or SEE Action and the lead authors at Lawrence Berkeley National Laboratory, I've had the great honor of coordinating the work you'll be hearing about today.

Next slide please. Today's webinar will include four sections and four speakers. First, the lead authors of the forthcoming study, Long-Term Performance of Energy Efficiency Loan Programs, will preview the study including the data sources, methods, results and implications. I'll introduce Greg Leventis and Jeff Deason in a moment.

Next, we'll turn to Reaction and Insights from the Efficiency Financing Community. We'll hear from Mary Templeton from Michigan Saves, who will provide the perspective of an efficiency financing program, then Neda Arabshahi from Inclusiv, who will share the perspective of financial institution. Finally, we'll save about 10 minutes for questions and discussion at the end.

Next slide please. Today's webinar is a big deal because it introduces a barrier breaking study that invites the investment community to see energy efficiency loans as secure, strong performing assets for the first time. There's so much untapped potential for investment and efficiency retrofits in our country's building stock.

According to the American Council for an energy efficient economy, the energy efficiency financing market in the US totaled 7 billion in 2019, which is roughly a 40% increase since 2014. However, given the half a trillion dollars and remaining cost effective retrofit potential in the US, not to mention the need for rapid decarbonization of our building stock opportunities for job creation, \$7 billion per year is not nearly enough.

We need to scale up our investment rate quickly, and we need to do it with the help of the entire investment community including large banks, pension funds, credit unions and other financial institutions. Since specialized energy efficiency lending emerged over the past decade or so, we've heard from many financial institutions that they're interested in lending more than the efficiency space, but they're not quite ready.

They need more evidence that energy efficiency loans perform and compete with other available investment opportunities. The forthcoming SEE Action study, long-term performance of energy efficiency loan programs provides the evidence financial institutions have been asking for.

The findings from this study, which looked at over 50,000 loans significantly expands the volume and sophistication of the public evidence base through loan level analysis for large programs, three with track records of more than a decade, and one that spans an economic cycle. I'm so excited, I could keep going. But we'll stop now and reserve that right for our speakers and subject matter experts to share the important findings from the study.

Next slide, please. Let's pivot to audience interaction for today's webinar and launch a quick poll to better understand you, our audience. So today, we will be using interactive platform for questions and answers, polling and feedback. Please go to www.slido.com on your mobile device, or by opening a new window in your internet browser.

Today's event code is #DOE. If you'd like to ask our panelists questions, please submit them anytime throughout the presentation. We will be answering your questions near the end of the session. You can select the thumbs up icon for questions that you like, which will result in the most popular questions moving to the top of the queue.

Alright, so let's dig into our poll here, which hopefully folks have now found on Slido and are beginning to answer. Please join us over at Slido if you've not made your way there already. I see that we are sharing the results live on our Zoom. And just for those of you who maybe don't see the question or don't have all the options.

The question is select the type of professional organization you're representing today. The options include lender, capital provider, financial advisory, private consultant or contractor, non-profit organization, state or local government, federal government and other. Give folks about 10 to 15 seconds to answer the poll.

And I think I'm reading this correctly that the non-profit organization is the majority of attendees right now, in terms of the organization being represented at about a quarter of attendees. This is followed by private consultants or contractors and state or local governments at about 20% each. Excellent.

With that, I'd like to move on to our next slide and introduce today's presenters. So we have a great lineup for today. Our first speaker is Greg Leventis. He's a program manager in the electricity markets and policy department at Lawrence Berkeley National Laboratory. He conducts research and analysis of demand side efficiency and coordinates technical assistance for the National Community Solar Partnership.

His research focuses on efficiency and solar finance, cost of saving energy and incentive program design analysis. Our next speaker is Jeff Deason. He's a program manager and energy efficiency team leader, the electricity market and policy department at Lawrence Berkeley National Laboratory.

He conducts research on programs promoting energy efficiency and other demand side energy resources with a focus on financing programs. Our next speaker is Mary Templeton, who serves as the president and CEO of Michigan Saves, the nation's first non-profit Green Bank, whose mission is to serve Michigan residents by stimulating and supporting investment in energy efficiency and renewable energy systems in homes and commercial buildings.

Since Michigan Saves was formed in 2009, the organization has enabled more than 350 million in clean energy investments in the State of Michigan. Our last speaker is Neda Arabshahi. She's the director of the Inclusiv's Center for Resiliency and Clean Energy.

In this capacity, she's working to build a network of credit unions committed to designing and scaling solutions to climate change with the goal of promoting affordable and sustainable energy for all people. Thanks to all our presenters for being with us today and thank you to our audience for joining this very significant webinar. So excited to share this with everyone. With that, I'll hand it over to Greg and Jeff to kick us off.

Greg Leventis:

Right. Thanks so much, Sean. I appreciate it. And thanks to Better Buildings for giving us this chance to talk about our work. Also, thanks to DOE's office of Weatherization and Intergovernmental Programs, and the Office of Strategic Analysis for funding this work and for some great guidance and developing it. Next slide, please.

What Jeff and I are going to talk about today is, as Sean was mentioning, its upcoming report on analysis that we conducted for the State and Local Energy Efficiency Action Network or SEE Action for energy efficiency financing programs, and we expect the report to be available in the first quarter of 2022.

Now, as Sean also mentioned, anecdotally, the performance of energy efficiency lending is generally understood to be strong. And by 2019/2020, several energy efficiency financing programs have been operating for 10 years. And that provides us a robust track record that we can analyze those claims with.

So first, I'm going to give an overview of the project, then we're going to characterize the programs through some descriptive statistics. And then after that, Jeff is going to discuss the loan performance and how the performance compares to other loan products. Next slide, please. Alright, so starting with the overview.

As Sean mentioned, there's no comprehensive loan level analyses of the financial performance of efficiency loan program portfolios. Within the robust track record that is now available that was mentioned, we believe this will be valuable information for capital market stakeholders. We're generally unfamiliar with these portfolios.

