**Chris Higgins:** My work focuses on single family and all residential under three stories. So Vancouver's path towards a hundred percent renewable. We have our own building code. Vancouver's somewhat unique in that way, although also Whitehorse and Halifax also have their own building codes.

We regulate both energy as well as greenhouse gas emissions. My role has a new build focus, so a new construction. And as of just I guess two years ago now in 2021, I started to shift about half my work to an existing home focus. So a lot of the presentation covers new builds. This is the biggest building, the, certainly the highest building that would be regulated through my work.

It's a three story multi-family building. But more typically a lot of what we see is a single family. I think everyone knows this, but there's an opportunity to take action and Vancouver's acting to limit emissions. So one thing we've done is we've declared a climate emergency.

I won't go into too much detail, but if you Google Vancouver Climate Emergency, us, like hundreds of other municipalities have declared a climate emergency and we're trying to limit the warming to 1.5 Celsius. We believe it's technically achievable and we're working to use a mix of different partnerships.

There's a number of big moves. I'll only talk about one of these today, but we're trying to become a more walkable city. We're gonna have 90% of people with an easy walk of their daily needs. We're trying to have safe and convenient transportation in transit, which is big move too, and have over two thirds of trips by 2030 be active transportation and transit which will be 10 years earlier than the goal we set about 10 years ago. We also want to switch to pollution free cars and trucks and buses. So 50% of the kilometers driven in Vancouver's roads would be zero emissions vehicles. Today, mostly what I'm talking about is big move four, which is zero emission space and water heating.

So by 2025, all new and replacement heating and hot water systems being zero emissions. We also want to lower the emissions. And the lower the embodied carbon in construction materials. And so by 2030 we want embodied emissions in new buildings in construction to re reduce by 40%.

The last big move is restored coastal forests and ecosystems. We've worked to develop negative emission targets that can be achieved by restoring forest and coastal ecosystems working with other jurisdictions. But as I said today, I'm really talking about big move four zero emission space and water heating.

So if we look at emissions in Vancouver, 50% of our emissions come from burning gas, natural gas in buildings for heating and hot water. 38% comes from burning gas and diesel and vehicle. And then a small amount comes from electricity and waste. The third and fourth place, but pretty distant third and fourth.

I think it bears a, looking briefly at what Vancouver builds. Vancouver's a holds the title of Dense city in Canada. And still almost 70% of what we build is low rise residential. So a lot of single family homes, some duplexes, town homes, or homes, all this is increasing. The number where we are increasing the number of duplexes, town homes, row homes, and low rise residential.

But single families still fairly dominant. Although duplex is as of last year getting close to taking the throne as the most built form. If we look at last year, we issued permits for 601 town homes, 369 single family homes, and 360 4 laneway houses. Vancouver City of Lanes. Most homes have lane at the back and we have allowed Laneway homes for more than the last decade.

And we issued permits for 86 duplexes. We often get the question why now? There's other challenges that, that we're fighting. Climate change is a huge challenge and a huge issue, and we need constant progress. So we often get that question from council. So now I'll talk about what I think a lot of people are most interested in is Vancouver's goals and our approach.

I really want to talk about one of the goals I have, and the city has is lowering energy use. So if we look at a average house where we, which we issued a permit for in 2006, I used around 20,000 kilowatt hours for space heating. And if we fast forward to 2019 after two code updates we're down to 7,000 kilowatt hours.

And then with our latest code change in 2022, which is now enforced, which requires electric space heating and water heating, which is often done with a heat pump for space heating and cooling, we're down to 1900 kilowatt hours annually. So pretty significant, greater than 90% reduction over that time period.

And it's really allowed us to switch to electricity cost effectively. So if you look at a house which we're issuing a permit for in 2022, it's spending less annually than a house built in 2019 or any house built prior to that that's heated with gas to heat with electricity, with a cold climate heat pump.

The efficiency has really enabled us to switch to heat pump or other electric source. Another way to look at it is in terms of the greenhouse gas impact. We went from 5.4 tons to just under a ton. Part of that was efficiency. We have, I would say, the strongest building code in Canada, maybe with the exception certainly in the provinces, the strongest building code.

White horse in the territories, they have a stronger building code than us, but they also have a much colder climate. So the efficiency requirements that we have for air tightness, for wall insulation for windows, for example, we went from U 1.8 windows to U 1.2 windows. So the best windows that are available from all local manufacturers.

U 1.2 is either a fairly basic triple glazed or the absolute best double glazed in a fixed window. So we really made significant progress there, but it all hasn't been code changes. We also have a passive floor area bonus. So for passive house on the PHI standard, we give a 15% floor area bonus for single family homes and an 18% floor area bonus for duplex homes.

For net zero if you're familiar with the Canadian Home Builders Association Net zero program, we offer the same 15 to 18% bonus. But you also have to have no gas on site. So you're not allowed to have gas piped to the home. So we offer that floor area bonus. The uptake has been huge.

