The Association for Preservation Technology International
Association internationale pour la préservation et ses techniques

TC•SP Technical Committee on Sustainable Preservation

National Trust for Canada / Fiducie nationale du Canada

APT Technical Committee on Sustainable Preservation with the National Trust of Canada

SPECIAL JOINT PLENARY **Saturday, 10/14/17**
HISTORIC BUILDINGS AND THE RACE TO ZERO CARBON: THE NEW IMPERATIVE
url: https://www.youtube.com/watch?v=clLR_PZPg7s&t=8s

Natalie Bull, President, National Trust of Canada - introduction
Bonjour et Bienvenue!
Welcome back to the Joint APT/ National Trust Conference, and welcome to this session: Historic Buildings and the Race to Zero Carbon: the New Imperative.

Just wanted to say a few words about the incentives plenary that some of you were at yesterday, where the National Trust talked about this opportunity in Canada with our governments looking at the state of historic places in Canada, and asking for recommendations from all of us about what the priorities should be.

And so you all should have received a link to this survey that we have online asking you all to help us give our government good advice about what's needed to help renew and reuse historic buildings. So really this is about green incentives. we see this as an opportunity to help encourage the retention of existing buildings.

I think we've all been asking ourselves for quite some time how we can make the retention and greening of heritage buildings the new normal in Canada. I'm sure we're all looking forward to this session. So I don't want to take up any of your time, but again to encourage all of you to take advantage of this session.

I'd now like to invite Dean Koga from the Association for Preservation Technology to the podium.

Dean Koga, President, APT - introduction
Thank you, Natalie. And I want to remind you all that Natalie is also a member of APT. An important member!

She asked me to say a few words about why this subject is important to APT. In the words of Mike Jackson: "we're the original green". Existing buildings are inherently green, as Carl has said over and over.

And if we don't preserve the natural world, the built world is going to suffer. So it's in everybody's interest to preserve the natural world. Isn't that what sustainability is all about? So we already have a head start, and we all know that we don't have to do very much to our heritage buildings to make them even more sustainable, but what we have to safeguard against is damaging them in the name of sustainability when it is not necessary.

Natalie had foresight to create a Technical Committee for Sustainable Preservation in 2004. That Committee has been instrumental in the work of APT over the years. They've been advocates, and APT is not an advocacy organization.

They've gotten the word out that heritage buildings have to be treated differently, for a variety of reasons that you all know. And they've been developing tools and programs to promote that, and to develop ways of treating heritage buildings in a sustainable way. The most recent is the OSCAR initiative, which you've probably all heard about.

Now it is my pleasure to introduce Mark Thompson Brandt. He's a member of the Board of Directors, is a Co-Chair of the Committee for Sustainability, and is one of the Co-Chairs of this tremendous conference! You guys have done a ridiculously good job! *(applause.)* Yes, please!

So, I want to bring Mark up to the podium to introduce our guest speakers.

Mark Brandt - introduction
Good morning! Everybody breakfasted? Everyone went running this morning? C'mon, you weren't out late last night, were you?

Thank you very much, Dean.

I think Dean pretty well said it all about the Technical Committee on Sustainable Preservation at APT. We'd like to reach out to everyone in the room, everyone at this conference, including our close colleagues at the National Trust and CAHP. I'd like to consider myself a three nation person, members of CAHP, APT, and the Trust, so I'm feeling very at home here this morning.

Before I say a couple of words of introduction of our two amazing guest speakers, we have a special treat for you. Minister Catherine McKenna, the Honorable Catherine McKenna, Minister of the Environment and Climate Change- for our American friends, yes, that's the new name of our Ministry of the Environment! The Environment and Climate Change! Yeah, we believe in science! We do!

So the treat is, although she is in Europe right now, meeting her counterparts there, pushing Canada's green agenda onto Europe because they need some help too, no just kidding, Europe is doing good.

She suggested that what she'd like to do is prepare a little video for us. So we're going to start off by having some words of wisdom from Minister McKenna, and then I'll come back and introduce the session.

So can we have the video please…

Minister Catherine McKenna - introduction (via video)
Remarks from Catherine McKenna, Minister of Environment and Climate Change
How Historic Buildings Can Be Part of the Solution.

Green buildings are an important component of our low-carbon future. For the innovation they foster, the new jobs they create, and the technological advancements they bring. Just as important, though, is the role in fighting climate change.

(repeat in French)

WIth 12% of Canada's carbon emissions coming from buildings, there are major improvements we can make. By reducing the amount of energy they waste, especially through lighting and heating, green buildings can help reduce carbon pollution across the country.

What's more, they also help create healthy spaces for people who work in offices. Natural light, fresh air, and even movable walls that allow offices to change configuration sound like simple design steps. And they are. They make our buildings better for those who work and live in them.

Today our strategy is to save Canadians money by making our buildings waste less energy as part of our Made in Canada climate plan. Our last budget put into action parts of this plan. It includes measures specifically aimed at energy efficiency in the building sector.

$182 million to develop and implement new building codes, to retrofit existing buildings, and build new net zero energy consumption buildings across Canada,

$67.5 million over four years, starting in 2018-19, to renew and continue energy efficiency programs, to make the building and industrial sectors more energy efficient, and

$39.8 million over 4 years, starting in 2018-19, to continue to support projects and activities that increase the use of wood as a green substitute material in infrastructure projects, such as mid-rise commercial and industrial buildings.

(repeat in French)

Our government is putting forward a broad, thoughtful, and modern agenda, that will guide us towards a successful energy and economic transition for Canada. And let me be clear. Green

buildings are part of that transition. As I always say, the environment and the economy go together.

Let me congratulate conference organizers for assembling such an important event.

I look forward to hearing about the great ideas it promises to generate.

Mark Brandt - introduction (continued)

I'd like to call attention to the very last thing the Honorable Minister said to you, to us. They have specifically told us they want to hear from us.

They want to hear what comes out of today's session, what come out of all the interface of natural and cultural conservation issues and ideas that we generate throughout this conference. We are going to do that, and I hope that you can be a part of that with us.

In understanding the connection between historic preservation and sustainability, as Dean already alluded to, it is very important that we not be complacent about inherently sustainable attributes of historic buildings.

We all have a part in saving the planet, so it's important that we not be seen to be sort of "rearranging the deck chairs on the Titanic", really hyper-focused on aspects of preservation while Rome is burning. So I think it's really important to take away some of the messages that you're going to hear today.

We went out and we got the two top voices, bar none, in North America, when it comes to dealing with the greening of existing buildings. I am absolutely honored to be able to introduce our two speakers today.

I'm going to introduce them both now, although they're going to come up, one at a time, to show you some very interesting presentations, and then we're going to have a discussion at the end of it, which I hope that you'll find quite inspiring.

Our first speaker will be Edward Mazria, the founder and the CEO of Architecture 2030. Many of you know Architecture 2030 thoroughly, and it's an inherent part now, really, of both United States and Canada professional architectural life, if you will. Those of you who don't, I encourage you to google Architecture 2030. You're going to be amazed at the breadth and the power of this organization, their programs, and their ideas, and their organization.

One of the many programs that they're not quite known for yet, not too much, is coming next year, is a student competition. Our investment in Mr. Mazria is going towards helping that

competition. So google it: Architecture 2030. You are going to see what an amazing organization Ed Mazria has put together.

The second speaker will be Carl Elefante. Carl, as Dean alluded to, is one of the founding fathers of the Technical Committee on Sustainable Preservation at APT.