So our objective here is to — make available for the first time a comprehensive analysis of energy efficiency known performance data from multiple state programs. And it's not just four programs, each of them serves four different states. So there's some variability in the geography there as well.

And we hope that this will increase investor confidence in these efficiency loans, and that it will create increase the availability of capital and better terms for efficiency financing programs. Next slide. Now the analysis covers four programs. First Connecticut's Smart-E loan program, which started in 2013, and as an unsecured off-bill loan.

And by the way, an on-bill loan is one in which loan payments are made on the utility bill, whereas off-bill loans, loan payments are made separately. Next is Pennsylvania's Keystone HELP. Started in 2006. And we were able to get data for the program from 2016 to 2017. It's also an unsecured off-bill loan.

And as Sean noted, that our data for this program includes loans that went through the Great Recession, so they weathered the economic cycle. Then there's Michigan Saves, which began in 2010, and includes unsecured off bill and some on-bill loans as well. And then New York's NYSERDA On-Bill Recovery Loans and Smart Energy Loans, which also started in 2010, and are unsecured on-bill and off-bill loans.

Now, the analysis only includes loans in these portfolios that are energy efficiency only. And in total, we have over 52,000 Energy Efficiency only loans, although we don't necessarily have that data for every data point. So we may have fewer observations for certain analysis style, like for example, income.

And then finally, before we go on, I wanted to note that we will also have separate report that's coming out soon, that is focused on the solar loans, the loans that contain solar in three of these portfolios. Keystone HELP does not offer solar loans. So next slide, please.

Now, so that you have a sense of what these portfolios look like, I'm now going to go over some of the descriptive statistics for the portfolio starting with the loan characteristics. So next slide, please. This first one shows the loan volume for each program by year or vintage. And you can see here in orange, Pennsylvania going through the economic cycle there.

You also see that most of the activity occurs in the past five to six years, like the Connecticut's program has been around for around seven years, but the others have been operating for 10 plus years with 1000s of loans each year. So this is a robust track record that we have here. Next slide, please.

This one looks at the principal amount, which is how much money the program participant bars. On the left hand, we have the percentage of loans that falls into each of the principal amount bins, which you see along the bottom there. You see that most of these loans are for between five and \$10,000, with the average across the programs around 9,000, the median around 7,600 and so on.

Next slide, please. Okay. Thanks. Now, the loan terms are dependent on program rules. You see these bands here, there's not really a lot of variability within the bands. So most of these loans are taken out for 10 years. Although as you see, NYSERDA is an outlier here, it's got a lot of 15-year loans. Next slide. Then we have the interest rates.

And these are also dependent on the program. And they don't necessarily stay static, they can change over time. And there are also special offers to. For example, a special 0% interest rate offer in Connecticut explains the low interest rates there. It was a promotional offer, and they made a lot of funds during that time period.

But the rates range from zero to almost 9% with an average and median interest rate of 5%. Next slide, please. Now the principal amount, loan term and the interest rate that I've just talked about, they all add up to determine what the monthly payments will be. And the average payment is \$93 a month, the median is \$80 a month.

So this gives you a sense of what that ongoing obligation looks like from the borrower's perspective. Next slide, please. So now we have the borrower characteristics. And these are important because

they can more directly impact the performance of the ones. Next slide, please. So first, the income.

Now not all of the programs have household income data. But we were able to use location information to make an apples-to-apples comparison to three of the programs. Keystone HELP didn't have sufficient data to include that program. So the bins here on the bottom represent the average income consists census tract where the project is located, compared to the area median income or the AMI.

And this is not the income of the participant, but rather what we believe is the proximity. And as you see, the average tract income is 91% of the AMI. And the average median or rather the median tract, census tract income is 88% of the area median income.

And note that across these programs, the majority of the borrowers are from census tracts of median incomes that are less than the median income of their statistical area. Next slide, please. So last but not least is credit scores. And you'll know that they're on the higher end as compared to the incomes which had a more normal curve like a bell-shaped curve, these are skewed to the right.

So these are reasonably high credit scores with both average and median credit scores well above 700. Next slide. So that hopefully gives you an idea of what these loan portfolios contain and what they look like. And now for how they perform and compared to other loan products, I'm going to hand it over to my colleague Jeff Deason.

Jeff Deason:

Yeah. Thank you, Greg. And good afternoon, everyone. And so Greg has just done a thorough job of describing the loans and the portfolios of loans that we studied. And I am now going to take you through an analysis of how these loans performed from a financial perspective.

And we will generally consider two performance metrics as Greg mentioned, both delinquency rates, which is the share of the outstanding loan principal from a portfolio or portfolios that is past due, as well as loss rates, which is the share of the original loan principal that has been charged off or declared as lost.

And I will explain how we define each of those factors in a little more detail in the next coming slides. So next slide, please. We'll start here with delinquency rates. So this figure shows the share of the active loan principal in each portfolio that we studied that was

between 30 and 120 days delinquent as of the date of each program dataset that we received.

And to explain these 30 to 120 windows, 30 days is a common marker of first delinquency. And that alone is at least a month overdue. And 30-day delinquency rates are quoted fairly widely in the literature. And as far as 120 days, we consider loans that are more than 120 days delinquent to be losses or charge offs.

And so we remove them from this delinquency rate computation, they're in a separate category. And using these 120 days delinquency as a marker of charge off ensures a consistent definition across the portfolios and it also generally comports with practices we see in other lending markets. And so to review the data up here at the top, about 17,000.

We started with 52,000 loans, as Greg mentioned, about 17,000 of those loans were paid off at the time we got the data. Meaning that either they had come to full term, or they had been paid early. About 2,000 of those 52,000 loans in our data were charged off as of the time we received the data, leaving about 33,000 active loans.

And that's why we see a sample size of 33,239 here down at the bottom. So with all that out of the way, what we see here is that the delinquency rates do vary somewhat across programs, but they're all between about 0.5% and 2.5%. And when we pool the four portfolios, which are going to do often in this analysis, the overall delinquency rate is 1.57%.

