

# SMB\_BR1\_Retrofit

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## SUMMARY KEYWORDS

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But first I'll introduce myself. I'm Laura Cameron. I work at the International Institute for Sustainable Development with my colleague, Zach um, we the iisd is a think tank working on environmental and Sustainable Development Research and Policy. Um, we work internationally, but we're actually headquartered and based here in in Winnipeg, and our team, the team that Zach and I are part of work on energy and climate policy, both in Canada at the federal level, and also here. And what we're going to talk about today is actually a project that we're kind of in the midst of. So it's very much a work in work in progress, and we welcome any thoughts, comments, questions or input. But basically, over the last number of months, we've been working on this project, exploring how to transition the building sector in Manitoba to reach net zero, to get off of fossil fuels by mid century. What does that look like, especially given kind of the old building stock that we have in Manitoba, and the sort of angle that we've taken with this research is really focused on kind of the social side of things, looking at workforce implications and equity implications and opportunities of this transition in our building sector, and particularly, what kind of policies and safeguards can we put in place to make sure that you know the transition built in the building sector doesn't worsen inequality and ideally improves things For those most marginalized by our current building system. And we have been working on this research with the CCPA Manitoba, the Canadian Center for Policy Alternatives, as well as Professor Mark Hudson from the U of M with the support of the Winnipeg foundation. So just to shout out those folks who are very much a part of it, and thus far, we've done sort of a range of literature review and interviews with experts in the sector across the province, and we're still kind of synthesizing the findings and writing up a report, which we will be publishing later this spring or early summer. And so we'll definitely distribute that through SPM channels when the time comes, we can



02:24

go to the next slide Zach,



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so as we'll talk about a bit more, there's obviously lots of challenges with decarbonizing the building sector, which many of you may be familiar with. And some of the pieces that we've

been thinking about and looking at is sort of where to strike the balance between deep energy retrofits and increasing renewable energy generation, especially in the Manitoba context, given our kind of unique grid and we've been focused on, as I said, implications for workforce, for governance and procurement, as well as the the finance side, looking at potential financing mechanisms and pathways given kind of the Intense investment needed for to make energy efficiency uh, reality in in buildings here, um, and, yeah, we recognize that there has been some great research done on this in the province, um, already, um, and especially by the road to resilience team and others who are focused on kind of this intersection between buildings and climate and energy efficiency, and so we're hoping to to build upon that work. And Zach has really been leading the way on this project, so I'll pass it over to him.



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Thanks, Laura. I'm going to talk a little bit about deep, deep energy retrofits now, yeah, like Laura said, sustainable building, Manitoba has done such a good job promoting, you know, talented speakers, and we're, you know, we're drawing on on a lot of that literature here deep energy retrofits, or der is, is describes when your house is renovated to reduce energy use. So it's much more comprehensive than a typical retrofit. Some of you might be familiar with programs like the greener homes grant, where you can get some some money to to get new windows or new doors or something like that. But a deep energy retrofit is when, when, when serious construction happens on your house to to substantially reduce energy, energy use in your home. So this picture is of a design method called the Larson trust method. Essentially what happens is they build a new house around your existing house and allows them to put a huge amount of insulation in there. And our research is focused focusing specifically on residential homes rather than commercial homes. So. Yeah. So the first step is to kind of assess the housing stock, the housing stock in Manitoba. Manitoba has the oldest, or one of the oldest housing stocks in Canada, with 16% of all homes built prior to 1946 this matters, because older homes tend to be pretty terrible from an energy efficiency standpoint. In the 1990s building codes got upgraded significantly, and energy savings in the housing stock jumped significantly as well. The other thing about the Manitoba housing stock that needs to be taken into consideration is just the cold climate, as we all know, the temperature swings here are pretty, pretty extreme, and this creates a an issue for peak demand in the coldest time in in the winter, there's just a huge amount of demand on the system. And this is, this is a real, a real challenge for our energy grid. And this graph shows about how energy gets used in the residential sector. It is mostly for space, heating, cooling. Cooling a space requires a lot less energy than heating space does. And so this is just represents a massive challenge across Canada, there's somewhere around 11 or 12 million residential buildings that need to be retrofitted. That includes, like almost every single building across every single residential building across Canada needs to be retrofitted, or, pardon me, Manitoba as well. So the state of deep energy retrofits in Manitoba today, the first thing to point out is that they're just incredibly expensive An average home like, what might An average home be like three or 403 or \$400,000 in in some neighborhood might like, it might cost an equal amount. It might cost, like, 300,000 or \$400,000 to do a full retrofit. We don't have solid numbers on this yet, but if you talk to people in who are doing these retrofits, that's essentially what they're saying. It's just incredibly expensive, and there's a small niche of builders in a Manitoba market today that can do that work, and they and they do do the work, and they're engaged, and they're doing important, important construction work there, but really it is only a relatively small sector of people who are essentially paying for it out of pocket. The other thing to talk about is funding. So if you look at Canadian programs like the greener homes grant, it's a federal program. It's probably the most well known building energy retrofit program for residential spaces. What you

