Welcome everyone. Thank you for joining us for this UI webinar, the business case for mass timber and wildfire resilience, creating value and producing fuels.

In recent years, we've witnessed increasingly devastating wildfires, both in the US and abroad.

Climate change is impacting the health of our overly dense forests in North America.

And mega fires are predicted to increase both in severity and frequency. And today, today's session expert panelists will give an overview of the science behind wildfires and the impacts on real estate.

Stressing the urgency for immediate action to maintain livability of the western United States.

We'll focus focus on the United States, but many lessons learned today can be applied to other countries. I do want to stress, however, that forestry practices vary from country to country and even within regions of countries.

We'll conclude today with a deep dive on the business case for mass timber, the building scale solution that offers the ability to increase demand for our forest products, creating an economic rationale for helping to thin our overly dense forest.

Today we hope to answer a few questions for you.
all, including why should you care about wildfire resilience?

This might be obvious to some of you in high risk fire areas, and perhaps less so to those farther away in urban areas further from direct fire zones.

How did the choices we make every day in real estate impact forest health and climate change?

And what else can you do to help change common misconceptions around forest health and wildfires?

Next slide.

My name is Melissa Crosskey, and I'll be moderating the webinar today.

I'm both a licensed architect and structural engineer in the state of California and have a broad perspective on the building industry. I'm a technical director with woodworks, the Wood Products Council, and have led the expansion of our audience to real estate developers. There are national partnerships with you.

They work on generating resources for the developer audience, including our business case studies, which we'll hear about more today.

I spent quite a bit of my time trying to convince developers to share their financial secrets and our business case series.

I'm vice chair of Uri Sustainable Development Council and manage our national partnerships with USLI greenprint leaders in the building industry who are working to reduce the environmental footprint of our built environment.

In my free time you can find me on the water paddle boarding, raising wild dolphins and cleaning plastic out of our water.

Our first speaker today is Molly McCabe. She's CEO and founder of Hayden Tanner, a development and investor advisory firm.

Our first speaker today is Molly McCabe. She's CEO and founder of Hayden Tanner, a development and investor advisory firm, accelerating impact and sustainability in the built environment.

She's also co-founder of the Lotus Campaign, which provides housing...
driven solutions for homelessness by engaging profit non
private for
profit real estate community. Molly is past chair of Mutualized
responsible Property Investment Council and has been
involved with many
ULI reports, technical assistance channels and other efforts.
She's an industry leader and has authored books on
sustainable
and resilient property development, investment and
financing.
Molly is a mom, a dog lover, an amateur, handy
woman, and serial entrepreneur.
Today, Motley will be talking with us about assessing wildfire
risk at the market scale.
Our second speaker today is Paul Hessburg. Paul is a
leading research ecologist with the USDA US Forest Service
and
affiliate professor at the UW School of Environment and for
Science and the OU College of Forestry.
He leads a team of researchers that studies a variety
of topics, including the landscape and disturbance ecology of
the
US forest past, present and future.
Climate change effects on our forest wildfire resilience
mechanisms and
landscape restoration and adoption. Paul's attend speaker
has done numerous
talks on the new era of mega fires and has
authored over 200 books, articles and chapters.
In 2017, he researched he he received the Distinguished
Scientist
Award from the Chief of the US Forest Service.
In his free time, Paul and his wife Mary enjoy
a variety of outdoor outdoor activities, including including
kayaking.
So when Paul and I aren't talking about fires, forests
and mass timber, we're sharing epic paddling and ventures.
Today, Paul will provide a brief overview on the science
behind increasingly catastrophic wildfires in the western
United States.
And our final speaker of the day is Noel Johnson.
Known as a real estate developer, consultant and nonprofit
leader.
His real estate experience spans over $1 billion of investment
and over 20 developments.
As a developer, he's completed the most mass timber deals in the United States.

His consulting work serves firms facing business strategy and built environment challenges.

Noah's managing partner of Conrad Investment Management, Woodworks's partner on the mass timber business case studies.

He teaches entrepreneurship at Lewis and Clark College and as president of Teacup Nordic Ski area.

In the winter months, you'll find him cross country skiing on Mount Hood.

Today, knolls presentation, economically viable real estate responses to fire and climate will focus on mass timber and building scale solution that can contribute value while reducing.

Force goals.

Forest fire fuels.

For questions, we encourage you to submit all your questions throughout the webinar, and we'll have time at the end for the panelists to address them.

What works is a UI green print innovation partner and we are a nonprofit organization. We're largely funded by the US Forest Service, Forestry Innovation Investment and Softwood Lumber Board.

We also have a series of national wood product manufacturers.

We don't sell anything. We are completely product neutral. Rather we advocate for the use of wood and commercial and multifamily buildings and really our bread and butter is free project assistance.

We're off. We're there to offer free project assistance for developers and their design teams on any commercial and multifamily buildings in the United States.