And again, in general, we're focusing on these pooled rates because we're trying to characterize the performance of energy efficiency loans broadly across all of these portfolios. And later in the presentation, I'll put this delinquency rate in context by comparing it to the delinquency rates of other loan products measured at the same times. Next slide, please.

And here we show the cumulative loss rates, again for each portfolio, and then also aggregated across all portfolios. That's what the red line represents. And in general, the red lines and bars will represent the aggregate across all four portfolios in all of our figures. And to create this figure, we basically declare the calendar year in which a loan is made to be year zero.

And then each subsequent year is year one, year two, year three, year four. And we assess the share of the initial loan principal that had been charged off on December 31 of the year in question to

create this graphic. So for example, the year zero delinquency loss rates here are the share of the original loan principal that had been lost as of December 31 in the year that the loan was made.

The year one loss rates are the share that had been lost as of December 31 in the following calendar year, and so on and so forth. And as we can see here, the loss rates are broadly similar across the portfolios, and the loss curves all display a similar shape. In particular, the curves are somewhat concave, meaning that loss rates are highest in the early years following loan issuance, and then they taper off in later years.

And overall, just tracking the red curve here, the pooled portfolios lost 2.1% of their principal by year two, 3.3% by year four, 4.5% by year six, and 5.1% by year eight. And again, we'll put this performance in context later in this webinar. But before we do that, I want to break down the performance of these loans by borrower characteristics. Next slide, please.

So Greg gave us a sense of the credit scores of the participating borrowers. And this slide shows the delinquency rate across the pooled portfolios broken down by borrower credit score. And those credit score bins are ordered by lowest credit to highest moving from left to right, with the overall delinquency rate again in red, and again, that's the 1.57% we've seen previously.

And as this figure shows, delinquency rates declined sharply as credit scores rise. And almost 6% of the outstanding balance is delinquent for borrowers with credit scores below 600. Well, only about 0.5% of the outstanding balances delinquent for borrowers with credit scores above 780. And so as we can see the relationship between credit score and delinquency is strong in these data.

Next slide, please. This next slide shows the relationship between income and delinquency rates. And as Greg discussed, we have this income metric that is the ratio of the median income of the borrower census tract to the area median income. It's not an actual household income value. We'll come back to that. Here we again see a relationship between income and delinquency houses from census tracts with higher incomes generally have lower delinquency rates.

Again, the delinquency rates decline from left to right. However, this relationship is not as strong as the relationship between credit and delinquencies. We can see here that borrowers from census

tracks with median incomes of less than 60% of the area median, which is the leftmost bar, have a delinquency rate of 2.6%.

While those from tracks with median incomes of more than 120%, which is the right most blue bar, have delinquency rates of 1.4%. So that discrepancy that limits the rate of the lowest income bin is less than twice that at the highest income bin. But in the previous slide on credit score, there was about a factor of 12 separating the lowest credit score bin from the highest bin.

So again, these results imply that the performance is far more sensitive to credit score than it is to income. Okay, the next two slides, next slide, please, look at cumulative losses broken down by the same borrower factors. And so this slide shows cumulative loss rates by borrower credit score.

And by matching the colors of the loss curves with the legend at the bottom of the chart, if you can do that in real time, we can see that the same pattern emerges. The lowest credit borrowers, who are represented by the yellow curve, have the highest loss rates at any given time. And the highest credit borrowers who are represented by the green curve have the lowest.

And in these curves were only including loan vintages that total at least \$10 million in initial principal amount due to sample size concerns where principal amounts are smaller than this. And that's the reason that we show fewer years of performance for the relatively low credit borrowers because the sample size there is smaller.

Nonetheless, for the data we feel comfortable with, we can immediately see that the relationship is clear and substantial. After three years comparing the yellow curve to the green curve, the lowest credit band has lost almost 22% of the initial principal, while the highest credit band has lost only 0.4%. And in fact, by year eight, the highest credit band has only lost 1.3% of the loan principal.

The next slide shows the same curves by income using again the same income metric as before. Again, we see that the lowest income borrowers represented by the yellow curve have the highest loss rates, and the highest income borrowers represented by the green curve have the lowest loss rates. But again, the trend here is not quite as clear and stark as it is for credit.

Looking at year five, which is the last year we have data for both the lowest and highest income borrowers, we see that the lowest income band had lost 7% of total initial loan principal while the highest income band had lost 2%. This is a clear difference. But again, it's not nearly as large in magnitude as the difference in losses between the highest credit and the lowest credit bands in the previous slide.

So thus far, we've been breaking the data down by one factor at a time. And to further explore the data, we perform some regression analysis on our loan level data. That's summarized in the next slide. And this method allows us to study the relationship between loan performance outcomes and individual loan and borrower factors, while holding all the other factors constants.

And this slide indicates the factors in our regression model. They are the program making the loan, the seasoning of the loan, the time since loan origination, the interest rate of the loan, the loan principal amount, and the borrower's credit score and the AMI-based income metric we have used throughout.

And the regression analysis essentially confirms the conclusions we've been drawing thus far. Credit score is a statistically significant predictor of both delinquencies and losses. The lower the credit score, the more likely loans are to be delinquent or/and more likely to be charged off. Income band is also associated with delinquency and loss rates, but not as strongly as credit score.

And the differences are not always statistically significant. I'm not going to go through in the interest of time. All the rest of the numbers are on this slide, but they do highlight the fact that essentially, as you cross the credit score band, the differences that this makes are larger than the differences as you cross the AMI patterns. Okay, next slide, please.

So, in my remaining few minutes, I'm going to compare the financial performance we observed in our energy efficiency loan data with available data on other types of lending. And we're going to compare our loans with two loan products, auto loans and unsecured personal loans.

And I want to be clear that these loans do differ in some important respect from the loans in our portfolios apart from the fact that they're not loans for energy efficiency projects. Auto loans, importantly, are secured by the vehicle that they are loaned for.