find is that they're really good. They've been really effective at promoting smaller retrofits, but these more comprehensive like massive, deep energy retrofits. If they don't have, they don't really have the juice to promote these kind of retrofits, and mostly it just comes down to funding. Like, like, I said, they're just so expensive. The greener homes grant caps out at five grand. So if you just think about it, like, let's say you're a homeowner. I mean, if you have an extra two, \$300,000 sitting around then, then you can maybe undertake a deep energy retrofit. But just for most people, it's just out of it's, it's, it's beyond, it's beyond their means. And so you take the five grand from the greener homes grant, and you you get do as best as you can. You get new windows and new doors. Costs add up, and then that's, that's basically all you can do. The issue is getting new windows and new doors doesn't actually make a dramatic impact on emissions. It is one of the factors, but it is not like the single biggest factor. And so this organization called Green Communities Canada, this federal organization, did an analysis of the greener homes grants and kind of the retrofitting programs. And what they found is that they, as I said, that they've been very good at stimulating these smaller retrofits, but, but energy savings have been limited. And then this graph in the bottom left shows how many of these were deep energy retrofits, and they tried, with their policy mechanisms to boost that and get more and more Canadians doing these deeper retrofits rather than the smaller retrofits. But it's still a very small amount. It's like 6% of all grants. And just to make it clear, like people in these spaces are doing the best they can, but there's just limited funding, and that's really one of the main, you know, the main things that that's holding us back. So in terms of policy for achieving emissions reductions in the building sector, the big thing that we're looking at in Manitoba. Is we're trying to achieve a balance between doing retrofits and also implementing a renewable energy technology. So on one hand, we have to retrofit buildings as efficiently as possible and as economically as possible, but on the other hand, to do a full scale retrofit on every building is kind of out of the it's just not feasible. And this is, this is something that a lot of retrofit builders are talking talking about. So we're kind of trying to figure out what exactly that balance looks like between doing them the most efficient, the most economical retrofit we can do, and and couple that with renewable energy system. So and finding exactly what this balance looks like is very challenging. This is something that we're still struggling with. We're still like wrestling with this in our own research that's going to be published in the summer, where we'll have a little bit more, more detail fleshed out here. And the reason it's so difficult to determine this because it's, it's really, it goes on a house by house basis, that a house built in the 90s, let's say, requires a way different system than a house built, you know, in in the 30s or the 40s. And this comes down to just so many different factors, insulation, the roof, how this how the basement is built, old windows, doors. There's so many different factors that come into play. And this is where enter guide comes into play as well. And our guide is the system. It's basically the federal system, how we how you get grants. So first the under guide person comes into your home, and they do like an analysis, and then they say, Okay, we recommend, if you're going to do retrofits, we recommend this, this and this. And then afterwards, they come back and they do another analysis, and they say, Okay, you saved this much energy, and we can quantify that. And it's been a very effective system. It works really well. And so what the most intelligent way to pursue a comprehensive retrofit strategy is to is to rely on this energy enter guide data so that we can have, like a comprehensive understanding of what needs to happen in all these homes. And one thing we're looking at is doing limited deep energy retrofits. So maybe not doing a full scale, 100%



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you know, deep energy retrofit, but just doing