Carl is also the Director of Sustainability for Quinn Evans Architects. And he is also the incoming 2018 President of the American Institute of Architects, an organization that looks after many thousands of members.

But also, I have some new news about Carl. As of about 12 hours ago, Carl is one of our five new members of the APT College of Fellows.

So without further ado, I'd like to introduce to you Mr. Edward Mazria.

Ed Mazria
Thank you for that warm introduction, it's a pleasure to be here today.

You probably have an idea of how important you are, but by the time we finish this presentation you'll understand really how important you are.

I want to talk about the Race to Zero. Why zero? First of all why zero; when do we have to get to zero, and then how are we going to get to zero? And that's where you all come in.

You all know in December 2015, on December 12, the Eiffel Tower lit up with 1.5 Degrees Celsius, and that was that the Paris Agreement was consolidated at that point, and agreed to by literally all the countries of the world, including the United States.

The 1.5°C Scenario: peaking global emissions right about now, and then phasing out all CO_2 emissions by the year 2050. If you go past 2°C, climate change becomes irreversible, and the planet keeps on warming because there is so much inertia, and so much CO_2 in atmosphere.

Well, what does that 1.5°C, or under 2°C mean? Well, the IPCC ran a number of scenarios, of when fossil fuels and CO_2 emissions would peak, and then different reduction strategies. They ran really four scenarios and it's only the fourth one that keeps us under 2°C.

That fourth scenario gave us a 66% chance of staying below 2°C, but it also gave us a 33% chance of overshoot. And that really wasn't good enough, so they ran a fifth scenario, and that's

called the 1.5°C scenario, and that's what was lit up on the Eiffel Tower, and that's peaking global emissions right about now, in the next year or two, and then phasing out all fossil fuel, CO_2 emissions by the year 2050.

So when you hear "80 by 50", "0 by 50" , "2050", that's what this refers to. Phasing out all fossil fuels, CO_2 emissions, by the year 2050.

The reason that's critical is that all the other scenarios they have run, if you go past 2°C climate change becomes irreversible, in our lifetime, in our children's lifetime, in their children's lifetime, and the planet keeps on warming because there is so much inertia, and so much CO_2 in atmosphere.

The ONLY scenario that will bring the planet back, after we experience a lot of the worst impacts of climate change, but the only scenario that brings the climate back to pre-industrial levels, is that fifth scenario, by phasing out fossil fuels by 2050. The planet doesn't hit 2°C, and then begins to come back.

We're roughly at 1°C right now, so we're headed in the wrong direction.

So how do we phase out?

First let's look at Canada's emissions. This is Canada's greenhouse gas emissions. That's actual, and that's where it was in 2005, it kind of reached its peak. Canada's pledge under the Climate Agreement, is that it would reduce its emissions, greenhouse gas emissions, by 30% below 2005 levels, which was at the peak, by about 2030. That's where they are now, it's a fairly steep curve down.

The Energy Information Administration, which, by the way, usually over-estimates things, every year we see that we do a little better than what they project, but they project, given current situation and current policies, that that's where Canada's trajectory is. So there's quite a bit of work to be done in Canada.

The US- this is the US actual emissions. That was 2005. The US projection was that by 2025, five years earlier, that we would be between 26% and 28% below 2005 levels. Again a very steep drop- and that's with current policies, and that's not the regressive policies that we're talking about- that's where they project we will be unless we do something differently.

So we all have quite a bit of work to do, and I'll go through that now, and why you're so important.

We know that over the next 15 years, the global population is expected to increase by 1.1 billion people, but world urban population is expected to increase by that same amount. 1.1 billion

people. Meaning that urbanization will absorb the entire population growth of the world over the next 15 years.

We know that over the next 15 years, the global population is expected to increase by 1.1 billion people, but world urban population is expected to increase by that same amount. Meaning that urbanization will absorb the entire population growth of the world over the next 15 years. That's a new city of 1.5 million people every week.

So what is 1.1 billion people? Let's try to get a handle on that. 1.1 billion people is the equivalent of the entire population of the Western hemisphere. That's 1.1 billion people. That's everyone living in Canada, in the US, Mexico, Brazil, Argentina, Central America… that's 1.1 billion people.

So think about building out the infrastructure, the housing, airports, the roads, everything for 1.1 billion people. It's essentially everything we have in the Western hemisphere at this time. The number is staggering, and we can look at it a different way, that we're urbanizing at the rate of 1.5 million people every week! So that's a new city of 1.5 million people every week. Urban.

That's the scale of this issue.

If we look at Canada, Canada's population is expected to increase by about 4.5 million people over the next 15 years, and Canada's urban population is expected to increase by over 5 million people, absorbing the entire population growth and more: people moving into cities from rural areas.

We know where all the emissions are coming from. Right now they're coming from urban environments. So 75% of all human-produced greenhouse gas emissions come from urban environments, from cities.

And if we look more deeply at cities, what in cities are producing the greatest amount of emissions, we see that overwhelming is buildings. The existing building stock, which is what you all are involved in.

So in New York City, it's 71%, in Calgary, it's 72%. Vancouver 55%, it's all over 50%. So if you look at most cities, you're going to be in the 50%-80% range.

75% of all human-produced greenhouse gas emissions come from urban environments. And if we look more deeply at cities, buildings are producing the greatest amount of emissions.

This is absolutely fascinating. This is a growth curve, from the beginning of recorded history. We took Aleppo, I was trying to find the oldest city in the world, and different people claim different things, but one of them is Aleppo, and that was at 6000 BC. And we can see urbanization from 6000 BC to the year 2000. That's 8,000 years of urbanization. We have increased the number of people living in cities to about 3 billion people. And you can see rural areas. They roughly cross at around 2000, 2005, a little later. Urban and rural populations, roughly equal/equal about now. We're slightly ahead in terms of urbanization.

Look at 40 years. What took us eight thousand years to do, to reach 3 billion people, is going to take us 40 years to do, and build out the infrastructure for another 3 billion people on this planet in a very, very short period of time. So the exponential curve, the growth rate of cities, is unprecedented.

And when you grow exponentially, in order not to collapse, you have to innovate. So as we've reached 3 billion people, we've innovated and innovated, to allow urbanization, the car came in, we built roads, we had public transit to alleviate congestion, you have to alleviate pollution and diseases, all sorts of things, we keep innovating. So cities become actually very resilient because we keep innovating to keep them going, to keep that growth going. But now- we're going to grow incredibly fast!

And, we have another problem, and I want to illustrate that with Houston. We all know that we had a disaster in Houston.

This is the population growth curve of Houston. Absolutely exponential. And I'm going to now put on that curve major flooding events in Houston. There was one in the 30s, 1935, I think. There was a major flooding event in Houston. The population was about 300,000.

So what did they do? They innovated. They built two reservoirs above Houston, to contain all the water, so the city wouldn't flood. That bought them over 20 years. 25 years. Until the next flood.

Then the next flood happened in the early 1960s. And so what did Houston do? They filled in their bayous, built up walls so that the water would flow through the city, and they could contain all the water flowing through the city, so the city wouldn't flood.

So they innovated again, but it took them quite some time to innovate, because the reservoirs did the job for a long period of time.

Then they had another flood, right after 1980. So that was another major flood.

Then there was another flood just before 2000.

Then there was a series of floods, now these are major floods in the city: 2001, 2006, all the way to 2016.

And then we have hurricane Harvey, which is the mother of all floods, which flooded everything in the city.