Almost 20% of new homes are built to one of those standards. So pretty significant win there in terms of transforming the local supply chain, which I'll talk about shortly. We also have Passive House trades trained inspectors. So if you're building a passive house, you can get an inspector and he or she has his or her trades credential from Passive House.

So they understand what you're trying to do and they'll work with you to proactively Avoid any delays in the construction process. We really tried to build local demand for high performance windows Passive House Windows. I've presented every year for five years at the local fenestration BC conference, which is our window and door conference to outline each year how many manufacturers are making passive house windows and how many projects there are to show that kind of continual growth.

We also have a passive house civic building policy. So all of our civic buildings, fire halls, daycares, office civic office buildings, community centers, they all are being built to passive house. And we tie that with strict code enforcement. So we issue stop work orders when fraudulent products are being used, which we have had some challenges with windows specifically.

Couple of quick images. This is Fire Hall 17. So it was our first passive house certified project. Replaced the fire hall 17 that was torn down after the building was no longer usable. And it is also can be great independent. So it has solar photovoltaic on the roof, and then it also has a generator on site.

That was our first attempt at a passive house project. And this was our second. Now this is two daycares. One interesting thing about this is an urban site. It's right downtown. It is on the sixth floor of a parking garage which is outside. And these parking spaces were our least used parking spaces cuz all the other floors have a roof over them so it's dry and closer to the street.

So we're able to take really low revenue spaces. And turn them into a daycare in case in this case it's actually two passive house daycares. Just a couple quick photos of those. All the windows you see there are from Cascadia, windows and doors. A local window and door manufacturer that's invested in all of their lines.

You can now purchase in a passive house certified product, or you can get a double glazed product as well in the same line. It's really a pretty significant transformation. One policy I wanted to talk as an ice breaking policy before Vancouver switched to no longer allowing fossil fuels for space heating and hot water, we set a requirement for large homes homes over 325 square meters, roughly 3,500 square feet, a little smaller, but roughly 3,000 square feet.

We set a three ton limit that applied to the entire property. So if you have a pool or more stables or snow melt in your driveway, all of that was counted in the three ton limit, which we had from 2018 to 2021. And in 2022 I moved it down to two tons. So this is really just for large homes, but it allows those with the greatest wealth to be able to demonstrate leadership in addressing climate change and developing the supply chains for heat pumps and other low carbon heating and hot water solutions. So what does it mean for homeowners and renters? Certainly lower energy use, improved comfort and improved resilience and air quality. We've had increased smoke events in the summer here due to wildfires and heat pumps with filtration have greatly improved people's comfort.

. That's a bit about new housing. I'll talk briefly about existing housing. So one in two family homes. We've largely focused on supporting homes in installing heat pumps. This is a winter shot here of a cold climate heat pump that a citizen retrofitted to replace their gas furnace. This is not my home, but also in my home, we've removed our gas furnace and put in a cold climate heat pump, the same brand Mitsubishi.

And even during our coldest year, the coldest. Night in the last 60 years, which is not that cold cause Vancouver's a fairly mild climate, but it was about negative 16 Celsius. And the heat pump performed without an issue cuz they worked down to negative 30 Celsius. The cold climate models. We've been focusing, as I mentioned, on new buildings since 2014.

And I just put 10% of my time into existing buildings. But in 2022, that's been moved to 50%. And one of the programs that I've run is with the Vancouver Heritage Foundation focused on retrofitting buildings 1940 and older. And in one of those buildings that were retrofitting the team found this newspaper clipping cuz they often use newspaper to stuff the walls.

And they found this newspaper clipping of the first heat pump installed in Vancouver. Which is pretty interesting. The article dates from the 1940s and now we're encouraging and turning to heat pumps as a solution. So it was fun to find it as part of a renovation of a 19 1910 home.

I won't go into details about heat pumps and how they work. But they're basically pulling heat from the outside in the winter and releasing it inside. And then in the summer doing the reverse. So pulling heat out of the home and exhausting it outside using the refrigerant height cycle.

We as a city have switched. We no longer allow simple air conditioning units that are permanently wired or plumbed. So we are only allowing full heat pumps, so systems that can heat and cool. So let's say you've got a single family home and you have gas heat, and you want to add cooling, you can, but you have to add a full heat pump.

You can keep your gas furnace if desired but you have to have to add a heat pump that's capable of heating and cooling. Some ways we support citizens at taking climate action. City staff I visited 36 homes in the last year when citizens have requested it to see how they can retrofit a heat pump.