We have a series of regional directors throughout the country who can answer any question that you have on wood buildings, whether it's innovative mass timber, what's possible with the new tallwood code provisions, maximizing heights and areas, and a variety of other technical topics.
In the chat, we just dropped a link to our project assistance. You can also e-mail our helpdesk [email protected] and you'll get a response and one to two days.

And next slide.

And with that, I'll hand it over to you, Molly McCabe, our first speaker.

Thanks so much, Melissa. As Melissa noted, I will frame for you what's at stake and why you as investors, developers, community members, parents, grandparents, and especially for those of you who are not in areas that are immediately at risk of burning, why you should care about the risk of wildfire and the implications of the changing climate that make wildfires more likely and damaging. Paul's going to talk about, you know, how we got here with regards to land use and forest health and give us some big picture policy and community scale solutions.

In response to to wildfire risk and Noel will offer up some reactions to this new reality and some ideas on how we can practically address these changing conditions in the form of building solutions that respond in a very intentional way that's sensitive to what's happening within the built environment and this asset class. So before we get there, go to the next slide please.

Let me point you to some really valuable resources that UI is put together. UI has done a number of reports, most specifically the Firebreak report which is available online at uli.org URL. I interviewed about 50 members of or 50 developers and others in the in land use policy makers and so forth in the region that is at risk of wildfire and can give you some very specific district and best scale best practices at a site scale solution. We also did a Sonoma County Advisory Services panel which looked at the fires that happened in Sonoma County back in 2018-2019, 2020 and then finally you Li has partnered with First St Foundation on Risk Factor Pro which shows.
risk.

Around flooding, wildfire and heat impacts. Next slide.

So here let me talk a little bit about why

we should care.

Prosperity of along the globe is really focused around places

where it's temperate and Mediterranean. There's a
correlation between prosperity

and temperate climates. The more moderate climates
produce civilization and

therefore that's where all the capital flowed. As the climate

impacts are intensifying, those cities that have temperate
climes are

going to see livability becoming more increasingly challenged

and with

some.

Areas facing daily daytime temperatures that are so high that

even workers can't be safe outside.

With the addition of rising sea levels, salination of
groundwater

and the expansion of arid terrain.

We're going to find governments and private sector citizens

burdened

with the need for more infrastructure and individual property

level

improvements. These changes will affect agriculture and

economic productivity and

will drive migration to more habitable areas. Next slide.

So the reality is that having a stable climate is

the core to a thriving and stable world.

So if you don't live in what's called the wooley.

Why should you care? That's the the Wildlands Urban

Interface

Society and the real estate industry today are grossly

unprepared

for this coming era of instability due to climate change.

And it's just not. It's not just about warmer temperatures,

it is about that loss of stability and and what

happens in an increasingly.

Less stable world. Next slide.

The bottom line is that hotter and more frequent wildfires

are causing increasing amounts of infrastructure destruction, economic hardship and

trauma throughout the United States and the world. It affects

large regions, including even the most prepared
It impacts adjacent areas that receive evacuate evacuees from those wildfire migration patterns.

And also those evacuees who are moving because of strict preventative measures which are rising, causing rising prices and less favorable conditions to live in.

The occurrence of wildfires and the scale of their consequences and how they have changed in recent decades are directly related to current climate and development trends, as well as to historical Land Management strategies. Climate change and housing and the housing affordability crisis especially, are exacerbating the severity of wildfires and the difficulty of managing them as we move more housing into those areas that previously weren't developed next.

Wildfire risk across the United States has been increasing dramatically over the last decades. From 1980 to 2022, there have been 21 wildfire events with losses exceeding $1 billion. This growing risk threatens economic stability, natural resources and quality of life for the communities and property owners affected. These costs are exceedingly high. In recent years, damage estimates between 2012 and 2016 totaled 8.5 billion.

Noah has reporting that. Between 2018 and 2021, that number has increased to $79.8 billion of direct costs. That represents nearly a tenfold increase.

I want to note that this particular slide is courtesy of the 1st St Foundation. Per Noah's research, that $79 billion is projected to rise to 141 billion between the years of 2020 and 2029. And these direct cost estimates are only a fraction of the larger economic costs associated with wildfires. The estimate does not include many of the costs associated with Land Management.
or long-term indirect or additional costs, for example, supporting wildfire suppression.

Is one of the most expensive things that we do.

It costs the government about $2 billion annually today, and estimates from the Office of Management and Budget Budget suggest that these costs could rise to 2.83 billion under conservative climate change scenarios and as much as 4.3 billion in higher emission scenarios.

And even those states who are capable of suppressing the most destructive wildfires today find we'll find their resources stretched thinner, unable to use their those finances for other things such as.

Parks such as such as police, such as as libraries, things like that.

So next slide please.