But you can see what's happening with climate change by just looking at the exponential growth rate, and the impacts of climate change, and flooding events, and rain becoming harder, faster, and the ability of cities then to adapt to these new realities. It is going to get tough. Heat waves- you're talking about all sorts of things. Fires, with climate change, this exacerbates the situation.

So, what's going to happen? Will Houston collapse? We don't know yet. Depends on- right now will be a lot of federal funds, they'll probably build out, can they innovate again to reduce the flooding? But then what happens when becomes more intense and more intense? And then you have heat on top of that.

There are certain cities that collapse, and we've seen that in New Orleans, where the population is half of what it was before. So that's the problem. So it is important for us to get a handle on climate change and begin not go to over that 2°C and begin to bring the climate back. Otherwise get into an untenable situation.

The good news is that after Paris, cities stepped up to the plate, 533 cities said they were going to disclose their greenhouse gas emissions. That was up 70% right after December. And globally, that 533 cities that said they were going to disclose their emissions, 190 of them had targets to reduce their emissions. So that's global. And a lot of that happened, half of that almost, happened right after Paris.

Luckily there are 131 cities in North America, the US and Canada, that are disclosing their emissions, and 74 right after Paris actually declared reduction targets.

Well, then we voted, we had a presidential election, and in came President Trump, and he is going to withdraw from the Paris Accord. Still in the process of doing that.

So what happened after Trump? Is it a disaster that he's in power? Our perception, how we think about it, is that he may be essentially a blessing in disguise. Why is that?

Well, that was between Paris and the US election. There were 533 cities worldwide that said they were going to disclose their emissions. A group of them, 190, actually established plans to do that.

Since the election, so, months ago, since that time, the number of cities that have declared that they are going to not only going to report their emissions, but come up with plans to do that, went from 533 to 7,400! Almost overnight. And ALL of them have pledged to come up with emissions reduction targets and plans to do that. They've all joined the Global Covenant of Mayors.

That would not have happened unless that election happened. We would still be limping along. And we know where all the emissions are coming from, they're coming from cities, at least a large percentage of that.

So this gives us a push. But we have to know, really, what to do.

So what's happening now? If you look at any city, any province, any state, any country, you'll see that energy consumption has essentially flattened out, and in fact the world has peaked in greenhouse gas emissions.

The cities are now flatlined, but they're not reducing yet. The new buildings coming in are more efficient, but they're still adding to the problem. Renovations are bringing that down, and they're canceling each other out.

But the emissions aren't going down, energy consumption isn't going down.

What's happening is that the new construction coming in, from all of that - people moving into cities, and infrastructure being built - all of that is actually increasing emissions, and then efficiency is reducing emissions, to where it's evening out.

So we've essentially flatlined. And we've been flat now for some time. This is just Los Angeles County, but I could show you California, I could show you New York State, I could show you Canada- I'll show you Canada in just a minute. Anyway, this is LA County. That's electricity, this is buildings' natural gas consumption. And you can see: flat.

So the cities are now flatlined, but they're not reducing yet. The new buildings coming in are more efficient, but they're still adding to the problem. Renovations are bringing that down, and they're canceling each other out.

If you look at Canada, these are commercial buildings, building use, you can see, Canada went up, and now it's flat. Canada, the entire country, is the same, relatively, as most cities in the west.

This is residential building energy consumption, and you can see again, that Canada is flat.

So we've got to get from that all the way down to the reduction targets that both cities, and states, and countries have agreed to.

That's the issue. So how do we do that?

Well, this is the building sector. It was increasing, it's now pretty flat in 2016, so it increased up and now it's flat. That's fossil fuel, you can see about 3/4 of all the energy consumption in the entire building sector globally, is fossil fuels. So, how do we get that fossil fuels down to zero by 2050? We need about a 42% efficiency reduction in the amount of energy consumption that buildings use. If we do that, then, we have a certain amount of non-CO_2 emitting energy. Now, we need to slightly more than double that, between now and 2050 to make up the difference, to phase out fossil fuels by 2050.

This is not undoable, by the way. This is very doable.

Depending upon the efficiency curve that goes down, if it doesn't go down as steeply as I've shown it here, if it goes up, we need more renewables. But this is what we think we can get in term of renewables, globally, in place between now and then to phase out fossil fuels. So efficiency has to play its part.

So how are we going to do all of this? How are we going to phase out fossil fuel CO2 emissions in the building sector by 2050? Well, there are two very different types of buildings in cities. There are big buildings and small buildings, and each requires a different kind of strategy to reduce emissions.

In cities, there are few big buildings that use lots of energy, and many small buildings that each use a small amount of energy. Each is responsible for close to about half of all the building sector's energy demands. Each requires a different kind of strategy to reduce emissions.

Let's look at Ottawa. Roughly have close to one million people. That's what we think of as Ottawa, that's downtown Ottawa, all the big buildings.

That's an aerial view, of the big buildings in Ottawa.

But now I'm going to go out to Ottawa itself, the city limits, and we can see that all of a sudden now there's a whole bunch of low-rise buildings surrounding all of these high-rise buildings. Smaller buildings.

And I can go out even further… and further… and out to the boundary. And we can see that the big buildings are really in that small circle. And the rest of the city is fairly low rise and lower density. So we have big buildings, and we have small buildings.

Now we'll go to Toronto, which is roughly three times the size. That's the skyline of Toronto, that's what we think of as Toronto. And there are the big buildings of Toronto, the Space Needle is down at the bottom left.

And if I go out from Toronto, I see the same thing. All of these low-rise, one-story, smaller buildings surrounding the downtown area. And if I go out to the boundary, that's really where all the big buildings are.

Now, let's go to New York. We think of New York as big. That's New York. That's New York City. That's Manhattan, the skyline. But if I look at New York, I see the same thing. That's where most of the big buildings are concentrated.

The Bronx goes all the way up to the top, Queens all the way out to the right, Staten Island goes past the bottom, Brooklyn is in there. Most of New York is mid-rise, low-rise buildings, with the high-rise buildings concentrated in certain areas.

And if we fly over any city we see the same thing happening. A concentration of large buildings downtown, and then low-rise buildings all around. Here's Seattle.

So what do we take away from all of this?

In cities, there are few big buildings that use lots of energy, and many small buildings that each use a small amount of energy. But if you add up all the energy that those few large buildings use, and the energy that all of these small buildings, mid-rise, low rise buildings use, each is responsible for close to about half of all the building sector's energy demands.

That's why I say we need two very different strategies for these buildings.

Very few buildings, we know that very few big buildings are transacted annually. That means they don't get bought and sold. Nobody buys and sells university buildings, hospitals,

government buildings, things like that. Large buildings - huge skyscraper, office buildings, they very rarely go on the market.

But each year, thousands and thousands of small buildings are bought and sold. All the houses are bought and sold. In New York City I think there's 22,000 houses on the market every year that are bought and sold. So we see that kind of thing happening.

If you're going to improve a building for energy efficiency, it costs about 75% less if you're doing a capital improvement for that building.

We also know that building energy improvements, if you're going to improve a building for energy efficiency, it costs about 75% less if you're doing a capital improvement for that building, especially large buildings. If you have to change the boiler out and do all sorts of things, and change the facade, and do a major renovation. If you do the efficiency part at that time, it's cheap. It doesn't cost very much, and usually it pays for itself. So that's an important issue when developing a plan.