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the, like I said, the most economical and the most efficient thing you can do with the resources we have. So something that builders talk about is air sealing, making sure that it's there's not just cold air coming in and the hot air just flowing out of your house, which is pretty much exactly what happens in a lot of old homes and and also just adding insulation there are kind of like, like, I guess you could say the low hanging fruit, like, what are the simplest like, Most obvious steps we can take to do to achieve significant emissions reductions and to achieve significant energy efficiency in buildings. The other element of this is the potential of ground source heat pumps. If you're familiar at all with sustainable building Manitoba, you know about ground source heat pumps, basically, and that's an image I have pictured here. And basically it's, it's a lot more efficient than just a traditional heating, traditional electric heat. This is also referred to as geothermal technology. Basically, it uses one quarter or 1/3 of the electricity required by a conventional heating system, and almost half of all heating in Manitoba comes from electric heat, and it's a very inefficient use of our energy. So basically, if you take a conventional house and switch it to switch it to geothermal heating, you can save a significant amount of energy. So with every house that you switch over away from electric heating to geothermal heating, it opens up space on the grid for more to to create geothermal heating for even more homes. So if you talk with someone, for example, some of you may have heard someone like Ed Lorenz talk about geothermal. He points out that we spent \$1.3 billion on what im dam. I think we're all familiar with the situation of dams in northern Manitoba, that they're very ecologically destructive and they're pretty brutal for indigenous communities as well. Instead of spending billions of dollars on a on a new dam, we could spend instead hundreds of millions, like we could spend less money than a dam cost to save the equivalent or even more energy. But because of how Manito hydro structure, they're not looking at energy savings as much as they are. You know, renewable. Energy generation, hydro, energy generation. And so around of there are 3000 buildings in Manitoba, and less than 1% of them are currently heated with geothermal technology. And then one other thing I would want to talk about here is a neighborhood based approach. Like I said, one of the main challenges here is that so many different there's so many different homes, so many different housing types, that it's very difficult to create one overarching kind of comprehensive building, comprehensive building strategy. And one approach that some neighborhoods have been taking is a kind of a neighborhood based approach, where we go, okay, all homes built in this style, between whatever 1996 and 1998 they need this retrofit, and then this is the way that you can achieve economies of scale, where things start to get very efficient, things that start to get very cheap, because you have this kind of system, systemic approach, rather than going every house, like, house by house, going, okay, like, what Does this house need. What does this house need? So the neighborhood based approach is something that also has potential to



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to promote significant energy savings.



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Another thing that we want to consider here is the issue of procurement and public policy. So procurement basically refers to this idea of the government acting as a purchaser for the industry. Some of you in climate spaces might have heard of this book by Seth Klein. He wrote

a book called *The Good War*, where he compared mobilization of the Canadian government for World War Two with the mobilization that we need for to to achieve our, you know, our climate targets. Um, so one thing, like, one example from in the book, is that he talked about, like, the government manufacture of the the things we needed for the war. They didn't make they didn't create market conditions to incentivize, um, businesses what they did, they just started building like tanks, and they just started building machines and planes and these kinds of things. And then so when a business came on to start making tanks or making truck tracks, pardon me, trucks or whatever they were, they couldn't kind of screw over the government and make a huge amount of money, because the government was very tightly controlling how much every industry was producing, and a number of people in Manitoba is building industry. Reference this book because it's a very kind of common sense and approach to how we need to be mobilizing for the climate as well. A similar book was written by an economist, an economist by the name of Mariana mozucato, who writes a book about mission economy, and she uses a similar comparison with the Apollo Project. There are so many examples in American history as well of the government making these kind of massive public investments. So for example, the Apollo Project was when they tried to land someone on the moon. And this was a massive public project, and it was run very efficiently and very economically by the government. And because of neoliberalism, of course, we've seen a shift away from that to all this kind of market centered thinking. And it was interesting for me, in the research doing that, that this kind of these kind of references came up in the Canadian literature as well. So pictured here is a report by by efficiency Canada, where they talked about our Canada's climate retrofit mission. And the word mission, there is a reference to mazzucatos mission economy, where she talks about that the governments need to have. We need to have mission oriented policy goals, and this is what we need for the for the public sector, but pardon me, for the building sector as well, because the our targets are so ambitious, like if we were to take climate change seriously, if we were to take to take our our building goals, seriously, it would be it would represent a massive shift in how we how we approach public infrastructure projects. And this is the kind of, this kind of bold, ambitious, entrepreneurial thinking that needs to be embraced by the public sector. And so this is another important part of of what, of what our research looks at here. So the the main example that's relevant in the Manitoba context is, is starting with Manitoba housing, or maybe like indigenous owned housing, and start to build an economy around an economy of building energy retrofits, around these around these types. I. So the other element of this is that that is the significant amount of job creation and workforce development that that we need for this. If we it is possible to quickly train a large workforce to be able to do this kind of work, we want to avoid a situation where der workers are turned into kind of assembly line workers. And instead, we want to make sure that these workers are getting skills they need to, to build careers, rather than just kind of be used as, yeah, like I mentioned, assembly line workers and the issue, it's not an issue of a labor shortage, but rather an issue of skill shortage and building skills proactively will can can address this kind of supply issue. The other issue that came up in our interviews was around employment, around energy modeling, the way funding works, for for energy modeling has been or basically like, for example, enter guide workers if you want, like an inner guide person, to come to your house and evaluate energy efficiency in your building. I mean, this is an important set of skills to have. It's an important job to have. But the way the funding has gone is that if funding all of a sudden gets cut, like we've talked to der builders, who all of a sudden they need to, like, like, a whole bunch of their workforce gets fired, and all of that development of skill and industry kind of gets lost, and then maybe there's funding. Funding comes back five years, 10 years later, and then they have to kind of rebuild this, and it's very disruptive. So a big part of this is creating stable, long term funding to make sure that there is the jobs we need for for building energy efficiency experts as well.