Meaning that the borrower loses the vehicle if they do not repay the loan.

And this, of course, is a powerful incentive for repayment that is not present for energy efficiency loans. If someone doesn't pay one of these loans, we don't go and rip the insulation back out of their walls, for example. Auto loans are also larger and have shorter payment terms than efficiency loans.

Unsecured personal loans are not secured by collateral, like our loans, and they also have somewhat similar sizes, but they carry higher interest rates and shorter terms than the loans in our portfolios. So we're not pretending that these comparisons are perfectly apples-to-apples, but they do allow us to put the performance of our efficiency loans in the context.

The next slide compares the 30 to 120-day delinquency rates. We observe in our efficiency with delinquency rates from various auto and consumer loan indices that we were able to access. And in the interest of time, I'm not going to review all of these indices in detail, our forthcoming report will do so.

The key takeaway is that the delinquency rate for our efficiency loans, again, 1.57%, is lower than all the comparator loan indices. It's quite similar to but slightly lower than delinquency rates for both prime auto loans, which would be the third series from the left, or the second blue series from the left.

And it's also comparable to but slightly lower than unsecured personal loans made by brick-and-mortar institutions, which would be represented by the second series from the left as well as the fourth series from the left. The next slide shows cumulative loss comparisons between the efficiency loans and two comparator indices for which we were able to gather these data.

Those are prime auto loans and personal loans to high credit customers made by online lenders, which are commonly known as FinTech loans. And we'd like to acknowledge the cooperation of CRO bond rating agency for making the data available to enable this comparison.

And one caveat here is that FinTech loans, in general, these online loans, do have higher loss rates than loans made by brick-and-mortar lenders, like banks and credit unions. And in general, the folks that issue the efficiency loans we study are brick and mortar institutions. And so that's an important caveat on the comparison.

If we were comparing to brick-and-mortar lending, we would expect this gray line to probably be somewhat lower.

Another caveat, however, that points in the other direction is that our energy efficiency loss rates are gross loss rates that do not include any revenues that were gained through collection activities after the loans were declared to be charged off. We simply didn't have access to those data. And all of the series that we're comparing to, both in this slide and on the next slide, are net loss rates.

Actually, can you go back to the previous slide for a moment. Thank you. So our gross loss rates are essentially an over-estimate of what the net loss rates in the efficiency loans would be after collections activities. And as this figure shows, the gross loss rates for the energy efficiency loans over time are much lower than the net loss rates from the FinTech loans.

And are similar to, or are slightly higher than the net loss rates for prime auto loans, which again are secured by the vehicles. And finally, our next slide compares what are known as annualized loss rates from various data sources to an estimated annualized loss rate from our loan programs.

And annualization is a little bit of a tricky topic and our method of annualization is highly approximate for our loans, which will be detailed in the forthcoming report. So this is a more approximate number than the previous slide, but it allows comparison to more external competitors, because we are able to source annualized loss rates from a greater number of places as shown here in this slide.

And as with delinquency rates, we see here that the energy efficiency loans have similar but slightly lower delinquencies than both prime auto loans and non-credit consumer loans made by brick-and-mortar institutions. Those would be the second and third series here from the left. Okay, next slide, please.

So our quick takeaways from this work, first, as Greg illustrated, energy efficiency borrowers are often fairly high to high credit, and they are middle income. The average participant credit scores were 734. There were very few borrowers with very low credit scores. However, the average borrower is from a census tract with the median income just under the area median income.

So that characterizes the population that's showing up for these loan products. We've shown that energy efficiency delinquency

and loss rates are low. We've quoted these numbers several times, I won't repeat them here, and that credit scores and income both affect performance but credit score far more so.

And then, when pulled across the four portfolios, energy efficiency loans do outperform their most logical competitors or performed quite similarly. They outperform creditworthy unsecured consumer loans in general, and their performance is very similar to prime auto loans, which again are secured by the vehicles. And finally, a few implications on the next slide.

First, as Sean noted at the beginning, energy efficiency loans appear to represent an opportunity for capital providers and lenders to lend at low risk, while in the process creating a more efficient building stock. Second, to the extent that the data here show stronger performance than might be expected. Although to be clear, we don't have a clear reference point for expectations here.

If that's the case, capital for energy efficiency lending may currently be overpriced. The third point is that high credit households in lower income areas can be expected to repay their loans at a strong rate. Again, credit appears to be a far bigger determinant of loan performance than income. And as such, energy efficiency lending can perhaps support policy goals related to equitable access to capital.

I do want to make two comments on this point. First is that we did mention that we use this area-based income metric. For one program, we actually were able to access household level income. And in general, the results, the relationship between income and loan performance in that program was quite similar to the relationship between our location-based income metric and performance.

Which suggests that the use of the location-based metric is not obscuring a trend that would otherwise emerge. And the second point is that there are high credit households in lower income areas, we were able to study this in our data and the correlation between income and credit, there is some correlation, but it is quite a bit weaker than might be expected.

So there are many households in our data that are from lower income areas and have higher credit scores, and therefore would be expected to repay at a strong rate.

And finally, we would suggest that the analysis of loan performance determinants which we've given you a window into here, but we've got plenty more in our report, could be used to design credit enhancement mechanisms to encourage lending to households that are currently underserved by estimating the likely repayment performance of different market segments that we may choose to access.

And with that, I will – let's see, are we turning back over to Sean, or are we going directly to Mary?

Sean Williamson: I'll just jump in, Jeff and Greg, to say thank you for succinctly collapsing two years' worth of hard work and do about 25 minutes. Very well done. Appreciate it. At this point, let's turn it over to Mary Templeton who's going to provide reaction and insights from Michigan Saves, one of the portfolios reflected in the study. Take it away, Mary.

Mary Templeton: Thank you, Sean and thank you to the DOE for funding this study, and to Lawrence Berkeley National Labs for taking such care with the data and using such precision to evaluate the data, we really appreciate it. Sean started out the webinar today saying that the study is a big deal. And we could not agree more.