Do they have enough electrical capacity? What has been my personal experience with having a heat pump in our 1908. And what the sort of cost range they can expect to see in getting quotes and what the rebates are available. Vancouver is a $6,000 heat pump incentive, although we are moving it down to 4,000 after April 1st of this year to really assist and try to offset the cost of installing a heat pump to get you to parody in terms of the cost of a heat pump compared to a fossil fuel furnace, like a natural gas or an oil fired furnace. We also launched a program, a home Energy Navigator with a number of other municipalities, including the city of Victoria where citizens can get support in understanding if their home would be a good fit for heat pump and understand some of the rebates that are available and the process to go through those rebate process.

So as of January 1st of this year, we're again no longer allowing wired air conditioning, so only heat pumps are allowed to be installed. One goal here is to improve the supply chain, and we worked with the heating, refrigeration and air conditioning institute to develop that requirement. And one of their comments, cause they were very supportive, was, it'd be great if you guys had developed this requirement 10 years ago.

Because it, that really does simplify the supply chain as opposed to having a warehouse full of one way heat pumps that only do air conditioning and then another part of the warehouse that's full of systems that can heat and cool. It really simplifies the supply chain at really pretty modest additional cost.

We also set a requirement for large renovations to electrify. So if you're spending over a quarter of a million dollars in declared value, then you must electrify your heating and hot water as part of that renovation. So that's been quite successful. We anticipate we'll probably get maybe 20 to 30 of those kind of renovations coming in this year.

I wanted to talk a little bit about the new buildings consultation work. Just a couple of quick slides. New buildings consultation. The Home Builders Association of Vancouver as been a longtime supporter as well as the Urban Development Institute, the Architects Institute of BC and the engineers and geoscientists to bc.

We like to keep them informed about the changes and we reached out to over 50,000 individuals. Organizations have represented over 50,000 individuals consulting on changes to the new building. And we made the change over the the timeframe was over nine months and we allowed a little bit of additional height cuz we were requiring a little bit of additional insulation in the attic.

And a little bit more space. We allowed the home to be just slightly bigger because we are requiring more insulation. We also engage with FortisBC, the gas utility. Canadian Institute of Plumbing and Heating bc Pember Institute, and a number of unaffiliated builders.

The city really provided a lot of support on training and development. For instance, for builders if you want to take a course on passive house, there's a 50% subsidy that's available from the city of Vancouver that you can take a course so your tradespeople can be trained on building to the passive house standard.

The industry had requested additional implementation time, so we did ad we were originally attending for a sort of a nine month implementation, and we ended up going with 18 months prior to the code change. And the additional implementation time was largely in response to Covid.

I took these changes to council in April of 2020. So it was the first report that council received that was not related to the Covid emergency. And industry at that time was very concerned about the potential impacts of Covid and home buying. And so they did request additional time, which in terms of training We've developed designer training for architects and designers both on low carbon heating systems for new construction. So whether it's an air to water heat pump, or an air to air heat pump, or a geo exchange system. We've also developed trades training with B C I T on installing heat pumps.

And we've also been coordinating training with other groups throughout BC specifically around heating with heat pumps. That's been a big shift for us. Many other provinces, my own province of Newfoundland, yeah heat pumps are very common but in British Columbia, they're a little bit newer for us.

I thought I'd give a quick timeline example. I'm coming closer to the end of my slides, I started to get engagement and feedback in June, 2019 and provided education to the industry. We delivered a course on air to water heat pumps in January 2021, and our original date was gonna be June, 2021 for the bylaw effective date.

We did end up moving it when more time was requested, and the implementation moved to January 1st 22, To give a little sense of some timing, I thought I could talk about some of the outcomes before I close. They're pretty significant. So if you look at carbon pollution we have a reduction of 86% compared to our 2007 baseline.

So our building code Deals with space heating and hot water heating, which are the biggest pieces for us. But we still do allow cooking with gas and we still allow gas fireplaces, though there is a limit of two gas fireplaces. We still do allow cooking with gas and we do still do allow ancillary gas uses.

A gas dryer or gas barbecue are two common examples. We work to align our changes with the BC step code. If you're not familiar with the BC step code, please google it. You can learn a lot. We're at BC step code step four for part nine. So there's five steps in the BC step code and we're one from the top.

And the province says, indicated that by 2030 we need to be at the top tier. So Vancouver's gonna try and do that a few years earlier to demonstrate that it's possible and fairly straightforward. We also aligned with Energy Star and work to improve opportunities for local businesses in terms of exporting products.

So thanks very much appreciate the time to present to you today and happy to answer any questions. And I'll turn it back over to Alison.

**Q&A**

**Allison Mostowich:** Thanks Chris. That was so interesting to the timeline and the process you took to get those requirements in place. I hope that was helpful to everybody that was watching, and I intend to share this with a lot of municipalities that we chat with.

So let's start with Jack's question. And I think it refers to just the last slide you showed, the 86% reduction in carbon pollution, overall emissions, or was that reduction within the building sector? Sector?