And, a building that is renovated or repurposed, rather than replaced, produces about half the greenhouse gas emissions over its lifetime, than tearing that building down and building it new, doubling the amount of emissions. Both the embodied carbon and the carbon it produces over its lifetime, will be at least twice as much.

So repurposing and saving buildings, and renovating buildings, is a key to this whole strategy.

A building that is renovated or repurposed, rather than replaced, produces about half the greenhouse gas emissions over its lifetime, than tearing that building down and building it new.

Just to look at building size and energy consumption: this is New York City. We can see that buildings under 50,000 square feet, there are 975,000 of them, uses about 52% of the energy.

And buildings over 50,000 square feet, the large ones you see in Manhattan, there are only 26,000 of them, so maybe 2½%, and it uses again roughly half of the total energy consumption.

And that goes all the way down for every city.

This is Seattle. This is under 20,000 square feet, it's a smaller city, so the number moves down in terms of where the breaking point is, but there are 176,000 buildings, building owners, under 20,000 square feet, and only 5,000 over 20,000 square feet.

If I look at Canada, and we couldn't find actual numbers for cities, but we found them for areas, so the Great Lakes area, which this is a part of: Under 10,000 square feet, the breaking point is 10,000 square feet, Canada is a much lower rise area, that area is much lower rise than a city would be. That number would probably move up. But under 10,000 square feet, there are over 3½ million buildings under 10,000 square feet, and only 183,000 buildings over that amount. Roughly 4 or 5%, I think. One uses 60%, the other uses 40%.

So you have very few buildings that are using a lot of energy. And you can keep track of them, because you don't have that many building owners, you're not going to get as much push-back, you can develop policies around that.

Then you have to develop another policy, where you can gradually get at this massive amount of small buildings.

So we need two very different policies.

So what's the plan? How do we do this?

Well, first, we know now that the buildings coming in are adding to the problem, and the renovations are canceling that out, but we're not moving down. So we need to bring the buildings in where they don't add to the problem.

So we need a zero net carbon energy code, building energy code. So that all new buildings coming in are zero net carbon. They don't add to the problem. Automatically, that will bring the curve down as we renovate.

And, in order to get a zero net carbon code, think about all the urban buildings that we're going to build that can't generate their own renewable energy on site. That's really the one-story, suburban buildings, out in the areas. But the dense urban buildings will need to either generate a little bit of their energy on site, and import the rest, so they should be highly efficient, and then be allowed to import the rest, of renewable energy, in order to get to zero net carbon. So any code has to allow for that.

Then you need two policies. One policy for existing buildings, and another policy for the big buildings and another policy for the small buildings, and they also have to allow for on-site and off-site renewable energy to get them to zero net carbon.

This is absolutely key. You're not going to get a building to zero net carbon, or to reduce its carbon footprint to zero if you don't allow off-site renewables to play a part, but you need to renovate them down to where they're highly efficient.

So, Architecture 2030, in January, will have out, an international zero net carbon building energy code standard, that any city, any state, any country can adopt. It builds on everything that we have today existing, nothing new.

We know that in 2003, CBECS was at- if we had a scale from 100 all the way down to zero net carbon, which would be zero, in 2003- 100, we set that as the typical building.

So how would the code work? I took an office building, in Toronto, a 50,000 square foot office building. We know that roughly in 2003, office buildings at that time used about 123,000 BTUs/square foot per year. You just have to know it's 100 on the scale. Now, the entire office building in Toronto, has actually gotten more efficient. So that the latest survey, in 2012, showed that actually office buildings, if we look at all the properties, moved down to about 106.

If we just met the 2016 ASHRAE 90.1 code, and I think Canada is at the 2013, roughly, with their national code standard equivalency, if you meet the 2016 code, which exists, you would get, and all the strategies that the code says, you do this with the boilers, you do this with insulation, you do this with windows, you would get all the way down to 37.

So how do you get from 37 all the way down to zero net carbon?

Well, 37 is essentially an efficiency standard, and then to get to zero net carbon, you use on-site where you can, and then off-site where you can't, in order to get to zero net carbon. So that's what the code will do.

So it's for any building, any existing building, any new building. The buildings can essentially meet the code because you have that flexibility, of on-site, off-site renewable energy to get you all the way to zero net carbon. This will be an absolutely critical piece in order to get us there.

Now, we have Vancouver saying ok, we're going to get a zero emissions code in for all new buildings by 2030. And I think Toronto just recently announced something similar, by 2030, we're going to get to zero emissions. Too late. Needs to be by 2020, which is why we're putting the code out out in a few months, so it can be adopted right away. That's been holding it back. And it's all doable because it's using the code standards we have in place now, nothing new, just allowing for on-site and off-site renewables to get us there.

So, two policies, and then we'll finish up.

Policy #1, for big buildings, what do we have to do? Well, as a policy we need to allow the big buildings to make the renovations towards zero net carbon when they are having a capital improvement cycle. So we need to give them that flexibility and time. So we develop a strategy of small incremental steps with the end game being zero net carbon. So that when you hit a capital improvement cycle you go to that end game and do that. Otherwise you make small improvements until you get there.

Policy #1, for big buildings: allow the big buildings to make the renovations towards zero net carbon when they are having a capital improvement cycle. When you hit a capital improvement cycle you go to that end game and do that. Otherwise you make small improvements until you get there.

So that's code compliance for big existing buildings. That's what a policy would look like.

And, you allow for three things: efficiency, on-site, and off-site to get you all the way down to zero net carbon. So we try to align building energy efficiency upgrade regulations with major capital improvement cycles. And, it's important to provide incentives also for pushing all the big buildings to get to ZNC as fast as they can, by giving them certain incentives.

You allow for three things: efficiency, on-site, and off-site to get you all the way down to zero net carbon.

Policy #2 for small buildings: there, how do you get them to meet the ZNC code? You have millions, in some cases millions of these buildings, or hundreds and hundreds of thousands of buildings. Well, we know at point of sale, thousands of buildings are bought and sold in this small category every year, in New York City it's 25,000 buildings that are bought and sold every year, small buildings.

And so at that point, who has the money? The person coming in to buy a building in New York at a hundred and… at $1000 or $1500 per square foot, has money to do the renovation. Usually when someone buys a building they're going to renovate because they're a new owner coming in, unless they're buying it for investment properties.

So at building transaction, we can require that within two years of that transaction taking place, that the new owner brings the building into compliance with zero net carbon. It's an easy sell. And, we allow them- let's say they don't want to renovate too much, they just want to renovate a certain amount- then they have to buy off-site- do on-site or buy off-site renewable energy, so they get to zero net carbon.

Policy #2 for small buildings: at building transaction, require that within two years, that the new owner brings the building into compliance with zero net carbon. [If] they don't want to renovate too much, then they have to do on-site or buy off-site renewable energy, so they get to zero net carbon.

And the cities need to provide for those people who are buying, who are kind of marginal, are below the median, give them incentives, low interest loans, and things like that, to do the upgrades.

So, how do we get to carbon neutral? We've laid out a plan. The code will be there.
The rest, though, the most important part of this, is that it's up to you all to get this job done. We can only put out the ideas, it's up to organizations like this, and people like you, who go out there and do the work.

Thank you.

Mark Brandt:
Wow. Now you know why we're calling it a race! That's not too strong a term, eh? Staggering, staggering facts.

You know Carl said many years ago, and a lot of people have picked up on it: "The greenest building is the…" *(whole audience says: "one already built.")*

Wow! Yes! Ok! We've got the whole room doing it!