As the nation's first non-profit green bank, we get calls all the time as states or other jurisdictions stand up new green financing programs or even investigate whether that's a possibility for them.

And we are so excited to have this study to point people to, and we believe that it will be transformational and attracting private lenders to do more lending with more assessable loan products, which we did not have a study like this when we stood up Michigan Saves back in 2009.

In fact, the term green banking didn't even exist. We didn't have data like this to review and we had to basically create our program from nothing. We had \$6 million from the Michigan Public Service Commission and a goal to address financing gaps in Michigan to accelerate investments in energy efficiency and clean energy projects.

With somewhat limited funds and a goal to serve all of Michigan, we knew we had to leverage private lenders and the private market. We ended up doing a lot of stakeholder interviews and lenders were instrumental really, really important in those stakeholder interviews.

And they stepped up from the start to help us create a program that met the unique needs of the energy market. With credit unions on the residential side and other financial institutions on the commercial side, we created a model that is simple. We used state dollars and some federal dollars to back private lenders in case of default, so that these lenders can offer better interest rates, longer terms for the loans and more access.

With this model, we've been able to support \$350 million in investments in clean energy, energy efficiency, renewable energy. We've been able to leverage each dollar of public investment with \$30 in private investment, because we can recycle that money as the loans are paid off. And we've only paid out 1.3% of the entire portfolio on defaults, which is a really incredibly low default rate.

Next slide, please. So how does this credit enhancement work? We set up a loan loss reserve, where we share the risk with the lenders. We do not pay 100% of every default. Instead, we set aside 5% of each lender's outstanding loan balance. Each month, we rebalance it. And so they have a max of 5% of the act of outstanding loans that they can draw on if a default occurs.

In the case of a default, a lender receives not the entire amount and the balance. We've actually streamlined it, it's about 75% of the loan balance. And what this does is it really incentivizes those lenders to close more loans each month, because that continues to build up their loss reserves, so that if there are defaults, we can support them with this credit enhancement.

They can claim a default after 90 days. And then they use their own collection mechanisms to try to get repayment or get the loan back in good status. And if they do, then that funding goes back into their loss reserve and it builds that loss reserve backup.

When I talk about some of the benefits of yielding better rates in terms, let me give you an example. Our credit unions offer up to 15 years, some of them are even extending beyond that to 20- or 25-year terms for solar projects. The interest rate is right around 4% fixed with no out-of-pocket expenses for the property owner.

Amounts are up to 50,000. Even some of our lenders are starting to go beyond that into 60, 70, even \$100,000. And all of our lenders offer loans to those with credit scores of 600 and above, and debt to income ratios of 50% and below. We've worked really, really hard over the last 10, 11 years to expand our underwriting.

We've worked really closely with the lenders, the credit unions with the intent to serve more and more households that otherwise would not qualify for such low-cost long-term funding. Next slide, please. In fact, we're really, really proud of the fact that 56% of the residential loans that we have worked with our lenders who originate have been in low to moderate income households.

Next slides. So some observations that we have about this study. First, why did we choose to participate in this study, share our anonymized data, review the reports and working with this great team to answer any questions that we might have, that they might have. First of all, we'd love to learn from our industry peers.

There are other programs that are represented in this study that have really good data. We'd like to compare our programs to that, to see if there are things that we can do to refine our offering in our marketplace. And we think this is a really strong chance to use national data to support a case for the private market to continue to expand clean energy offerings.

What did we learn? We understand that our defaults are low, but we wondered if that was represented all over the country. And we did learn that that was the case. We also like to look at defaults compared to credit scores and access to low to moderate income communities.

And this study is fantastic proof that underwriting can be more expansive, especially in low to moderate income communities with good credit without adding additional risk. Next slide please. What are the implications? We're really excited about the possibility of continuing to expand underwriting without adding more risks.

For those that have had challenges with credit scores due to maybe medical expenses, a loss of a spouse or a partner, or discriminatory issues like redlining that prevented people of color from building credit, owning homes and building generational wealth, we think that these studies can be useful with lenders to prove that energy loans are good loans, and can be offered to those with credit challenges, and to those with limited income.

When you think about expanding the terms and making the interest rates affordable, the concept of using energy savings to pay for the loan payment becomes a reality. Eventually, we would like to see private lenders take this into consideration when underwriting the loans. We think this is a really unique factor that energy loans

provide, which is not apparent in some other competitors that were used in this study.

We also think that this report gives us opportunities to rethink the way that we structure the loan loss reserve. For example, with evidence like what's shown in this report, would the private market have the confidence to make energy loans available for longer terms, better rates, and for more individuals, perhaps without the loan loss reserve? And can we use public funding and other ways to advance the market?

We can then insert that pressure on things that really do need additional loan, last resort, reserve support or credit enhancements. For example, we might be able to use the loan loss reserve to mitigate the risk of making loans to those with lower credit scores, while our lenders offer loans for credit scores as low as 600.

What if we expanded beyond that? And what if we allowed energy savings to be included in the debt-to-income calculation? We'd love to begin to build a case for reducing interest rates, extending terms and allowing more to be financed, perhaps with the support of a loan loss reserve in a previously inaccessible market.

Also, we have the benefit of the loan loss reserve, but not all states have that. We've had the benefit of working with lenders that have been willing to expand their offering. Not everyone has had that experience. In order to address the climate challenges in front of us, we need to scale across the country and we need to scale up fast.

We think that this study proves that these loans consistently perform and should be the proof that the private lenders need to reimagine rates, terms and access for these high performing loans. Next slide, please, many thanks to the DOE and Lawrence Berkeley National Labs. We believe that this report can really be transformational to accelerating investments in clean energy.

Sean Williamson: All right. Thank you, Mary, for sharing your time with us today, as well as the wonderful data from Michigan Saves. What an exemplary program. Very happy to have you on with us today. All right. Neda, please take it away.

