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How green buildings could help save the world

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Terri Wills is the CEO of the World Green Building Council. She is responsible for developing and implementing the strategy for the organization. Previously, Terri was with the C40 Cities Climate Leadership Group where she spearheaded C40's networks that have had a direct impact on policy in over half of C40 cities. Terri also served as the London City Director for the Clinton Climate Initiative, worked with the Government of Ontario on clean technology, and for the BBC as a Head of Strategy.

What “net zero” and “green building” mean

At the World Building Council (WorldGBC), we say that a green building is one that, in its design, construction, and day-to-day operations, reduces or eliminates negative impacts and creates positive impacts on climate and the natural environment. We often use the term “green building,” singular, in addition to “green buildings,” plural, because the action of building is as important to us as the building after it's built.

Green building is about preserving precious natural resources, but it's also improving quality of life. In the past, many people have had the idea that a green building is all about making sacrifices and doing less of something to preserve resources, but now we also think about how a green building can contribute positively. It's about improving our quality of life, and improving our ability to thrive on the planet in the future.

Like green building, net zero carbon can refer both to a building's operation and to its construction. At WorldGBC, the definition of net zero carbon begins with operational efficiency, as we recognize that that is more achievable in a shorter time frame. Buildings that are net zero carbon utilize deep energy efficiency in their operations, and the energy that the building does use comes from renewable sources, either on site or off site. An example of an on-site source would be a solar panel on the roof. An example of an off-site source would be drawing power from a zero carbon district energy system or renewable energy source near the building.

We're also enabling individual Green Building Councils (GBCs) to tailor the definition of net zero carbon to their local situation. We're finding that different countries have slightly different definitions because of different geographies, different cultures, and different political and regulatory environments where the meaning of net zero carbon has already been defined. Some countries specifically define levels of energy efficiency. For example, in Australia, a net zero building must be approximately 20% to 30% more energy efficient than a standard building, at which point you can start layering on renewables. Australia is also willing to accept carbon offsets, such as investments into carbon sinks, so that can also count to make a building net zero in that country. Others countries are saying that they will accept offsets but within limits. In the Netherlands, for example, renewable sources of energy count so long as they're located within 10 kilometers of a building. Investing in a solar farm located on the other side of the country, on the other hand, doesn't count toward becoming a net zero building.

Today, we're really focused on operating emissions. Over time, we'd also like to take into account emissions generated during the construction of buildings. Some countries are already starting to look at this aspect, but it's much more difficult, and it's going to take some time to get there.

GBCs often work very closely with national governments and companies. For example, in Australia and Canada, the local GBCs are in very close dialogue with the national governments and companies to understand what's going to work from regulatory, feasibility, and cost perspectives. Many GBCs are developing an initial definition, then piloting the definitions and related certifications in a number of projects in their country. These pilot projects test and refine the definitions and the assessment processes as they roll out net zero certifications. This is how the original green building certifications were developed, and some of the net zero certifications and definitions are also being developed in this way.

New technologies, new approaches

To achieve net zero and green building goals, builders very much take a holistic approach, and must take geographic and climatic factors into consideration. We're conducting net zero initiatives in 10 or 11 different countries. One of the biggest issues in Canada to get to net zero is heating, so there are heating technologies that are really important there. In Australia, it's the opposite—cooling technologies are important.

While some of the effort toward net zero will be handled through technology, some of it might also be handled through design. We do a lot of work with Green Building Councils in the Middle East. In places such as Dubai, you get up to 50° C in the summer, so cooling is a serious issue. Do you need to expend so much energy on cooling, or is there a way to design buildings to naturally cool? In Masdar City, a net zero carbon city that's being built in Abu Dhabi, they've started designing buildings in the way they used to in ancient times in the Middle East. How do you maximize cross breezes by positioning the building so that ventilation comes through the building? We're seeing a mix of new technologies and old technologies. Insulation is important in many locations, and that could be handled through new technologies and new forms of insulation. On the other hand, we were in Morocco last year, and they're using earth and mud as forms of insulation—old capabilities.

Many green buildings now are advocating for much better daylight. The more you can rely on daylight, the better. We have a smart lighting system here in the UK Green Building Council office, which shares space with the WorldGBC. We have massive windows here, and we can rely on daylight, but the smart lighting system mixes very well with the daylight. The lights come on when it's darker outside but they're not on when it's light outside. I think maximizing the natural elements of design features and combining them with flexible technology like this is really, really important.



Data-driven systems and smart systems are a very important part of this picture. When we're talking about a net zero building that has operating emissions of zero, we have to have some way of measuring that. In the past, a lot of green buildings were design-oriented, meaning you would get a certification, such as LEED or BREEAM, based on how you designed the building. But once you've designed it, you don't necessarily know how the building is operating. Now we're starting to talk about a net zero carbon operating building. Those buildings must know what their energy use is on a day-to-day basis, and they must know what percentage is coming from renewables to make sure that it's at net zero. Systems such as Arc Skoru, which the US Green Building Council has launched, enable you to look at energy and water consumption and benchmark it against comparable buildings. Data-driven systems and metering become really important in the conversation as a means to achieving net zero emission buildings.