Now we have a new mantra. If you want to cut carbon in half: **reno over demo!**

Right? That's what Ed tells us!

Every time he used the words "existing buildings," "small existing buildings," "large existing buildings," you are allowed to think "small historic buildings," "large historic buildings." Go out there and do it!

OK, without further ado, the Reverend Carl Elefante.

Carl Elefante
Well after that, I have a certain amount of trepidation here, about being able to live up to the standards, but I'll give it a try.

I wanted to start with just reminding us about some of the bigger purposes of what we're doing here. An awful lot of advice I'd been getting since being elected the AIA President, is know your purpose, and then align everything to your purpose.

So let's just remind ourselves of a couple of things about our purpose. And clearly getting to Zero Net Carbon is one of them, but in the context of what?

Ed described this dawning of the urban era: from time immemorial to this decade, most people have lived in non-urban settings. From here forward, most people are going to be living in urban settings.

Anyone in this room have any engagement with urban settings?

Literally, the world is pointing to us, and saying: architects, engineers, contractors, the people in the building industries: you are now at the nexus of human future. The problems are largely generated by the scenarios that we create, in shaping the built environment, and the solutions have to be embedded in that urban future.

Literally, the world is pointing to us, and saying: architects, engineers, contractors, the people in the building industries: you are now at the nexus of human future. The problems are largely generated by the scenarios that we create, in shaping the built environment, and the solutions have to be embedded in that urban future.

One thing I can observe as an architect talking about this a lot these days, is: let's get over two words. One is "cities", the other is "urban". It doesn't refer to just some segment of human existence. ALL people live in holistic communities. Whether you have to get in your car and drive to get a quart of milk, or whether you have the privilege of walking down the street and getting a quart of milk, everybody needs to have access to all the goods and services they need to survive. No matter what the scenario is. We ALL live in cities, whether they're rural cities, or highly dense megalopolises. Everyone needs a city to support them. It takes a village. So let's get over the urban/rural conflict in our discussion.

ALL people live in holistic communities. Everyone needs a city to support them. So let's get over the urban/rural conflict in our discussion.

We are, 100% of us, are 100% steeped in human civilization. We, in the construction industries and the design professions, are all contributing to human civilization by shaping the built environment. We're all in it together. There's not a false divide between rural, suburban, and urban; we just have some different conditions that we need to deal with. That's all. We're all in this together.

One of the amazing things about this moment is not only have we reached this point, where more than half the people on the globe live in urbanized areas, but it's been actually been memorialized by an international agreement of essentially all the nations of the world coming together in Quito, Ecuador in 2016 and signing the Habitat III, which proclaims the New Urban Agenda. So, we actually have, it's like we have a report card like we got from school, that says, in fact, that these conditions exist. So the nations of the world have memorialized this moment.

The second thing that I want to make sure that we just remind ourselves about in terms of our purpose, is the impact of the design that we are engaged in on the lives of the people around us. No matter what field that you're looking at- public health, education, housing affordability, whatever field you want to point to- in the last decade, in virtually every field, one of the major focuses of that field has been understanding relevance of built environment on that topic.

So, number one, pure numbers, the world is becoming urban. Number two, in every field, the world is looking to the impacts of the built environment on what's happening in that field.

Anyone here in this room engaged in shaping the built environment?

Number one, pure numbers, the world is becoming urban. Number two, in every field, the world is looking to the impacts of the built environment on what's happening in that field. This is about life and death.

So these two trends point to the importance of what we're doing, in shaping human civilization.

I want to bring it home in that this isn't just niceties, this isn't just nice to have, this is about life and death. And I'm not going too far in saying that. If you really want to understand that, just look at food supply and climate change. That's one topic that's like this. Food, I think that's kind of a necessity.

My favorite architect, Winston Churchill said this, and I think it's important. The greenest building is the one that's already built. That's important for us to know. We need to know this one too: "First we shape buildings, thereafter they shape us." This is our mantra, as a field.

So what do I mean that this is life and death? I want to give you a 19th century example. So New York City, after the Civil War- once killing each other was sort of taken out of the equation- in 1870, New York City is this incredible engine of commerce, this incredible engine of industry. It is an engine of progress, and it's also fatal to live there. Two thirds of the deaths in New York City in 1870 are preventable deaths from infectious disease. So cholera, dysentery, tuberculosis, are the three big killers of people in New York City in 1870.

By 1940, and why 1940, because 1940 is when penicillin becomes widely available for public use. In other words, the medical solution to infectious disease is now available, 70 years later. Well, what's the condition today, in 1940? Well, that number has dropped to 11%. How did it drop to 11%? Changes in the built environment. The work that we do took the public health issues of the day, and solved them with changes to the built environment.

I'll just say one last thing about this. Pipes, with water, clean water, pipes with sewage, electricity, lots of other things that we would call infrastructure; building codes that required light and air, so our buildings were part of this.

"First we shape buildings, thereafter they shape us." This is our mantra, as a field.

And I just wanted to remind us, that what did the architects of the day, the shapers of the built environment, what did we do? What was our attitude? We didn't stop with pipes. We said, well, we're going to remake our cities. And as we remake our cities, what should they be? What do they need, to be cities for people? They need parks, they need schools, they need libraries, they need beautiful train stations that make us feel good about entering a new community. They need to be beautiful cities. And the architects faced with this created the City Beautiful movement. Because good pipes is not enough for good peoples' lives. We shape lives.

Shaping the built environment literally is affecting the future survival of people.

We also happen to have another international agreement that says, yes, shaping the built environment literally is affecting the future survival of people. And that's the Paris Agreement that we've heard about before.

So, that's the context in which we've had this wonderful opportunity to hear Ed Mazria focusing us on the thing that we must do over the next generation. It's now. We must do it NOW.

And he talked about this Roadmap, and I just want to now put on my heritage conservation architect hat, and say, what does this mean for us in this room, as heritage conservation professionals?

And I want to point to two aspects of what he talked about, in terms of reducing the current emissions, and 50% by 2030, zero by 2050.

It means two things. And one is building reuse. We must reuse the building stock that we have, and as we do that we must change its behavior.

It means two things. And one is building reuse. We must reuse the building stock that we have, and as we do that we must change its behavior. In order to do that, in order to meet those numbers, that Ed talked about, we need to greatly, greatly accelerate how quickly we are renovating the building stock: and the estimates are between three and four times the rate of current renovation work.

We need to greatly, greatly accelerate how quickly we are renovating the building stock: the estimates are between three and four times the rate of current renovation work. It's the biggest opportunity that the design professions have ever had.

Now, as the elected President of the American Institute of Architects, somebody walks into the room and says we need you to do three or four times more architecture, that sounds like a really good plan to me! It sounds like a jobs program! And it is, it's the biggest opportunity that the design professions have ever had.

And then the second is the embodied carbon side. We can't build our way to zero net carbon. We have to conserve our way to zero net carbon. The most important activity, is conservation.

And then the second is the embodied carbon side of it. And this, if there's any group, of hundreds of people, that understand this part of it, it's the people that are in the room this morning. We're the ones who get this. The importance of the embodied carbon of the buildings that we're conserving.

We can't build our way to zero net carbon. We have to conserve our way to zero net carbon. The most important activity, is conservation.

Know anybody involved in conservation?

So let me get into this, as a conversation among us. We'll see how much of this we want to talk to Minister McKenna about. But let's have our own honest conversation about it first.