So you as an ambassador, why should you care? And in particular, if your city is not going to burn or your community is not at risk, why should you care? Well, I think if you can see this picture from San Francisco, you can note that this bright orange skyscape is really a wake up call to all of us and an exclamation on the point of these changing conditions. Climate change definitely causes more wildfires, more days when we have them, and more days when we will have heavy snow.

Countervailing my market and migration forces may be creating near term opportunities in regions. But those regions have longer term climate risks.

Next slide, please.

What we know now is that metro areas have a fundamental threat. From climate risk.

Different than it was before.

The analytical challenges of defining and addressing systemic risk and resilience factors like migration.

Run up against the need to make immediate investment decisions.
about opportunities in high risk areas. Often we find ourselves
pushing out further to develop due to the high cost of land and increase fees and regulation. The real estate industry runs the risk of maintaining sort of a business as usual approach to investment. We are looking often at policy or legislation as the driver for our decision making, making only slight adjustments so that we don't get into trouble with the regulators or client or our clients despite the need frankly for more climate sensitive strategies. And wildfires are really one of the big bigger climate challenges that are impacting real estate as well as other investable assets. Anyone who wants to invest increasingly needs to navigate. This shifting environment. Next slide, please. Between 1964 and 1990. We've seen an extraordinary increase. Currently, we have 79 million homes that currently have wildfire risk. 4.2 million of those homes have cumulative burn probabilities greater than 26%. That means that 25%, one in four of these homes will burn over the course of their mortgage. Insurance, if it's even available, will not cover the cost to rebuild. So who's actually at risk? Well, right now the insurance industry is actually in great turmoil. They're grappling between those increasing costs. And what we're finding is that many of those insurers are actually declining to continue to ensure in places like California, the state has had to put in moratoriums in place so that those insurers will in fact state in that economy for some period of time. Next slide, please. Increasingly, we're investing in in risky places and increasingly risky assets. Last December in 2021, the wildfires in Boulder County were
especially haunting.
In some places, in a few hours, homes were engulfed, and then whole neighborhoods.
The fires cost at least $500 million in damages and store destroyed 1100 buildings. That's in December, and many of those households were underinsured.
Next slide, please.
$1.3 trillion of property.
Resides currently in the wildland urban interface. At risk of fire.
There are other things that come into play as we look at the risk to real estate and the risk to your businesses and to your communities into your home life.
Business interruption.
You know, if you decide if you're making decisions on where you want to move, you probably should think about what's the financial cost of setting up your business in those locations? What's the potential financial cost of a climate risk? They're delays in construction.
As developers, we're opting adding things to our buildings. And so some of the asset features that we're currently adding now are air filtration systems that will address harmful air quality. We're also coming up with backup systems to deal with things like public safety power shutoffs. And if you're not in California and other places, you don't know that sometimes your power can be shut off. For in Sonoma County, it was, you know, hours and sometimes days at a time that really impacts your ability to do business and there's a whole component.
Around economic viability for small businesses in particular and large businesses as well.
They're expenses for flame resistant roofs, energy efficient air conditioning.
You know, and those kinds of costs take big bites out of anyone's budget, but in particular for those who are on limited incomes.
And increasingly we're finding that people are taking climate risk
into consideration when they choose where to live and where to open businesses.

Next slide, please.

If you think back to say California and we, I, I chaired the panel on the Sonoma Wildfire panel and what we found for example was in the wine country as all those plumes of smoke and the fires wafted through those community, we saw complete communities shut down. Vacation spots became evacuation zones, revenues from wineries and local businesses completely dried up impacting wages, productivity, the community tax base. And dislocating community members to faraway places, the impact on the nearby property markets was pretty substantial. And again, we're finding that housing affordability is really impacted.

A recent core logic analysis showed that housing values and rents in the wake of wildfires. When a particular area was significantly impacted, the areas housing and distracted to the housing supply, prices and rents went up dramatically. So for example in Santa Rosa, the biggest city in Sonoma County housing prices, it had about 6% of its housing stock destroyed in the 2017 Tubbs Fire. Those people had to move somewhere and what they found is that annual growth rate of rents tripled. And home prices jumped.

We’re also at risk of watersheds and the municipal water supply being at risk energy costs, many, many places are subject to you know, hydro and other types of of systems that are impacted when the fires run through the through the communities. And then there’s the cost of fighting fires and the competition for resources, which I mentioned earlier. If you’re spending money fighting fires, you're putting in new systems to address it, you can’t use that money for anything else. And finally, let's talk just a little bit about health. Next slide, please.

