Cleveland, Julie

From: Jeff Reinke <jsreinke@yahoo.com>
Sent: Friday, November 3, 2023 5:11 PM
To: Plan Commission Comments
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Subject: Comments, an article, and a video, for the Comprehensive Plan Interim Update meeting, on Monday, November 13th (?).
Attachments: Ultra-Sustainable Construction Article.pdf

Greetings to the members of the City's Plan Commission, and others. We hope you are all doing well.

Firstly, we are submitting to you, via a pdf, a short article on advances in building technologies. The article is from the 9-22-2023 edition of *Newsweek* magazine.

This article is a prime example of LEED - Leadership in Energy and Environmental Design. Also, while reading on the Comprehensive Plan Interim Update, we somewhere came upon the statement

(sorry, we are not exactly sure where): these new building technologies will make for "#4 [a] better fit with the predominant uses and development patterns in the surrounding area."

These new technologies can save large amounts of money and energy for developers, construction companies, building owners, and the general population.

Secondly, we are submitting a 13:38 minute Ted Talk on how new buildings are being constructed and built to bring more joy into people's lives. If you will please watch the entire video, you will

see and hear about such buildings. We have an example of such a building, going up right now, here in Madison, Wi. We are referring to the WYSO (Wisconsin Youth Sympathy Orchestra) building,

on the 1100 block of East Washington Avenue.

We encourage the Commissioners and everyone to read the article and view the video. Our hope, intention, and purpose is that Madison will use these technologies and techniques to build more

energy, financial, and people friendly buildings, both now, with the Interim Plan, and indefinitely into the future.

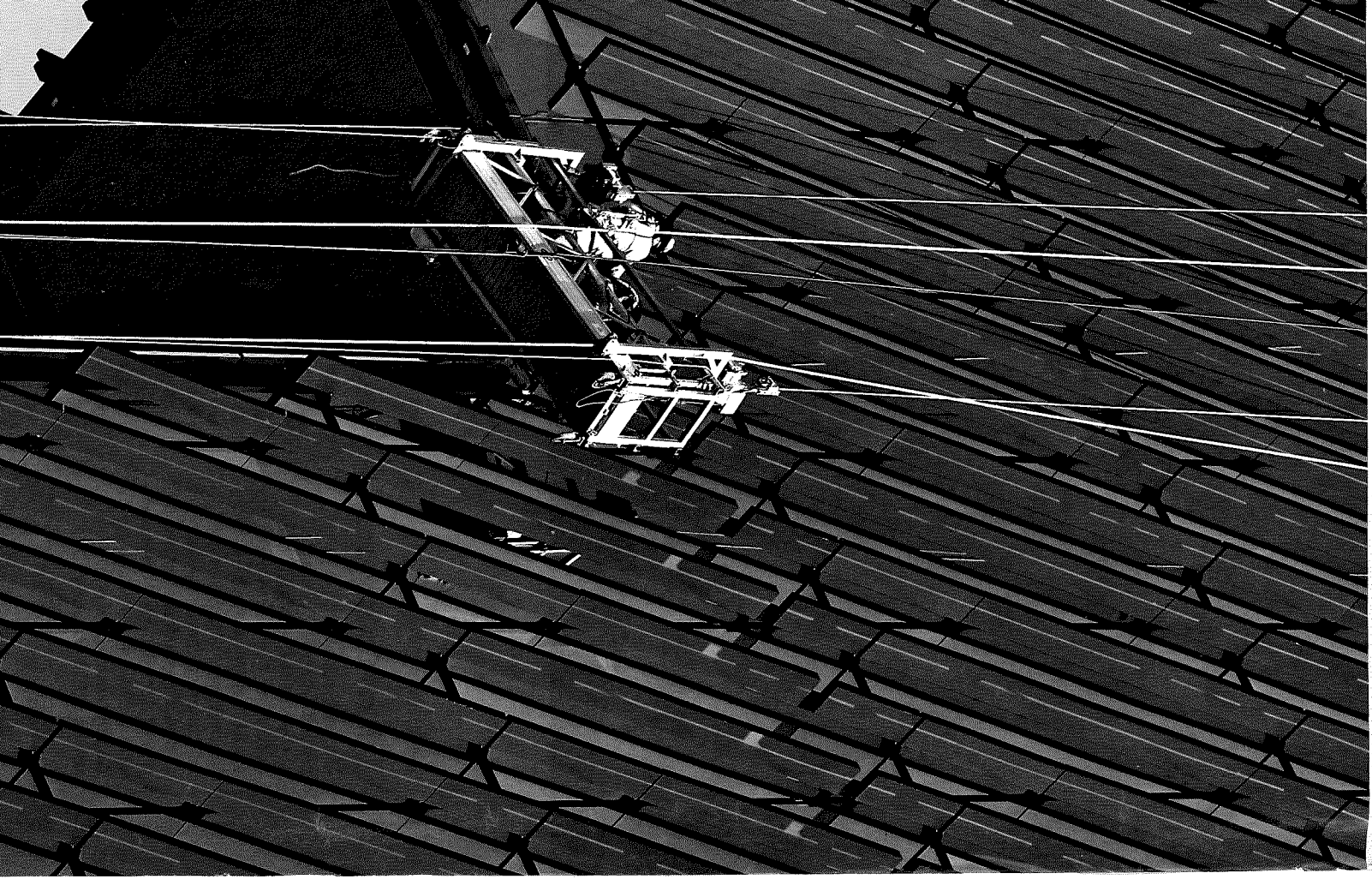
Thank you very much for your time and consideration, of the *Newsweek* article, the video, and our heart-felt comments.