Neda Arabshahi: Great, thanks so much, Sean. Just to echo Mary's sentiments, we at Inclusiv are also very excited about this study. We think it's going to be completely transformational. If you could go to the next

slide, please. So Inclusiv is a national network of community development credit unions.

Our mission is to help low- and moderate-income people and communities achieve financial independence through credit unions. We are also a certified CDFI and have been working towards financial inclusion since 1974. If you could go to the next slide, please.

We have a network of 420 Community Development Credit Unions, and 25% of the credit unions across the country that are currently offering green loans, energy efficiency and solar loans, are Inclusiv members. I should also note that in our membership, 75% are low-income designated credit unions, 58% are Community Development Financial Institutions, CDFIs, 29% are minority depository institutions.

So our network is really working to serve those members of our country that are historically excluded from the financial system. Next slide, please. And so as part of this work, we realized that credit unions were really well positioned to get involved in the green lending space. And so we launched our Center for Resiliency and Clean Energy.

We are training community-based lenders, credit unions, loan funds, and community banks to offer accessible and affordable financing for clean energy and energy efficiency projects, particularly financing that serves the LMI and BIPOC communities. So we launched the nation's first Solar Finance Training Program for community based lenders in partnership with the University of New Hampshire.

And we've also been doing a lot of research into the role that community-based lenders play in green lending. And if you could go to the next slide, please. One thing that is really significant just to put this in the national context. LMI and BIPOC communities already have a higher energy burden. So the energy burden for low income households is three times higher than for non-low income households.

Black households spend 43% more of their income on energy costs than white households. And Hispanic households spend 20% more than Native American households, spend 45% more. And if you could go to the next slide, please. I'm sure many have heard about President Biden's Justice40 Initiative, which is to deliver at least

40% of the overall benefits from federal investments in climate and clean energy to disadvantaged communities.

So these are the folks who have the higher energy burden, they're most often first and most significantly impacted by climate change and there is now a national commitment to address that. If you could go to the next slide, please. And as I mentioned, Inclusion members, but credit unions in general, are already serving these Justice40 communities.

The members across the country in credit unions often are those that lack access to clean energy. As I mentioned, they have a disproportionately high energy burden. But credit unions are also really comfortable and well positioned with underwriting loans to those populations. And there's also, they have a very significant impact on the national economy.

They are over 5000 credit unions; they have combined assets of over \$1.7 trillion. They serve 113 million members across the country. And they're starting to build a track record in green lending and energy efficiency, electric and hybrid vehicle and solar lending.

There are 292 credit unions that offer or are developing green loans, and 61% of those credit unions offering green loans are either Community Development Financial Institutions, low-income designated or minority depositories. And to date, we have some limited data on the green lending. And they've completed over 1.3 billion in green loans over the past few years. Next slide, please.

Actually, I'll just focus on the bottom half of this slide. There are some credit unions that have gotten involved early in green lending and built significant track record or made very significant commitments to the space. One is Clean Energy Federal Credit Union. They're low-income designated credit union, and they exist just to offer clean energy loans and to make it easier for everyone to afford clean energy.

So they've originated over 4,700 clean energy loans just in their first three years of operating. So that's just one example. Lots of different credit unions have been getting involved in this space. Next slide, please. I'll just skip to the important points here. The 292 credit unions that offer or developing green loans have combined assets of over \$283 billion.

They're serving 17.3 million members and as I said, 61% are targeting LMI and BIPOC communities. So these are lenders that have commitment to financing green projects, they have a commitment to serving those that have been historically excluded from our financial system and from the clean energy movement.

And we at Inclusiv are providing training so that they're able to get their green loan programs off the ground. So there are many that are already working in this space but there are many more that have not entered the space yet. We've been training lending professionals. We've trained 76 financial institutions in solar lending, and we are expanding into energy efficiency lending as well.

And bringing it back to how this research will impact this community, this network of lenders, every single person who's taken our solar lending training program has said how do these loan portfolios perform. This is the kind of data that they need in order to convince their management, their board of directors, and their regulators to approve adding and ramping up energy efficiency and solar loans.

We'll also help them to determine the appropriate rates and terms and loan amounts and which credit scores and income levels to support. And in particular, I think Mary mentioned this as well, it will help them to figure out what types of supportive programs like credit enhancement are needed so that energy efficiency loans can actually be accessible to those who might not have access through typical underwriting processes.

We see this study as something that our network has been waiting for. And they've told us over and over again will help them to finance more energy efficiency loans for more LMI and BIPOC members of their communities. Next slide, please. So if anyone has any questions, feel free to reach out to me. And I'll pass it back over to Sean. Thank you.

Sean Williamson:

Excellent, thank you Neda. If I could invite our speakers to go on camera now for our Q&A. And invite our attendees to go to Slido if they've not already been there. www.slido.com, enter the code #DOE. And you can ask a question or up-vote the questions we already see listed on Slido.

And I'll start with directing a couple of questions towards Greg and Jeff. Some more characteristic questions about loans. And I suspect, Mary and Neda may have some thoughts on this as well.

But what are we seeing in terms of the percentage of loans that are going towards single family residential versus multifamily or commercial?

Likewise, do we have any insights or knowledge on the types of measures being financed with these loans? We have a question here about building envelope improvements, for example. Likewise, electric heat pumps, high efficiency gas equipment or renewable energy retrofits. I know it's a lot there. If I'm trying to condense a lot of questions into one.

Greg Leventis: I can speak to some of that. This is exclusively single-family residential loans. We did not do analysis on end-use types that were included in the projects. We unfortunately don't have the analysis for that part. I don't know if you have more to add Jeff, or if there are questions in there that I'm forgetting.

Jeff Deason: No. And perhaps Mary can speak to this for one program. But I mean, we don't, yes. We did not focus on end-use measure data for this analysis. We would expect that these loans basically comprise the combination of HVAC, type improvements and building envelope types of improvements with other assorted things mixed in.