Heat and wildfires. Wildfire smoke damaged the body, and for many, what it
does it moves all of our activities indoors. People
don't go to local restaurants, they don't shop at local
stores, they don't get exercise.
And now, during many of these elongated fire
seasons, people don't even step outside for longer than it takes
to walk to their cars. Life has become more air
conditioned. Already the impacts add up to billion dollars of
lost wages and lost work. Next slide please.
So many people do not think about the relationship between,
you know.
Climate change and other things. They think of climate
change and wildfires being in a sort of a discrete, discrete
category, but in fact climate change is a threat multiplier.
And we need to address how we can look at
the relationship between how we build and where we build,
and how emissions from burning fossil fuels contribute to
heat, drought, wildfires and other extreme weather events.
Sometimes small sounding changes can make a big
difference. We
have a limited window in which to use our knowledge
and abilities to change the course of the future for
good.
So where do we go from here? Well, we know
what we need to do, each of us individually, and
a society is to reduce our footprint.
And.
We are witnessing a paradigm shift where the private sector
now sees climate action is no longer a threat for
job losses, but rather is an opportunity for create job
creation and economic revitalization. So.
The clearest path to reducing future losses is thinking about
where and what you build and how you build, where
you invest and how you place your wealth in light
of climate change. So with that, I'm going to pass
it along to Paul.
Thanks, Molly.
That's a great setup.
Morgan. Yeah. Thank you.
So my assignment today is to talk to you about.
The constellation of factors that have come together produced the
current lack of landscape resilience and to discuss some things

that we can do about it. Next slide. Appreciate the excellent setup, Molly.

We we know that there's a significant threat. There's no need to do convincing there. But it's good to talk about those things that work together to create the current predicament. Fire exclusion, historical timber harvest, climate change and smoke management are but three significant influences, whether you realize it or not, going back into the early to mid 1800s, the introduction by your American colonists of European. Diseases caused a mass depopulation of the western United States, actually the entire United States, there's a lot of indigenous burning going on, and so it declined really rapidly beginning there. Livestock grazing began in sheep and cattle grazing in the West on a massive scale. And if you think about it, cattle and sheep are eating the grasses and that had been the conveyor belt for spreading many of the historical environments.

We developed built environments increasingly as the West became settled and once people were they had structure and infrastructure that was valuable to them. They wanted fires no longer to be around them. And finally in the 20th century, usually in about the 20s and 30s of the 1900s, we see fire suppression having a massive influence on excluding fire. Early timber harvest logged the large old fire tolerant trees and then a lot of shade loving intolerant trees replaced. The spaces where the large trees were removed, climate change beginning in about 1985 and beyond quite significantly brought us warmer, drier and now windier climates. And these conditions, they're escalating. So year round fire season in California is a normal condition now. And in many other states throughout the W 40 to 80 days of exposure is occurring and finally we add.

Uh, smoke management. There's no time when the air
was like the air quality that we’re striving for. Much of the United States burned over the courses of the millennia, and so we’re looking at unsustainable air quality. And that is the influence of actually increasing severe fire and poor air quality because we’re not doing the prescribed burning that would improve that air quality. And in addition to that, we’ve got a growing wildland interface and urban areas that are increasing the desire for improved smoke management. Next slide please.

So I want to show you some photos that sort of dial in the changes that we’re seeing. 1st I’m going to show you the frequent fire forests. These are the dry pine dry mixed conifer forests that top photo from the 1930s and the the sites that are more open are S aspects and Ridge tops and the bottom. You can see in 2010 that many of those open areas have filled in well in those open areas in the top photo firewood have spread on the ground and many times there wouldn't have been enough fuel. For the fire to continue spreading so you can see there's strong topographic control on where forest occurred and how it would burn next slide. In moderately frequent fire forests like you see on the top, you see this really diverse patchwork of areas that were recently burned, older burns, open conditions, more closed conditions and this was a really important patchwork condition, if you will. When you take fire out of the woods, you get the the conditions in the bottom slide and you can see that the Gray and brown trees and red trees there, these are bark beetles that are responding to overly dense. Forest conditions killing large swaths of trees. Next slide, please.

Even in the upper elevation cold forest, you can see in the top photo those Gray areas are recently burned areas, areas where hardwood shrubs and hardwood trees have come back. And these were essentially a governor on the flow
of fire across many cold forest landscapes because a lot of hardwood conditions act as a wet blanket under many fire behavior conditions. And you can see that that forest patchwork has filled in and it's now in many areas that were burned.

Previously a continuous carpet of forest.

Next slide, please.

So, so just about everywhere you look, there was some manner of change in forest conditions as a result of those factors that I discussed before. And so I want to highlight a couple of stabilizing feedbacks and the low and moderate severity fire force. That frequency tended to thin forest patches and reduce density of forests and the fuels on the ground and so that tended to promote more frequent fires.

Next slide please.

And when you take that feedback out of the woods, what you get is regeneration and release of small and medium sized trees that fill in the gaps. And those act as fuel ladders, places where fire from the ground can climb up the canopies of the smaller trees into the crowns of larger trees, and that gives us severe fire behavior and severe fire effects.