So first, let's define the challenge for us, the heritage conservation community. To me, it really starts with wrestling with cultural value. What is the balance between us advocating for cultural value, and us advocating for material value?

What is the balance between us advocating for cultural value, and us advocating for material value?

We are going to be challenged, to get our act together on this. We are going to be pulled in two different directions.

This quote from Stephanie Meeks, quoting John Steinbeck: "How will we know it's us without our past?" To me, this is sort of the equivalent of Winston Churchill's statement. It's the essential statement that defines why we care about cultural value. How do we keep that perspective with the avalanche of buildings that Ed just talked about?

We know that for every one of the Mount Vernons there are in the world, there are tens of thousands of ordinary buildings in ordinary towns that we have to be accountable for. So how are we going to wrestle with the cultural value equation, in terms of this challenge that we must solve within this generation?

We know that not every building is Mount Vernon. We know that for every one of the Mount Vernons there are in the world, there are tens of thousands of ordinary buildings in ordinary towns that we have to be accountable for. Us. It's our job! We're the ones that are being asked

to address this. So how are we going to wrestle with the cultural value equation, in terms of this challenge that we must solve within this generation?

The second is really understanding that avalanche, and what it means in terms of the demographics that we're addressing. Those "Mount Vernons" tend to be in this- and I'm using US statistics, commercial building statistics, frankly, this is the world that I know, so forgive me for being a little bit myopic about commercial buildings in the US - but the historic buildings that are plaqued, are in this 15% of the building stock.

And I raise that mostly because of this slide. And that is that the majority of the buildings that exist today, are modern era buildings. And what do we in the conservation heritage world know about the difference between the first set and this set? They're a completely different set of buildings.

I'll just point to a couple of qualities of them.

One is that they are addicted to fossil fuels. If you unplug them, they're literally uninhabitable. The buildings in that first group were built without fossil fuels, largely. And they knew how to survive in a world without fossil fuels.

Most of the buildings that it will be our responsibility to deal with are addicted to fossil fuels. If you unplug them, they're literally uninhabitable. So we're going to have to change their behavior. It's not just conserving them, it's transforming them.

Most of the buildings that it will be our responsibility to deal with are addicted to fossil fuels. So we're going to have to change their behavior. It's not just conserving them, it's transforming them.

The next challenge is the one that I think we talk about least. It's kind of like our affordable housing topic. We know it's out there, but it's too awkward to talk about so we don't talk about it much. But we have to talk about this. It's the biggest impact that we can have. And that is abandoned and unoccupied buildings.

Every major city in the US- and again forgive me for being a little myopic about the US- has an abandoned building problem.

Detroit, of course is the poster child of this. Any guesses about how many abandoned buildings there are in Detroit? Anybody know that number? 40,000. There are 40,000 empty buildings today in Detroit. That's over 16% of the building stock of Detroit is abandoned buildings.

Do you know how many empty lots there are where there used to be buildings that were torn down? 60,000. There's 100,000 either current or former abandoned buildings in Detroit. Detroit is by far the worst. Most other cities- Baltimore is at about 11% - most other cities are at 5-6% A "good" city is in the 1 or 2%, but even that, I mean c'mon, we have tens of thousands of buildings that are sitting there empty. The carbon footprint has already been stamped by those buildings, and we're just letting that carbon footprint go to waste.

The next challenge is the biggest impact that we can have. And that is abandoned and unoccupied buildings. The carbon footprint has already been stamped by those buildings, and we're just letting that carbon footprint go to waste.

There are groups like fire marshals that are out there advocating for the demolition of those buildings every day. That's their solution: go tear 'em down. "Mayor, what should you do? Go tear down those buildings." So there are people out there giving that advice every day.

Quinn Evans Architects: we know that those abandoned buildings still have value, and that you can do a wonderful new place to live by just simply loving those buildings and doing what they need.

The other aspect of this, though, is also unoccupied buildings, and Mike Jackson is probably in the room here somewhere. And his work with Upstairs, Downtown, google that. We have so many buildings in the heart of our towns, where the second and third floors, fourth floors and fifth floors are empty. What can we do to consolidate those buildings? What are the policies and design solutions that we have available to us to get those spaces occupied again?

And this is actually a Quinn Evans project, of taking five buildings, linking them together with an outside- basically like a fire escape system- one elevator serves five buildings. How do we create the ownership models and the codes to allow us to do things like that, to simply occupy the spaces that are built and are not being used today? This is our first challenge.

The second challenge that we have is growth. How do we accommodate growth in historic buildings? This is what contemporary architecture is doing to grow historic buildings. If we don't like these models, then we'd better start proposing other ones! No one else will. It's up to us.

The second challenge that we have is growth. We in the heritage conservation world deal with this every day, every week. How do we accommodate growth in historic buildings?

These are all real world examples of accommodating growth in heritage situations. How many of these models do we want to point to and say, "do it like that?" Any? If we don't like these, this is what contemporary architecture is doing to grow historic buildings. If we don't like these models, then we'd better start proposing other ones! No one else will. It's up to us.

We know that the 19th and 20th century building stock, that 15% historic buildings and the 60% modern era buildings, the current practice today is very different. These buildings are treated very differently. Their wants and needs are very different.

So how do we face the elephant in the room, and that is the Mid-Century buildings. We had a symposium on that in Kansas City, just recently.

What is the modern-era building reuse scenario that is out there? Which do we want to see done tens of thousands of times? Do we have a plan that is as good as the SoHo loft for these buildings? It is up to us to really define it.

This is an example of a publication that was done a few years ago, when the mayor of Boston said we have to tear down Boston City Hall. Clearly a landmark-worthy building. This was THE most important building that got built when I was in architecture school. It got published more than anything else, got talked about as the savior of humankind. We were going to do more buildings like Boston City Hall.

You can't tear this building down. This building is as significant as Mount Vernon, in my view.

Well, what is the modern-era building reuse scenario that is out there? This is a real project, right around the corner from my office. I could have gone to a hundred different sites in Washington, in the last five years and taken these same photos.

So the before, during, and after, the converting this building from, I'll call it "Brutalism light", to the false paradigm of the "sustainable glass building". So is that what we want to see? Is this it? Is this the standard we want to have for what modern-era buildings are being treated like? To change their behavior from a building that is literally un-occupiable unless it is addicted to fossil fuels. Is this the solution? If it is not the solution we want, who is going to have to advocate for the right solutions? The people in this room.

Here are some other examples, and, as we all know, all government is bad, but I want to take my hat off to the GSA, the General Services Administration of the United States of America Federal government, that has actually said, to its modern era building stock and the architects working on it: will you guys play around with this a little bit, and try to find some solutions? Because we have a big challenge here.

And these are three that are just some examples. The one on the left, the Green-Wyatt in Portland: it's kind of like, what are the passive solar type of scenarios that can be added to a building that is basically just a giant glass box?

The one in the middle, the Celebrezze in Cleveland: they literally overclad the existing building with a second skin to create a more workable, energy efficient skin, instead of tearing it all off, they literally added to it.

And then the last one, the Lever House is probably the best known example of- actually, there is nothing here that is original anymore, but it looks just like the old building. So it's all about the architectural, cultural heritage that this building represents. The material side of it, the material is all in the landfill somewhere.

So which one of these is a good example, which do we want to see done tens of thousands of times? It's up to us to weigh in.

The world around us: Terrapin Bright Green, an organization created by Bill Browning of Rocky Mountain Institute, his study of the New York City skyscrapers, basically said, you know, probably just tear them down. Probably not any really good solution here. So that's what the literature is, swirling around us.