It's also important to improve operations. Linking technologies to each other, to smart systems, and to data helps to create better efficiencies. A simple example is turning lights off when you don't need them. Another example is capacity management: how do you bring in solar when it's cheaper?



Green buildings are healthy buildings

Alongside Net Zero by 2050 efforts, healthy buildings is another very important trend. We have increasing evidence that shows that green buildings are healthy buildings, and that many of the environmental attributes of a building also bring tremendous health benefits. Better access to daylight is a big check for a green building, but it also helps employees to sleep better at night. We're seeing a growing use of daylight, air quality, CO₂, and other sensors within buildings.

Companies are using these sensors to allow employees to monitor the workplace environment. This has become really big in China, where air quality is a serious issue. Employees can refuse to come to work if the sensors indicate that the air quality is poor in their office buildings. In this way, sensors and the data-driven approach puts power in the hands of building occupants. I think that will help drive the demand for healthier and greener buildings.

We have a green building here in London, and it's made a world of difference to the quality of the worklife in our offices. We hear that Millennials will represent nearly 75% of the workforce by 2030, and Millennials are increasingly demanding quality of worklife. They want healthy buildings, but they also really care about corporate social responsibility, the values of their companies. So while healthy buildings are important, we can't forget about carbon emissions. Many employees and tenants want a healthy building that's also a low-carbon building. We see these two concerns being intricately linked.

We have the Paris agreement, and we have to meet the targets we agreed on. We want to limit global warming to 2° C, but we also want healthy buildings. WorldGBC feels very strongly that we shouldn't separate the two. Rather, we need to talk about how green buildings can be healthy.





According to the Net Zero by 2050 initiative, all buildings have to be net zero by 2050, but all new buildings have to be net zero by 2030—which, in all honesty, is just around the corner. We have a lot of work to do, but we think it's entirely possible. I think you'll see in the next one or two years that net zero buildings are on the increase, but we also need to keep an eye on how to evaluate the healthiness of those buildings, to help really make that business case as well.

On the whole, there's a synergy between healthy buildings and the environmental imperative. The majority of attributes that make a building environmentally friendly also make a building healthy. But it's not completely clear cut. WorldGBC is about to do some work on this, to make sure that we're going over the health and environmental impacts attribute by attribute, taking each into consideration.

Air quality offers one example where there can be potential tension. In some countries, they pump fresh air into buildings to reduce CO₂ levels inside. Depending on the technology used, pumping fresh air into a building can actually increase energy use. So then the question is, are there more efficient ways of ventilating and bringing in fresh air? Is the additional energy load being met with a renewable source? It's not a straightforward equation: increasing ventilation is better for green buildings.

WorldGBC is becoming increasingly aware of and careful about what some people are starting to call "well washing." WorldGBC wants to be very clear and articulate about where there may be tradeoffs between healthy buildings and the environmental imperatives. So on the whole, yes, there are synergies but we need to look more closely at the individual attributes.

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New buildings, renovations, and retrofits

In some cases, it's easier to address environmental and health impacts in new buildings, because you can design it from scratch and you have the funding right there. Often, adding green elements doesn't incur additional costs, or only very marginal costs. The barriers for existing buildings are largely financial. The best examples of major retrofits we've seen involve doing a major refurbishment project, where energy upgrades are done alongside major aesthetic upgrades.

There's a great example in Hungary. There's a 19th century palace designed by Gustav Eiffel, who designed the Eiffel Tower. They did a massive retrofit and turned it into a green building, at one of the topmost levels of certification. It's an absolutely beautiful building. They kept all the main historical elements, but they were able to turn it into a very, very green building. And there's the Empire State Building. Doing an energy retrofit made a lot of sense because they already had the funding to do a major refurbishment. A lot of the work we're doing is making sure that companies looking to do a major refurbishment are also prepared to layer in energy-efficiency retrofits and implement new technologies. We think that that's entirely feasible.

Another of my favorite examples is the Italy GBC, which has a green building certification designed specifically for historical buildings. You can imagine that in places like Rome and Florence, it's not as if you can just tear down the buildings and build new ones. So they've designed a very specific green building certification entirely for historical buildings that need to be preserved. We think that's really positive, because it shows that there's so much that we can do. But you need to have the technology and advice to do it properly, to preserve the history.

WorldGBC doesn't have a mechanism yet for tracking the renovation rate. We usually get our data from other sources—for example, a number of countries are collecting data as part of one of the energy directives issued in Europe. Are we on track to achieve the conversion and retrofit rate required to limit climate change to no more than a 2° C increase in global average temperature?

I doubt that we are. Do we know the exact data points? We've done a lot of research, and we know that we need to reach a renovation rate of 3% per annum by 2020. That's the newest data that's come out of the EU.