Next slide, please.

In addition to this local stabilizing feedback, we have a landscape scale feedback that we've lost these higher severity fires. They created pathworks of meadows and prairies, shrublands, young, middle-aged and older forests and conditions were open and closed and there were patches of hardwood and all of these patterns work together to spatially regulate the future size and severity of fires. These these feedbacks are really critical to the landscape and sort of that's the net.

Effect of a lot of these fire exclusion influences. Next slide please.

Climate change. Molly tied up the vital role of climate change. In the top left you can see the 1951 to 1980. This is sort of a Goldilocks, a mild and equitable climate of that mid century. Before we really see
the climate ratcheting up. And now as you advance clockwise to 198393 you can see the climate is warming and these are northern hemisphere summer temperatures. And as you continue you can see summer temperatures from 94 to 2004 increasingly warm.

By 2005 to 2015, we're really out-of-the-box and our climate is significantly warmer with many more extremely hot days and the trends are continuing. After 2015, the conditions are even hotter in summer. Next slide please.

So what I want to show you here is that the exposure that's provided by the warming of the climate, by the end of this century, we're going to see summers in the northern hemisphere to last nearly half the year. That's going to diminish the snowpack where forests grow as a consequence of snow accumulation, and it's going to cure out fuels earlier and longer during the season. So we can expect a tripling or quadrupling of burned area by the end of this century.

Next slide, please.

Here I want to show you in several states here in the West how the high fire years are associated with not enough water. That's the climatic water balance or climatic water deficit. That's simply the difference between what vegetation cover needs to grow and the amount that's available. You can see low fire years in the left or where there's plenty of water and the high fire years are where there's simply not enough water and even the live vegetation is curing out. Next slide.

All right, what does this mean? So on the left map of the United States, I'm showing hazardous fuels and the likelihood of containment. Hot colors.

High hazard potential, cool colors less so. You can see the West really has a bullseye on it on the right side. What does that mean when fires escape? If in fact we have a poor likelihood of containment, what is the consequence when these fires escape?

And this is the risks to home in percentile. So
if you look at the hottest colors, what you're seeing is most of the risk to homes is living in the West, some also high risk in Florida and Texas and Oklahoma. So the key ideas here are the worst wildfires in the US are ahead of us. Fire suppression alone can't solve this, and it won't protect us by itself. Next slide, please. Some key takeaways for forest landscapes I think it's important for folks to be advocates of promoting changes, improvements in wildfire resilience in the landscapes that surround the wildland. Key things to promote are to recreate these diverse patterns of forest age, density, composition at hardwoods back to the forest, rebuild Pathworks, rebuild open and closed canopy forest mosaics and promote these adaptation changes. Next slide please. And built environments. Adopt the International Wooley code. All of it. Those separate egress roads out of new developments are really important. About 70% of all new housing starts in the West are in high fire danger environments. This critical maintaining defensible spaces. Go to Google Firewise to find out what that means. In rural environments, maintaining the capacity to douse fires, water storage tanks, hoses and pumps, build with wood, we approved. Building products again, Google Firewise for what that list looks like. Promote living in wood rather than smoke. Then out the trees. Use those in mass timber products. Reduce the associated smoke. Prescribe burning saves half to 90% of the smoke over wildfires. Avoid developing in high fire danger. Environments build up, not out. Appropriate air filtration is going to be critical. Smoke going to be with us, whether wild or prescribed fire, it's
important to be able to live safely and work safely. And finally, emergency shelters and Emergency Management plans are going to be key for shut INS and folks who really don't have access to safe environments. Next slide, please. We have time tested methods to to create more resilient landscapes. They're listed here thinning and prescribed burning. An open canopy forest is a more fire safe forest. Prescribed burning is needed to maintain these treatments. It really reduces the smoke associated with wildfire smoke as I said by many times and that makes our communities more livable. Less period of smoke, less smoke overall using managed wildfires and Backcountry. This is away from urban areas. Allow them to do some of the thinning work that's necessary. Work at a fast pace on a large scale. This opportunity will have passed in the next couple of decades and then doing the maintenance work that's needed. This is an enduring transgenerational commitment. We need to do the work and pass on forests that are prepared for the next generation. And finally, these resilience treatments provide a green fiber source for mass timber products. It's an end to end. Scan for forest carbon storage and healthy living environments next slide, please. So you would ask why a research ecologist might white say why mass timber? And the reason is we have many interacting challenges that cross many spaces, large and severe wildfires like we've been talking about, extended droughts, insect and disease, which is creating increasing amounts of fuel. Communities are at risk, local economies are at risk. These issues cross many boundaries and the problems align with doing work across several spaces. That creates the corresponding benefits. It also provides more sustainable building materials. The thinning that
is needed to make these forests more fire safe yields tremendous wood and fiber assets to mass timber. Next slide please.
The Forest Service is keenly interested in mass timber strategy and investments. Over $55 million have been invested so far in education, technical assistance, development of research and codes and other initiatives. I believe that Melissa and Lindsey can provide resources if you're interested in diving deeper here, last slide please.
I want to thank you for your time and attention. Hopefully it makes sense that creating resilient landscapes surrounding our communities is actually critical to making our communities more livable and sustainable and healthy environments for living. That's great. Thank you so much Paul and and and before you Molly for setting this up and I think having some rather sober motor motivation to what I'm going to try and. Discuss, because I think obviously in challenge there's always opportunity and the the fun part about this thinking is to be a protagonist and to think about what are viable responses. And you know, Paul just did a very nice job of laying out a number of them. I think before I go into the details, it's helpful within the real estate investors mindset within the developers tasks. To keep a bit of an empathy towards the fact that we have a responsibility, the chart on the left in the green is noting that the built environment bears a huge amount of responsibility with respect to emissions. And on the right, it's sort of just motivating what Paul did so well. But if we go to the next slide, it is one of many economist cover stories, and I use the Economist as sort of a barometer for. The global mindset or what's of issue, as Molly noted, a climate change is a risk magnifier. And of course there's so many risks out there that some of my friends I've noticed on that on this webinar today and
others who have the daunting task to invest in a fiduciary fiduciary in a responsible fiduciary sort of long term stewardship way, invest the resources, the money if pensions.