Next is this whole notion of the acceleration of rehab. This is a projection- unfortunately not that new, and one of the things we're are lacking is new- and I want to tell you that as President of AIA next year, I commit, and I have set money aside, to doing a study through the AIA, I hope APT will come and join us, I hope that Architecture 2030 will come and join us, to do a study that defines what this challenge is, what the building reuse challenge is, that we're faced with, so we can just simply really understand what the problem is. The money is in the budget, we're going to do this in 2018. Come join us, ok?

Another thing just to note about this, is that we don't have to fight economic trends, we're actually part of economic trends. So let's get smart talking economics. And let's get smart, really, talking in terms that will help us achieve these things. I'm just going to leave that there. It kind of goes back to the issue of dealing with how do we talk about cultural value, how do we talk about embodied value of these buildings.

We don't have to fight economic trends, we're actually part of economic trends. So let's get smart talking economics. And let's get smart, really, talking in terms that will help us achieve these things.

In talking about them, let's remember our grandmother of how to get it right in the modern era, Jane Jacobs, who really did talk about the value of existing buildings as an integral part of her understanding of the city.

Again, understanding the language of building reuse, Don Rypkema, many other people who really, really understand, let's get good at being able to talk about these buildings in economic terms.

One of the reasons why that's so important is to get to this question of embodied carbon, and finding a way to monetize embodied carbon. We HAVE to find a way to putting a monetary value behind monetized embodied carbon and avoided impact.

We all know this study, from the Preservation Green Lab. The National Trust Preservation Green Lab. That really put the numbers behind the proposition that the greenest building truly is the one that is already built.

We have to find a way to putting a monetary value behind monetized embodied carbon and avoided impact.

How do we go about, and relate that to the Carbon Economy? California's carbon economy is probably the most developed one that we have closest to us. And look at these two- there are five fundamental guiding principles of California's carbon economy- look at two of the five:

"Energy efficiency is greatest energy resource", and "Investing in greening existing buildings is good for business."

So we have the ability to link into this conversation. It's up to us, the people in this room, to define how to do that properly.

We all know very much that there WILL be interventions. How do we make them the most beneficial, and least destructive and disruptive? How do we do that?

One of the things that we again know, is the value of building life cycle planning. They actually have many life cycles, not just one. We have to be involved in defining those reinvestment cycles.

One of the things that we again know, that the people in this room understand, is the value of building life cycle planning. And we also understand that buildings are not one thing, they are assemblages of many things. They actually have many life cycles, not just one. Ed talked about this in terms of the capital reinvestment cycles. Again, we know this stuff, and we have to be involved in defining those reinvestment cycles and what it really means, for buildings, with the skin investments vs. the structure investments, vs. the stuff investments.

Fortunately there is a lot to work with, it is highly codified with what it means to really assess life cycle. We have tools that really allow us to use our normal processes, of using our BIM model development and things like that, to really get to the bottom of this.

There are also great people, like Peter Busby out in Vancouver, who are looking at literally how we make buildings, and to really understand what the embodied carbon footprint is of our buildings.

In the conservation world, we have a real appreciation for preserving the embodied carbon investment that is already there. How much do we know about our actions? And as we intervene in these buildings to change their behavior, how much do we know about the embodied carbon footprint of the actions that we're recommending? I can tell you from my own perspective, my practice, we don't know enough, we have to get better at this.

In the end, we are adapting, we are transforming existing buildings. We have this great lesson of the 19th century industrial loft, that tells us, this is a building that's an adaptable building. This is a building that the third user, the fourth user, the fifth user, has just as real an opportunity to use this building well as the first user. And we of all of the design professions, understand this from the perspective of having used buildings that are a hundred, two hundred, three hundred, five hundred years old.

Well, we have a LOT of these buildings, these really ordinary, mid-century modern era buildings that have to be adapted. Do we have a plan that is as good as the SoHo loft for these buildings? It is up to us to really define it.

There are architects that are even taking buildings like the Boston City Hall, these Brutalist buildings that we're all supposed to hate today, because they're so unfriendly, and finding ways

to reuse them sympathetically, both in terms of their carbon footprint and really making them places for people again.

So we have to preach long term value. And I just want to go to this example, here is this year, 2017, the greenest buildings in the world, these are the AIA Committee on the Environment top ten buildings for 2017. Really amazing buildings.

On the level of long term value, how many of these buildings have the same generation-after-generation-after-generation value proposition that the SoHo loft has? How many of the designers designing these buildings thought about them in terms of their value for the second user, the third user, the fourth user?

Who understands this? Who will be the proselytizers of this? The people in this room. We have to bring this to the conversation.

So here we are back at 71 Garfield, a Quinn Evans project in Detroit, Michigan. The whole roof is covered with solar tubes, it uses ground source heat pumps, this building is using about 20% of the energy of a typical residential property. This is a really, really green building reuse project. It is an affordable housing project, too. We can do this! We can do affordable housing in a place like Detroit, and make it a green building. We've got examples like- we've got a textbook, we've got Jean Carroon's Green Preservation! We just have to buy Jean's book, and "just" follow the instructions!

I'm just going to end by saying, you know I've said a lot of things about the people in this room. And I mean it with all sincerity, that our little band here has a perspective, that -do not think that somebody else out there thinking this way. They're not. They're thinking in different terms.

I've tried to define things that are our unique viewpoint, the need of the heritage conservation world to weigh in now. No one else is going to do it for us. It's our perspective. It's our "happy little band" that has to step up and get this done!

So, let's get energized, and let's get busy!

Moderated discussion
Mark Brandt (MB):
Wow. Another thought-provoking and provocative presentation. This small group of committed people.

I thought that it might be nice now, in the final segment of this session, to get the value, the best value, the most value, out of these amazing brains that we have here, and just let them talk. We tried it yesterday, and it's amazing. I think you're in for a real treat.

So we're going to have a panel discussion of a different kind. Carl and Ed, I'm going to provide you with some questions, but mostly, we just want you guys to talk. So just pretend, really, that you're having a fireside chat. There are not 900 people in the room in front of you. There are not bright lights in your eyes. Can we maybe turn them down a little bit? Fireside! Think fireside! Mr. Lighting Man?

And I'm going to throw some thoughts out there, that pick up on your amazing ideas that you've given us today, and we're going to let you guys chat away.

I want to start off with a - what's that game on TV, short snappers? Quick short snapper, Carl, I'm going to throw it at you.

Where do we draw line- because you mentioned the Mount Vernons of the world. Where do we draw the line between the need for cultural preservation and the need for zero carbon? Is an iconic building that can not easily take a performance upgrade, is it fair game still?

Do we need to, as John Ralston Saul told us on Thursday night, do we need to change the model? At what point are we sort of allowing perfect to get in the way of, or be the enemy of good? Can you elaborate on that just a little bit?

Carl Elefante (CE):
Yeah, so thanks for the easy question!

The answer to the question has to be answered by people in this room. And I'm not going to presume to tell you what the answer is. But it's time for us to get into this dialogue.

I pointed to Mount Vernon because Mount Vernon happens to be a place that Quinn Evans Architects is pretty involved in. In the US at least, it's the first place where somebody essentially articulated the paradigm: "we want this place to last forever", and forever is a pretty long time. So, bringing a long term perspective to what conservation means, was established by the Colonial Dames at Mount Vernon. The cultural value of that couldn't be more obvious.