That's what we generally see in programs of this type. And to be clear, as Greg mentioned, we removed any loans that had solar PV as part of the loan, and analyze those separately, which will be part of a separate product.

Mary Templeton: Yeah, I would just confirm from the Michigan Saves' point of view that most of them are HVAC improvements, building envelopes, including like insulation and air sealing. There are other types of improvements in there but most of them are related to building envelopes and HVAC improvements.

There was a question about heat pumps. We have not seen a huge implementation of heat pumps in Michigan yet. However, we are seeing more and more evidence of that these days.

Sean Williamson: Alright. And one more question. And I think we've probably got time for here. With regards to any subsequent studies in the works, that maybe look at loan performance of commercial buildings, look at performance of PACE loans, I saw that, as well as if there's any consideration of energy burden.

And measuring the correlation between that performance of these loans. Greg, and Jeff, maybe you can speak things in the works or potential studies that we might be able to deal with more debt in the future.

Jeff Deason:

A couple things. First, let's just be clear that none these loan programs don't offer PACE assessments. So there were no PACE assessments in the study that we did here. We do have a variety of work on both residential and commercial PACE that we have done. None of it is directly assessing the same type of financial performance of PACE assessments that we study here.

To the commercial question, Greg and I don't have any research in the works on that at the moment. There's always the possibility of future. We do have colleagues at the lab, in particular, Paul Matthew, who has done a lot of work on commercial mortgages and energy efficient, the relationship between mortgage performance and energy efficiency.

And by the way, we do have a study in the works on the relationship between residential mortgage performance and energy efficiency. A challenge in studying performance for commercial loans like these is that the loan pools are just a lot smaller. And so it gets a lot tougher to get results for a large number of loans.

And again, the programs are reviewed were almost entirely residential loans, and where there was commercial loans, we removed those. I think you asked one other question, Sean, the third question that I've forgotten.

Sean Williamson:

That's all right, Jeff, I think we've covered it.

Jeff Deason:

I don't know if others have anything to weigh in on here.

Sean Williamson:

Yeah. And I am going to transition to our wrap up slides if others have final comments or thoughts before we transition to that.

Greg Leventis:

One thing that I was remiss in saying was to thank Mary and Michigan Saves, Todd Parker there, the whole team there, they were just amazingly helpful and put a lot of work into it themselves. Thanks a lot, Mary.

Jeff Deason:

And the same to all three of the other programs who did have to go to some effort to get us the data for this study. I do want to note that there were a few questions that I saw in Slido about on-bill loans and all those questions will be addressed in the written

report. We did observe some interesting and perhaps surprising results there.

And I don't know, Sean, if we're able to answer Slido questions after the fact. But if so, maybe we can throw a few replies. And again, the main event will be when the actual report is released, we will be speaking to this stuff.

Sean Williamson:

Fantastic. Well, let's transition to our wrap up slides here. Leave folks with some resources to know where they can find more. Let's go ahead and highlight that I'd like everyone to check out DOE's excellent energy efficiency financing resources. Highlights include the Better Buildings Financing Navigator, the SEE Action Network, Financing Resources, and Financing Resources housed on DOE's State and Local Solution Center.

Whether you're a building owner looking for guidance on the most suitable financing for a project, or a public sector energy professional looking to design a financing program, we've got something for everyone. You can explore these resources, which are linked in the handout shared in Zoom chat. Next slide please.

This webinar is part of the 2021/2022 Better Buildings Webinar Series. As you can see, we have a great lineup of presentations through April. Visit the Better Buildings Solutions Center to learn more and register for these upcoming webinars. Next slide please. We hope you will join us on December 7 for our next webinar titled, Assessing and Reducing Embodied Carbon.

Join this webinar to move from theoretical assessment and reduction to practice as panelists share real world examples tackling embodied carbon, exploring lifecycle assessments and building design renovation to reduce CO2 emissions. Next slide. If you're interested in learning more about the topics discussed today, I encourage you to download our additional resources handout in the Zoom chat box.

The handout contains links to resources from the Better Buildings and our speakers. And our final slide. We have some contact information. And I definitely want to thank our panelists, presenters, all those who've advised and helped to review the forthcoming SEE Action loan performance study. It's been tremendously helpful.

We're very excited to be approaching the release of this study within probably the next two months. I encourage you all to follow

the Better Buildings Initiative on LinkedIn and Twitter for the latest news, as well as stay up to speed with the State and Local Solution Center as well as LBNL for the release of this study.

So thank you very much everyone for attending today. Thank you to our speakers for bringing your expertise and energy. And I hope everyone has a great afternoon.

[End of Audio]

Additional Speaker Q&A:

Better Buildings does not endorse or recommend any product or technology provider. The answers in this document are solely the opinions of the speakers based on their professional knowledge and experience.

Additional Questions

Audience member: What are the interest rates, if any, charged on these loans? Does the loan payment equal the energy cost saving each month?

Greg Leventis: Interest rates range from 0%-8.99% with an average and median of 5%.

Most of the studied loans do not have requirements that the loan payment equal the energy cost savings each month. We did not have data on estimated energy savings from most of the studied programs.

Audience member: Did you draw any conclusions based on the type of program? eg - on bill pay vs PACE vs another type of security?

Greg Leventis: None of these programs use PACE and no PACE loans are included in the analysis.

Jeff Deason: As the report will discuss in more detail, we observed higher delinquency rates on NYSERDA on-bill loans than on other loans, though not higher loss rates. Per the program structure, any utility bill delinquency hits the on-bill loans first, so any bill delinquency immediately makes the on-bill loans delinquent. As short-term utility bill delinquency is not uncommon, we believe this likely explains the finding.

Audience member: Are any similar reports in the works for commercial buildings/ commercial building owners?

Greg Leventis: Not currently. There are a number of challenges to the same type of study on commercial buildings including that there would be fewer observations.

Audience member: Will USDOE provide new grants to S&L govts for EE financing? I was part of a USDOE team 2010-12 to program use of ARRA grants & leverage commercial finance. There is a toolkit from this work. Thank you!