In the like, there's a lot of things to navigate and so as the next slide shows. The issues of wildfire and how it can impact society, they're both local in terms of, like a lot of people know, people who have been impacted. It's not ethereal and it's visually stunning. It plays really well on the Evening News.

But it's one of many in a context of real challenges that confront. Where and how we build the assets and the investments that we're thinking into the future about because as the next slide shows.

The consequences that Paul laid out. Are essentially creating a lot of feedstock, not a lot, but some of the feedstock on the left that can go to become on the right a beautiful home. And in this case this literally these logs on the left from Southern Oregon are the CLT on the right that you see in one of my recent mass timber home developments, the subdivision in in Portland OR.

And so maybe there's some good that's coming out of this challenge that can motivate us because the next slide is to remind us that there's no free lunch in this world, right. The Economist in me is is always needing to say this because if we're trying to consume more responsibly from our EV vehicles, you can see two of them here parked inside of a mass timber garage.

And if we're trying to build new homes, as Molly said, we're probably going to have a substantial amount of climate driven migration. So the let's build less, IE let's consume less housing is probably not a realistic scenario when we have substantial movement of peoples we're going to either be.

Using our forests or we're going to be using our minds. This is literally a picture of the whole rush Mahoning mine in northern Minnesota, where my family is
where I'm born and raised in Minnesota. So there isn't. An option where there is no difficult decisions to be made. They're all hard decisions. And I do think that the response that mass timber provides and we can go to the next slide is a comparatively reasonable response. This comes from the observation that's shown on the right. From the journal Nature that's illustrating how wood timber both stores carbon. It's sequesters it but also probably emits less than our other main structural materials that are steel and cement, concrete being being made from cement and steel. This is by weight and so different buildings will use different proportions of these three elements. I'm never expecting or going to be arguing that mass timber in a pure way is the right way because steel and concrete do phenomenal things. But I do believe a more thoughtful hybrid mix as we're building our homes, our office buildings, whatever, into the future is a viable and interesting response to the challenges that we face. Because. New buildings. Let's assume they'll be built. They need to satisfy not just one, but multiple stakeholders. If you're an occupant, you simply want something that's beautiful, fair enough, and you want to have an enjoyable experience. But you're also interested increasingly, and I think more and more will be what's the social, responsible, healthy option as an occupant. I think if you're an investor, you're also having different pressures to put money in the direction of ESG values. But at the same time, you need to also be looking for lower volatility, differentiated cash flows, especially given the tumult that we are seeing and that the initial economist slides remind us of are going to be with us and they're probably going to be increasing. So with the next slide. We are going into the business case studies. That take these broader ideas and look at it on
the individual asset level. Credit goes to woodworks for funding this multi year study where we are authoring just like you would in Business School case studies that look at the multitude of apartment buildings be they high rise, mid rise or normal Type 5 office buildings big and small, but they're really and the next slide shows this there really all. Examples of what we would call sort of normal development, the 90% of the capitalism market out there that's producing the built environment. There's a lot of government projects, there's a lot of higher Ed projects, maybe nonprofit or foundation kind of 1 off passion projects. But of course this scale of change is coming from the standard development world and there's so. That is to say, we need to, as we're studying replicable and scalable examples, we need to be paying attention to what we're studying. The scale of the project, the impetus for it, the location of it, its asset class does it neatly in normally fit and the sponsor, for example, is the sponsor doing the project, the developer, the protagonist, knowledgeable? Do they have had they considered other options, the traditional options, and why did they opt in to do a mass timber? Project O, that's the study methodology that is hopefully well founded and with the next slide helps us go into an example here. This is a San Francisco well respected San Francisco developer that's done an office building in a great location. This is called the one deharo office project. The next slide shows how we look at the project team. They are name brand normal well recognized teams. This is helpful because. We know that they know what they're doing and they wouldn't have done something silly. The next project, the next slide gives us a sense of the project itself, some of the details. I'm not going to spend time on the project, but I'm just giving you a sense of what each individual case studies content contains. The next
will show you the quantitative details. As Melissa mentioned, this is not easy to necessarily convince developers, investors to share, but we are genuinely.