**Chris Higgins:** Yeah. Great question. That's in buildings. Overall emissions are down, but certainly not 86% down. I don't have the number at my fingertips. The amount that overall emissions are down but overall emissions are down, but not. Not by 86%, certainly that's just in buildings.

Buildings is my work entirely and so that's the piece that I know about. But I certainly request and I'm sure get the statistics overall for what we're down. And again, it's just in Vancouver, so it's not like a BC or Canada-wide statistic.

**Allison Mostowich:** Fantastic. Thanks. So I had a question about that process. When you were taking those changes to council, what did you see as the biggest catalyst pushing it forward, and then what was the biggest challenge?

**Chris Higgins:** Yeah. So I would say the biggest challenge, I'll do the reverse order, but the biggest challenge came from manufacturers of gas boilers.

Or I guess any industry group that were represented can manufacturers as boilers. They felt that the industry wasn't ready. And that Vancouver should be aligned with federal timelines for much, much longer. In terms of the shift off of fossil fuels, they really wanted us to push for hydrogen oil boilers as opposed to moving to electrify.

But in British Columbia, we don't really have a hydrogen infrastructure. There's just two gas stations where you fill hydrogen cars. So we don't really have the hydrogen infrastructure and council really wanted us to make progress occur.

Our electric utility is greatly expanding early electrical supply. So electricity was a reasonable place to look towards. So yeah, it's the biggest challenge I would say. Gas oiler industry and to a degree the gas industry broadly. But really, at least for that change the gas boiler industry was very outspoken.

There was like a climate rally in Vancouver a couple of years ago, just before Covid. And there was over 70,000 people that came out, it was a huge rally.

The rally had closed off two major streets surrounding city hall. So that was part of the catalyst push council to really direct staff to be as aggressive as we can on climate. That's the whole reason why we have work.

So I guess in terms of the push, it was a combination of citizens as well as council and feeling that we had council support and then the provinces goals or province under fleet BCS was by 2028-2030, They want all new structure to be net zero energy ready, so you don't have solar panels on.

**Allison Mostowich**: One individual's asking. So moving forward with electrification in other provinces an issue that is often brought up is the grid and whether the grid can handle it. So how did Vancouver address that concern?

**Chris Higgins:** Yeah, great question. So our electrical grid, British Columbia has been growing for a hundred years to meet new demands for refrigeration in every home, for example.

Televisions, electric dryers, electric vehicles, the grid has continually grown to meet the demands. And so we have monthly checks with BC Hydro electric utility to tell them about Vancouver's plants. So their grid continues to grow and adapt to supply the electricity that we need.

We've also worked to improve the efficiency of buildings. So when buildings are turned down and builders are replacing them, we're seeing a very significant production in energy, electricity to use over the old buildings, especially with the old buildings needing electricity.

We're continuing to work with BC hydro to ensure the Grid has been ready and will be ready in future. Our electric utility has been at this for over hundred years, so they're continuing to improve their service.

**Allison Mostowich:** Thank you.

So Lawrence is asking, thinking about the city's emissions more broadly, is there consideration around how land use planning connects buildings with those transit and act, active transportation, big moves that you mentioned at the start?

**Chris Higgins:** Yeah, a hundred percent. One of the projects I'm involved with, we're looking at setting a new baseline for the city, which will allow four to six dwellings for a lot. And we've recently publish Vancouver Plan, which is our new plan for the city as a whole.

So land use is a huge part. In Vancouver over 50% of people walk, bike, or take transit for their daily needs. And we're working to further improve that, make it easier for people to be able to walk, bike, take transit for their daily needs. So certainly land use planning is a huge part of achieving goals.

**Allison Mostowich:** Fantastic. Thank you. Okay, so there was a reference to wiring for ac. Can you just talk a little bit more about what that means in this context?

**Chris Higgins:** Sure. Yeah. So if you pick up a window unit that plugs into an outlet that's not regulated, you can still do that.

If you want to get a window AC unit for a hundred dollars or something from Walmart or home Depot or Costco, that's not an issue. You want to get air condition system installed your house and have installer come out and run refrigerator lines and wire hard wiring in electrical line. That system has to be clean. So it has to be capable of heating and cooling.

**Allison Mostowich:** Okay, great clarification.

Thank you. So we have a question about Vancouver's policy on photovoltaic. So what is Vancouver's policy on pv, both for new and for renovations?

**Chris Higgins:** Great. Two parts there. So first thing is we're encouraging photovoltaic through net zero standard. So I think the last year we had about 50 Houses. We issue permits to 53 homes and allow all photovoltaics. In terms of our assistive requirements, they're allowed to cover the roof except that there does need to be an access walkway or fire response.

We're an earthquake zone and an active zone. So there are engineering requirements for PV systems. But they're allowed and they're encouraged. They're required if you're going to maintain this standard.