Sean Williamson: Various provisions under the recently passed Bipartisan Infrastructure Law will include grants to states and local governments. More information will be available in 2022.

- Audience member:* I wonder how a borrower's energy burden (percentage of income toward electric utility bills, for example) correlates with credit score? Outside the scope here probably but of interest.
- Greg Leventis:* That is definitely of interest but out of the scope of this study, as we did not have energy expenditures in our data.
- Audience member:* Why is the focus on the relative failures of repayment, rather than on the actual energy efficiency improvements? Did the failure to repay these align with poor energy efficiency improvements?
- Greg Leventis:* The objective of the analysis is to provide performance (i.e., rates of payment and non-payment) data on these programs. We did not have energy consumption data or project end use data to conduct an analysis of what may have contributed to the instances of nonpayment. However, there are many factors that could impact nonpayment, most of which are separate from energy costs.
- Audience member:* Why do you think NYSERDA's (and to some extent Smart-E)'s delinquency rate is so much higher?
- Greg Leventis:* As noted above, the structure of NYSERDA's on-bill loan makes it more susceptible to delinquencies, although the losses are in line with the other loan products. Our regression analysis shows that some of the difference in Smart-E delinquency is due to loan and borrower factors, but some differences persist between programs. It is beyond our scope to explain all differences in program performance - indeed, our primary objective is to render the performance of efficiency lending broadly, not to parse these differences.
- Audience Member:* What factors account for the 5:1 ratio of delinquency rates between MI (low) and NY (high)?
- Jeff Deason:* Some of these factors are discussed in the responses above. Again, we cannot explain all differences between programs.
- Audience Member:* Does it cover for multi-family/rental property owners??? It could help reach out to LMI population (often not home owners). What kind of co-benefits are taking into account (health benefits)?
- Jeff Deason:* Most if not all of the loans in the dataset are to single family residences. It is possible that a few small multi-family buildings (e.g, duplexes) may be included, but no large multifamily buildings/owners. Co-benefit analysis was outside of the project scope.
- Audience Member:* Will you be presenting loss and delinquency rates for on- vs. off-bill loans in the forthcoming reports? If so can you share the results?

- Jeff Deason:* See the response to a similar question above.
- Audience member:* Was there analysis of repayment rates relative to the energy cost savings received? (e.g. better payment when substantial lowering of energy costs?) If so, does this suggest importance of approving "value-likely" EE measure baskets?
- Greg Leventis:* This analysis was out of scope for the project. We did not have energy consumption data to conduct an analysis of what may have contributed to the instances of nonpayment. There are many factors that could impact nonpayment, most of which are separate from energy costs.
- Audience member:* I understand that Michigan Saves has included cannabis operations as eligible entities for the program. Is there any data regarding the delinquency rates or other key takeaways from this subsector yet?
- Mary Templeton:* Cannabis operations are commercial loans. Commercial loans were not included in this study.
- Audience member:* Q to Neda: as the slide lists 40% of resources will go to disadvantaged communities- does it mean for individual households (single-family) or: multifamily serving low-income will qualify as recipients of these investments in clean energy?
- Neda Arabshahi:* This 40% of resources should reach both single family and multi-family properties. The White House has defined this at the community-level rather than the individual level.
- According to the White House, "Justice40 is a whole-of-government effort to ensure that Federal agencies work with states and local communities to make good on President Biden's promise to deliver at least 40 percent of the overall benefits from Federal investments in climate and clean energy to disadvantaged communities."
- You can find more details [here](#).
- Audience Member:* While you did some work on PACE, it was not included in the study. Does the PACE inclusion of secured loans & no underwriting, and worse loan performance, also support your conclusions for these more successful programs?
- Jeff Deason:* We have done other research on PACE, but have not studied repayment rates of PACE assessments, either in this report or elsewhere.

- Audience member:* Most data is through 2020. Too early to tell if charge-offs jumped during pandemic?
- Greg Leventis:* We do not have data post-pandemic impacts to be able to tell.
- Mary Templeton:* We have not seen an increase in charge-offs since the pandemic began.
- Audience member:* Can you say again whether the report itself is published yet, and if not when it will be?
- Greg Leventis:* We expect the report to be available sometime in Q1 2022.
- Audience Member:* It looks like income predicts delinquency even when you controlled for credit score. What can be done to address the greater risk being presented to lower income borrowers?
- Jeff Deason:* We do not investigate this question in the report. Still, one can imagine risk-sharing mechanisms - such as loan-loss reserves, which Mary discussed on the webinar - that could provide mitigation for certain classes of borrowers. Our data can help set expectations for the performance of various borrower classes.
- Audience member:* What data would lenders need to apply this to commercial property? And, are you planning a follow up study on commercial assets?
- Greg Leventis:* Commercial loans are very different in a number of respects, and we would not recommend attempting to extrapolate our results to commercial properties.
- Not currently, as discussed above.
- Audience member:* Along with upgrading energy efficiency, is anything done to assure that indoor air quality is maintained or improved?
- Jeff Deason:* This was not something we investigated in this project; this question would be better directed to the individual programs.

Put Your Money on It: Investing in Energy Efficiency

Additional Resources

Learn more about the topics discussed on the webinar by visiting the resources below.

Better Buildings Resources

- Better Buildings [Financing Navigator](#) 2.0
- Energy Savings Performance Contracting (ESPC) [Toolkit](#)

Explore more resources on the [Better Buildings Solution Center](#)

Other Resources

- State and Local Energy Efficiency Action (SEE Action) [Network](#)
- State and Local [Solution Center](#)
- Lawrence Berkeley National Lab Financing Energy Efficiency [research](#)
- Lawrence Berkeley National Lab state and local government financing [report](#)
- [Application](#) for Inclusiv-UNH Solar Lending Professional Training courses
- Inclusiv 2021 Clean Energy [Brief](#)
- Inclusiv and Center for Resiliency and Clean Energy [webpage](#)

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