Looking at an asset individually in the context of its sub market and its asset class to say what was the market return that should have been generally expected and then what did this project's Performa IE what was it thinking it would achieve and then what did it achieve? Because at the end of the day a project that cost twice as much and has a whole return is not going to be a scalable or replicable project.

It will attract the volume of changed mindsets that we're hoping could be in the future. So we can respond to what Molly and Paul have been well describing. The next slide gives the qualitative learnings, not just quantitative learnings.

And we're able to from the quantitative and qualitative in the next slide sort of discern what.

Learnings we can from these projects, I will say that our analysis is generally framed by a very traditional sort of Real Estate 101 mindset which is the net income in the numerator, the costs in the denominator and or the purchase price like what is the value. These are three things, cost, purchase price value depending on your perspective and what seat you're sitting in that are the denominator and then the return often called the cap rate depending again which seat you're sitting on. That's the basic measure that we're trying to make sure we sort of look at all of this.

In that context, so going into learnings in the next slide from the dozen that we've been able to deeply study both quantitatively and qualitatively looking at the project, talking to multiple sources on the project team, talking to informed participants in each sub market. So we are trying our best to make sure we're getting the real scoop at the asset level and at the submarket level what we're
In some ways it's dumb simple, but we don't know until we know. Which is to say, these things are leasing up fast, which is awesome. That's a hugely important thing and these things are attracting really high quality tenants if you're in the office. Asset class, they're attracting absolutely who you want in terms of a credit tenant. If you're in the apartment, you're getting outstanding, qualified residents excited to move in. If with, with, with respect to the lease up, the apartments are phenomenally having phenomenal absorption rates. And then with the office buildings we're seeing tremendous pre leasing which is so huge that the tenant improvements and the and that can happen while the building is being constructed. And so when the building's done it's not empty but it's literally got seats on seats doing things in that building. These are the two key trends irrespective of office or multifamily that we're seeing mass timber buildings sharing other buildings, other individual assets have interesting storylines of outstanding rents or of. Actually saved costs, but what we see universally are these two trends, the next slide will go into specific to multifamily a little bit deeper we're seeing. That. Basically everyone loves the the look and feel of it and if you of course can broaden your target market that helps you irrespective of everything else. I mentioned the pre leasing and you can see here that pre leasing translates to lower costs in certain ways and what is also of interest I think and again this is a bit of a prognostication but. These things, when you wake up in the morning and you walk out, you know you're in a different home. You're not in the standard multifamily home. And there's a distinction with that, that when the next thing gets built right next door has a bit of a durability.
Against future supply. So if you're an investor, your asset that might be 10 years old continues to sort of have some distinction and stand apart. That's hard to do and that's awesome to have if you're holding an asset for a longer term. The final thing that I think is really helpful and increasingly important is it's really a tangible example of the brand values. So I can't tell you how many times I go into development deals and they call themselves like ecovillage and they look, smell and act exactly like the standard run-of-the-mill. Project.
And that sort of greenwashing is I think something we all have seen and and and don't really like. In this case, it's a very concrete way of aligning an asset, an investment and new development with the brand that is increasingly being sought by members of society.
On the next slide, the office market is in some ways similar, but there's some important distinctions because in the second bullet point, you'll see here that if you're an, if you're a firm operating in society today, you're being asked by different stakeholders what you're doing, for example, to attract and retain great talent. So if you deliver them this better space, that's a comparative advantage that you can demonstrate.
Uh, to your ownership, to your stockholders that you are taking action towards ensuring you've got the best talent from the regulatory side, IE the local governments. We all know that some firms are favored and they're the good guys and some firms are seen not as this is a way that I believe.
Firms can be showing the regulatory side how they are trying to behave as a business, as a member of society. I think these are important and increasingly challenging questions for CEO's to to navigate.
And of course we're also seeing, I want to highlight the very bottom if you're an office owner, it's a hard market right now and what we've seen is tremendous sub leasing and or these buildings staying occupied even
during this COVID disruption and this sort of work from home shift that again it's too early to make strong conclusions, of, but that is worth its weight in gold. So that's an important observation. Let's go one more slide here. I believe yes. And so I believe we're inviting you to learn more. This is these are a sample of the projects that we've been able to complete. We're working on more and excited to release those. Soon this QR code will pause and you can take a picture with your phone to to link right there. And with this, we can go to the next slide and go to Q&A if I'm understanding it correctly, which I think. Might be Melissa. Yes, we're going to go to Q&A now and if all of the speakers can please turn their videos back on. And I also want to mention that this webinar will be recorded and a copy of the slides will be available on ULI Knowledge Finder and about two weeks, along with a PDF and a list of resources on wildfires and mass timber. And and we only have a few minutes here for questions, so I'm going to jump right into questions. The first question is from Molly. Molly, as a real estate developer, you've explored mass timber for some of your projects. Can you share with us some of the challenges that you faced in pursuing mass timber and in an area where you'd be one of the first developers? To do so. Yes, I can and we would definitely be the first one in the market. I actually am working on a project currently in Montana and we would be the first one in the market and so some of the challenges are a. Contractors who are not familiar with it and so therefore their ability to sort of figure out how to make it happen and how to price it. In Montana in particular as it relates to the building codes, we did not, we just approved the most current building codes but we skipped the last one and So what by skipping the last one we sort of missed out in that you know preparation and understanding of of some of the
mass timber things that are showing up in the building code. So we're kind of playing catch up so I think.