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Another issue is



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the issue of quantifying retrofit building stock to help Gage, to gage the effect on employment. So in the Maritimes, the Maritime Provinces, they they're assessing the number of homes they need to retrofits that they need to retrofit, and their requirements, for example, how many heat pumps do they need? You know, how much, how much building material they need. And and this is, this is also a way to kind of predict employment and support, you know, employment in the field. So finally, our research is going to come up with a series of of recommendations. Some of these are relatively straightforward that many of you will be familiar with. For example, building the building code needs to be upgraded. Item. Not going to go into detail here it's, you know, this is very clear. Other Other things are like supporting a geothermal utility in Manitoba. This is something that the road to resilience documents have have talked about that something that we support as well. We mentioned a government run procurement strategy. And then there's other smaller policies as well. For example, mandatory building energy efficiency labeling, like, if you buy a house today, how efficient it is, or how efficient the heating is. It's some it's like this small, little afterthought that almost doesn't even come up, which, if we're going to take climate change seriously. That's, which is, that's, like, pretty unacceptable. And there's other places in Canada, for example, in Alberta, they're pushing for this, that if you buy a house, the government, like you are forced to create a rating, like, how energy efficient is this house? And then that's going to affect the market price. And so there's other smaller things like that. And we don't have a firm list to share with you quite yet, because we're still in the process of it, but that's that. That's basically the gist of our research. And I left a few minutes for questions as well, if people have any thanks,



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amazing. Oh, Laura, you can take it if you want to go for it. I was just



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going to say there's a few questions and some good discussion happening in the chat. One piece around embodied carbon and how, you know, where's the kind of trade off between replacing buildings? Versus retrofitting, I think both from an economic perspective as well as from an emissions perspective. And that is obviously a huge question, one that we've been talking about a lot in our research. I think it's definitely something we're going to incorporate in the report. I don't think we're going to be able to do a full, kind of, you know, really robust, like, calculations with, like, including the full life cycle emissions, because there's just the the data is very hard to get. I would say, um. But I think it's definitely something we're flagging. I don't know, Zach, if you have any more comments on that, that piece



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on the data issue. Um, on the

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like, embodied carbon and and where the trade off is between replacing buildings versus retrofitting?

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Yeah, the question of replacing buildings versus retrofitting is very challenging. I'm not exactly sure what to say about it. It comes down to a house by house basis. Like, if there's some smaller, older homes, like in the in, in, like, let's say the North End, that maybe cost \$100,000 but my the deep energy retrofit cost might be like, 300 or 400 and then and and then this leads to all kinds of there's this other social aspect as well that we need to make sure that equity is a strong component in here as well. And this, this opens the question, opens the door to kind of a series of of issues that we need to take into consideration. And unfortunately, I wasn't able to get into into that section in very much detail here, should I go through the list and kind of address some of these questions

 26:06

here? Yeah, I think maybe the next one that I saw was around private finance, like, what is how do we incentivize or attract private finance into or to participate in this. I think that's an area that Mark Hudson is sort of leading in our research, that on this finance side, and one of the areas that he's sort of exploring is the role of, or the potential for public banking, like capitalizing a public bank that could, you know, finance, a lot of these projects on like a neighborhood in the larger