Our focus for renovation so far has been primarily in Europe, where it's much more important than new building. We recently released the results of a major renovation project called BUILD UPON in which thirteen of our Green Building Councils worked with their national governments to develop national renovation policies which will really spell out how renovation goals will be achieved.



We have so much work still to do. We're hoping that the new net zero certifications coming out will help. As I mentioned before, many certifications so far have been design-focused and not operational. Once we launch operational-focused net zero certifications in a number of different countries, there will be more of an incentive and potential reward for companies to track their operating missions on an ongoing basis. We believe that this will drive the renovation rate, because companies will realize that if they're making portfolio commitments, they will have to change some of their buildings around the world.

It's definitely possible to achieve our net zero 2050 goals, but we really have to step up the rate of renovation, and we see our GBCs playing a really significant role.

This is not just a European issue—it's definitely also an issue in other countries and regions as well, such as the US and Canada, and even China, where there's so much new building going on now. But there's also been a lot of building in the last ten or twenty years, and China has just recently massively embraced green building. Their certification is now one of the three biggest in the world, in terms of square meters certified. In China, there's a big opportunity to go back and retrofit a lot of the buildings that were built before the green revolution started.

The situation in the United Arab Emirates is similar. There's a lot of building going on now, but they also had a significant building boom in the last ten to twenty years. Many of those buildings are massive, and they're massive energy guzzlers. Our Emirates Green Building Council is working closely with the city of Dubai to benchmark existing buildings and move them closer to the newer, greener buildings.

The opportunities and challenges differ slightly from sector to sector. Office buildings represent a huge opportunity, because renovations can be driven by major companies across the sector, but there's also a huge opportunity for housing. There have been some really interesting initiatives in the Netherlands. Energiesprong, which also serves the UK, is a company that comes in and turns your house into a net zero home in a day—and they make it look better as well.



The importance of space utilization and optimization

We're hearing more and more from so many people that office optimization has to be part of green building strategy. How to improve the usage of space, how to redesign space, how best to implement hot-desking and flexible working spaces—that's all part and parcel of green building strategy.

A case in point is the WorldGBC office here in London. We thought we'd have to move to a new office space, but because of really smart utilization we're now able to fit many more employees into the existing office space. If every office in the world was doing something similar, that would really cut down on the amount of building space required.

Space optimization may be less of an issue in Europe, where we're not seeing so much growth, but places such as Dubai and China, where they build the equivalent of Rome every three weeks, have to get smart about office utilization. There comes a point where we just can't keep building to keep up with population growth.

We estimate that there is roughly 150 billion square meters of floor space worldwide today, and that's expected to go up to 300 billion square meters by 2050, but that's a mix of commercial and residential. The number we've been using for a long time, which comes from the UN, is that a third of global emissions comes from buildings, but we really need to dig more deeply into that number. We'd like to start working with both the UN and the International Energy Agency to verify that number, and to determine what we know, what data is out there. There's a dearth of good data here, because no one has really been digging deep into the numbers. We need more data to help guide our strategy.



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Navigating the political climate

The best way for building developers and building owners to get involved is join a Green Building Council. A business can join a Green Building Council as a member at a reasonable cost. That enables the business to get access to the events that the Green Building Council is running, to get involved with committees, and so on.

If you're particularly interested in health and well-being, if you're particularly interested in net zero, most of the Green Building Councils offer opportunities for engagement. They also offer education and networking, so it's also a great business development opportunity.

Through the national Green Building Councils, businesses can engage with the World Green Building Council, because the GBCs are all members of the WorldGBC. We offer opportunities to partner directly with the WorldGBC, but we usually reserve that for global companies such as Signify (formerly known as Philips Lighting). Signify has joined a number of local Green Building Councils, but they have also joined the WorldGBC corporate advisory board to create a strategic relationship at the global level. We work directly with a limited number global organizations who are committed to green building and are engaged in our Green Building Councils globally. But we always encourage companies work at the local level through the local GBCs first.



The effect of world politics on sustainability programs is a big question right now. Trump has pulled the US out of the Paris Agreement while countries such as China, Canada, the UK, and others are taking a leadership position on climate change. I think it's now become deeply embedded within companies. Major companies are moving ahead with massive net zero and decarbonization strategies, because they recognize that this is where the market is going.

In the past, companies have often waited to see what the policies and regulations are going to be. But it's now come to a point where we know that global warming is real, we know that climate change is happening, and we know it makes good business sense to decarbonize and to have a climate mitigation strategy. So I think this is happening, politics or no politics. We need to make sure that companies are emboldened to take action regardless of what the latest regulations and policies are. That can be really challenging and frustrating for companies. Companies often look for long-term regulatory certainty, but with the political winds right now, we have to make sure that companies are putting a stake in the ground, that they're going to move forward with net zero programs because it's the right thing to do.

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