Those are, those are particular as it relates to some of the things that Noel said. You know we don't know whether or not we will get higher rents or better you know any of those things because it's just we don't necessarily have what I would call credit tenants so to speak in our market. We believe that those are the cases and we have a lot of excitement around it, but that's definitely been one of the challenges from our perspective of getting it adopted here.

And no, would you like to offer some advice following up on that for developers who are in markets where they might be the first in mass timber?

Yeah, I think the simple advice I've always given is ensure that you're working with a team that is less. It's not necessarily the experience, but it's the mindset, right? Are you going to roll your sleeves up, not assume and do some hard work, right? Doing something new and being the protagonist is going to be a challenge. And so if you surround yourself with sort of committed persons that are really from the architect of the engineer to the contractor to trying to find the persons in your, in your permitting departments, whether it's building code.

And I'll just add to that that woodworks, we've also expanded our audience to general contractors being small and many face the same problem as you finding experience builders and we're always there with our project assistance to help navigate new territory and educate entire teams.

And Paul, the next question is for you.

And the US, you've told me that you know, our the public perception of the US Forest Service has has been in the past to suppress fires. But what we heard from you today is that we're not going to.

Battle these mega files fires with fire suppression. So if
you could please paint a picture for us of what the future of the forest ServiceNow looks like or should look like.

So it's a great question. Going forward, the Forest Service and other state organizations are going to continue to suppress fires with their best resources.

My point really is that resource availability is always going to be lacking and so a multi tool toolkit is going to be necessary to essentially exceed the pace and scaling of wildfires, changing the landscape. And I I talked about some of those additional tools. But if you stop and think about it, just doing a reactive trying to suppress fires isn't getting the job done and it's also not leaving for us in a condition we want them and so a lot of different tools are going to be required.

But obviously there's no position where fire suppression will stop happening. It just can't get the job done by itself.

Right and. I wanted to share with you in closing just a few kind of misconceptions, common misconceptions in the industry that I think are speakers really did a fantastic job of addressing today and I just want to reinforce them and leave you all with a few final thoughts. Wildfires impact both urban and rural development and a variety of different ranges that. Molly pointed out. From our municipal water supply to energy infrastructure, air quality and beyond.

And we heard Paul talk about the need to restore patchwork force and it's a common misconception that the easy button for sustainability is to plant more trees. But in our forests in North America, we actually need to work towards restoring through the patchwork through prescriptive burning and also creating value creating demand for high value forest products like mass timber, which can create an economic rationale for helping to thinner.
Of course, I think the one of the former Cal Fire chiefs, Ken Pimlott, said it best with the extreme catastrophic wildfires ahead of us. We need every tool in our tool belt and.

Paul shared Paul, Molly shared quite a few of them with you today and we've also included some other resources that you I's resilience team has on those. And lastly, a lot of developers have the tendency to think when they come to us with mass timber, their first question is what does it cost and if it's not cheaper, I'm not going to build it. And our business case studies that we've talked about today, mass timber is consistently a slight premium. And I hope that you have all learned that there are other ways to contribute value and contribute to the financial bottom line as well as stakeholder and investor. Even though it might be a slight premium.

We are out of time, but I would like to invite you all to continue say thank you all of you for joining us today and invite you to continue the resilience conversation. At.

The 4th annual Resilience Summit, which will be held in conjunction with the UL I spring meeting and Toronto and you have all of our e-mail addresses. Please feel free to reach out with any questions and thank you again.