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scale, so that we don't,

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yeah, so that we can kind of lead with,

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or proceed with public investment, even if the private market isn't, kind of leading the way. But I don't know, Zach, if you have more to say on the finance side,

 27:03

yeah. So we're doing this research in collaboration with the CCPA and the U of M. Those people aren't here with us right now, and that's kind of we we let them, yeah. Sorry, that's not exactly my area of expertise, but it is. It is a very important part trying to mobilize private private finance. Sorry, I can't give them any details about that right

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now. I see one comment in the chat about monitoring reporting on embodied carbon, like they have required in Vancouver, which is not something that I was aware of personally, is definitely something that we should look into, I don't know exactly if you're familiar with

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that. Again, there's so many elements to this here, like the element of finance and labor and even colonialism and social equity. And then there's embodied carbon as well. It would have been great to get into embodied carbon a little bit more. If you think about like, think about almost every exterior facing a wall on every building in Manitoba needs to be retrofitted. The amount of building materials that are going to be required is just astronomical. It would be good to have a very thoughtful approach to embodied carbon on this as well. It's, I'm not sure that's something that we've been able to really dig into as much as maybe we could have. So

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I appreciate the comment, though,

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no. And I think, Zach, you're absolutely right. It is a multivariate problem, right? Because the first thing is, does it even make sense? I think one I'm I'm Steve Wilson in Vancouver, and hearing that there's houses for sale anywhere in Canada for \$100,000 just makes me cry and want to throw up a little bit. But, you know, in different markets, what's the incentive? I was talking to a contractor in Calgary who was saying, and he does deep energy retrofits, and the first question he asked is, should we do this? Because if this house is going to be better as a duplex, a triplex or quad Plex, and in Vancouver, they recently allowed up to six plexes on a single family lot. Is that, you know, if we do this deep energy retrofit for 300 grand, is the house going to be here in 10 years, right? Would it be better to not do it and for sure, just increase the density, right? So the first question is, does it make economic sense? Is the next owner going to continue this? Because most people I'm I've seen some research kind of view their home ownership at about seven, eight years and then, and then after the financing, question is, what do we do? And how do we do it, and what's the best decision? So you're absolutely right. It is, it is complicated and and really excited to learn about the specific concerns in Manitoba.

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Yeah, yeah. I think that's a great point, and that's also something that's come up through the



conversations that we've had with interviewees, is around the yeah, there's efficiency at the building level, and then there's also other types of efficiency, like density, for instance, and that's something that we need to factor in. Because, of course, if you, if you build a do. Complex or quad Plex on a single family lot, and you have, you know, four times more people living there. You increase the efficiency per capita far more than you would by retrofitting that house. And so I think there's a there's, yeah, as we've sort of began to unpack this research, definitely like, I think we have more questions than we started with. So this report will be more about kind of flagging, some of these, you know, laying out the kind of lay of the land, and some of those practices, like what's happening in BC and other jurisdictions, and sort of some of the considerations around, how do we reach economies of scale, how do we balance kind of the economic and the emission side when it comes to replacing versus retrofitting? And yeah, I think considerations around density and other sort of forms of efficiency are a huge part of that. So certainly won't have all the answers, but we'll have, hopefully a few more answers by the time we publish our report.

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I see one more question there about, how does the public bank idea differ from government operations, taxes used for public infrastructure?

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Yeah, I wish Nile was here to kind of dig into the public bank,

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public banking element. Laura, do you have thoughts on this?

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Yeah, not. I can't speak with any authority on public banking. Sorry, we'll have to circle back to you on that with our fellow researchers.

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Yeah, once the report comes out, this question will be addressed in detail, though. So, you know, weight and eager anticipation.

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Would it be similar to some of the PACE programs that are that I that are in Ontario, or the seat programs in Alberta?



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PACE is an important part of this. Um, it's a very, it's a very important it's a very important thing. But there's also an element of this that that just at some point needs to be undertaken by by the public sector, rather than putting putting it on individuals. And again, this comes back to even, like, what we were just saying about efficiency, like, is it efficient to do to raise building efficiency in a in like, a row of single homes, or maybe, does it make more sense to, like to build a giant multi unit residential building, and then, then the funding for this is all, is all much different, but yeah, again, like I said, sorry that we can't give as much detail as as on the financing element of these of this year. Yeah.