But I think that the National Trust, for example, in their own work, quite a number of years ago, I think about 50 years ago, created the Main Street program. And the Main Street program really did look at the whole, rather than the individual buildings, and really asked what does it take to have a community that survives its culture? I think that that's kind of the level of the question that we're at here.

What are the things that your city, here in Ottawa, or your community wherever it is- what are the cultural themes, the cultural underpinnings that really need to be maintained in order for that community to continue to function? I think the people in this room have to answer that.

We have to answer it in the context of knowing that we have this other dimension now to what we're doing, and that is the carbon dimension. I think to a great extent, the growth issue is probably the hardest one. I need Mike Jackson to back me up on this, I think it was the University of Minnesota about 20 years ago, 15 years ago, did a study on building demolition, why are buildings demolished? Number one, because they are hard to take care of, and number two, because of the need for growth. So I think that we need to get at that, and understand that our goal is conservation. What do we need to do to really articulate an approach to conservation that balances all of these things?

So, I didn't answer your question, but I'm not gonna.

The people in this room have to answer your question.

MB:
Yeah, ok, but remember I told you to pretend they don't exist out there. So let's really get into the real fireside chat now.

Because Ed, I want to bring you into the conversation, even though I'm going to use the word preservation. You've talked about, Ed, the dire need for change, but that it's doable! And that, I think it was actually, Carl, that you talked about three or four times, the rate of renovation needs to increase, but Ed, I know you're in agreement with that.

We, bring- when I say we, this close little tight-knit community of careful thinkers-
(Jean Carroon: "you said we weren't here!")
Oh man, busted by Jean Carroon, I can't believe it!

The community out there, the preservation and conservation community out there- they bring a certain approach to transforming buildings. Today we're talking about transforming buildings. They bring a certain approach to that. I think, in my view, and I think what I'm hearing from you, but need you to articulate it better, is that there here is a way for that preservation approach to be taken more broadly, more widely. Out into the mainstream world. And that, in fact, I think what I'm hearing you say, is that it's absolutely needed!

Ed, can you start - and now I want you to face Carl- Ed, what do you think of that? About a certain approach? Because your presentation, which was fantastic, filled with numbers that are meant to push us forward. But I'm talking about the ways forward, the specific ways, on-the-ground ways.

Ed Mazria (EM):
Yeah, if we look at how far we've come, and the fact that the existing building stock keeps moving down the scale, so it is getting more efficient. And we now know that you can fairly easy bring in new buildings at zero net carbon, so I see great movement in that area.

The elephant in room now is embodied carbon. I mean, think of building out the entire western hemisphere in 15 years! I mean, the numbers, and the number of cities popping up that are over a million people on an annual basis is just staggering! So the resources, the cement, the steel, the wood, everything else that goes into building a building and all the associated infrastructure is huge.

So repurposing existing buildings and the embodied carbon associated with that, or not associated with that in a sense, is huge. It's absolutely huge.

If we build everything out new and tear down and rebuild we're going to be in huge trouble. Because the elephant in the room now, as actual new buildings become operationally much more efficient, the amount of resources they use, and the embodied carbon in those resources is staggering. So repurposing what we have, and saving all that embodied carbon is just enormous.

The numbers- I remember the numbers we looked at 8 or 10 years ago when we started all of this. And it took about 15 years of building operations to pay off the embodied carbon debt, for them to actually equal each other. 15-20 years. You'd see the curve.

Now, it's 40 year, 50 years, 60 years, because the new buildings have become so efficient, that the embodied carbon in building them and putting them up, it takes- you almost can not through building operations reach that amount of energy consumption and carbon.

So the whole repurposing and reuse of existing buildings is enormous.

The second thing is, then, that we're going to have to produce all these new materials with zero carbon, by 2050. There's no other alternatives. So material selection, and how we do all of this, actually how we renovate and how we build new, is going to have to change pretty dramatically.

Right now it's hard for us to see those changes, just because of trying to look into the future is always difficult, and dangerous in a sense. But when see the amount of changes that have happened over time, and the timescale of change has narrowed dramatically, so changes are happening at a pace that we've never seen before: IT, technology, all sorts of things.

I remember last year Carl and I were in China together, we were in Shanghai last year. And we had a car that kind of took us around, there was a lot of congestion, all that kind of stuff.

I just got back from China last month. And all of a sudden there was not that- I didn't see as many cars, and all that. But I saw thousands of these bicycles, all over the place! These orange bicycles, blue bicycles. All of a sudden, within a 6 month period, a billion dollar industry was created called Mobikes, and they have other names for them.

But essentially what it is is essentially a locking device on a bicycle, that you can unlock with app. You get on the bike, they charge you 15 cents a half hour, which is relatively nothing, they have a little basket on them, and you can ride the bike anywhere and then just leave it! Wherever you get to, your destination, you just put the kickstand down, put the bike, close the locking device with your app, the meter goes off, and the bike sits there!

Now there are thousands, well, millions, of these bikes all over the city, and people riding Mobikes, because they're so cheap. You don't have a station, and it's alleviated a huge amount of congestion.

Now, this thing happened so quickly that it creates its own problem. At a popular destination these Mobikes are piling up, there are literally thousands of Mobikes, there's a hill of Mobikes all over, people are just tossing them in a pile and leaving them there.

MB:
They're changing the model but-

EM:
they've created another problem! And now they're dealing with that issue, and having a way to do that.

CE:
So one of the things I wanted to pick up about what you were saying that I think is pretty important was the big building vs. the little building scenarios.

One thing that I think really kind of supports that, is that I think the architectural profession is literally parallel to that, there's the big building and little building equivalent of the large firms and the small firms.

So essentially there is a community that is ready to support both of those agendas, and I think it would help in terms of what the preservation community and the conservation community can contribute to this, is really understanding that both of those models are of equal significance. We really need to get both of them engaged here.

EM:
Our profession, getting involved in, for example, the literally hundreds of thousands of buildings that are sold every year, to repurpose them at that point in time rather than rip them down and rebuild them, is going to be a huge opportunity to save carbon. Absolutely huge.

If we bulldoze the way we've seen in many cities, especially abandoned buildings. I was in Cleveland a while ago when the recession hit, and they were just bulldozing entire streets, of

buildings. There would be these empty streets in an area because they didn't want the property values of the buildings that were there to go down because of all these abandoned buildings. So rather than working to repurpose them and get people in them and occupied and everything else, they just took the bulldozer approach like you said. The fire marshall.

Which then takes out of commission a huge amount of carbon savings. And now to rebuild that block- all the infrastructure is in place in that block except the buildings. And now to rebuild that is double what you would normally then think of in terms of carbon. So there's a whole new way to think about what we do as architects, and how do we save existing infrastructure and then repurpose it?

MB:
There you go.

It's been so amazing to have both of you guys today. Ladies and gentlemen, what did you think? *(applause)*

We have to wrap up, we're running a bit late. We have some great messages for Minister McKenna. Hopefully she can then take them to her counterpart in Washington.

We can all jump on the AIA's promise. We will. We will do that. TC-SP is already working on it. I see my co-chairs Nancy and Cory already making notes. We are going to do this thing.

I can't say it enough. It's us. We have this. We have these skills. We need to get out there, we need to message, and we have that opportunity.

So thank you very much to both of you.

There is a lot more in this topic coming in paper sessions, and lunch hour sessions, so stick with it and we'll see you around the conference. This is our final day, let's go out and have some fun!

Thank you very much!