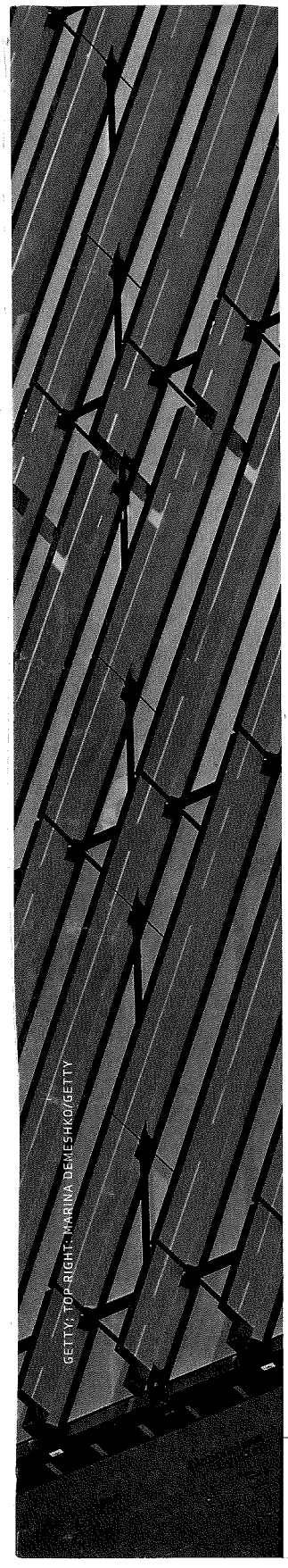
Sincerely,

Karen Banaszak and Jeff Reinke

[Where Joy Hides and How to Find It | Ingrid Fetell Lee]

Where joy hides and how to find it | Ingrid Fetell Lee





GETTY; TOP RIGHT: MARINA DEMESHKO/GETTY

CLIMATE

Ultra-Sustainable Construction Goes Mainstream

A new green generation of buildings is hitting goals that were inconceivable 10 years ago—sometimes even improving the environment

by **DAVID H. FREEDMAN**

TRONDHEIM, NORWAY, A CITY OF 180,000 JUST 200 miles from the Arctic Circle on the coast of the frigid Norwegian Sea, hardly seems an ideal location for harvesting energy from the sun and surrounding environment. But a new 200,000-square-foot office building there is producing nearly half a million kilowatt-hours of renewable energy per year—twice as much as the building uses. The extra energy is powering other nearby buildings and charging electric cars, buses and boats throughout the city.

Highly sustainable buildings have been popping up around the U.S. and the world over the past decade. But now a confluence of new technologies and improving economics, as well as climate-change-inspired government regulation, are leading to the next wave in big construction: ultra-sustainable buildings. This new generation of green buildings is hitting environmental goals that would have seemed inconceivable just 10 years ago—in some cases not just avoiding all harm to the environment, but actually improving it, leading the communities and cities around these buildings down greener paths.

These futuristic-seeming buildings promise to close a yawning gap in the world's efforts to slow climate change and mitigate its harms. About 40 percent of the world's greenhouse gas emissions come from the heating, cooling and lighting of buildings—not including substantial emissions from the construction of conventional buildings. Sharply curtailing these emissions is an essential part of fighting climate change.

Zero Emissions Energy

To appreciate what goes into making an ultra-sustainable building, consider what it took to build the one in Trondheim. The product of a collaboration between

five Norwegian real-estate-industry organizations, the plans called for zero-emissions energy to heat, cool and otherwise power the structure. To get that energy, the developers built solar panels into the building's 31,000 square feet of exterior skin and pumped in what scant heat could be wrung from the nearby ocean waters. The result was the "Powerhouse Brattørkaia" building, finished in 2019, and now a model of how buildings can push out more clean energy than they consume.

Another ultra-sustainable building that's boosting community energy is the PAE Living Building in Portland, Oregon, designed by ZGF Architects as an office building. It relies on insulation and ventilation to reduce energy consumption by 80 percent compared to typical office buildings and collects and treats rainwater to meet the building's water needs. Because of limited space for solar panels, it couldn't generate all of its energy needs onsite. To make up the difference, it paid a nearby low-income housing project to install solar panels that generate enough electricity to power both the building and the housing project. "It makes sense to look at energy production from a regional point of view, rather than just in each individual building alone," says Kathy Berg, a principal at ZGF, which has been involved in a number of ultra-sustainable projects.

The motivation to use ultra-sustainable ideas in new commercial development—as well as to retrofit existing buildings to make them more sustainable—is economics. The costs of green technologies have been rapidly dropping. Solar energy, in particular, is becoming a better and better deal, falling in price about 10 percent a year, according to the U.S. Department of Energy. Renewable energy is becoming the smarter choice economically," says David Orr, a professor emeritus at Oberlin College and one of the pioneers of ultra-sustainable building design: "Anyone who buys a building that isn't solar-powered is just wasting their money." Regulators at local, state and federal levels are also demanding greener buildings.

"Anyone who buys a building that isn't solar-powered is just wasting their money."

Net Energy Positive

Making a building "net energy positive"—that is, capable of producing more renewable energy than it uses—is getting easier thanks in part to big improvements in solar panels. Panels today produce about 50 percent more electricity per square foot than they did 10 years ago, and experimental versions are already doubling today's output. Some new rooftop panels further boost output by capturing reflected light from the roof itself, as well as direct sunlight.

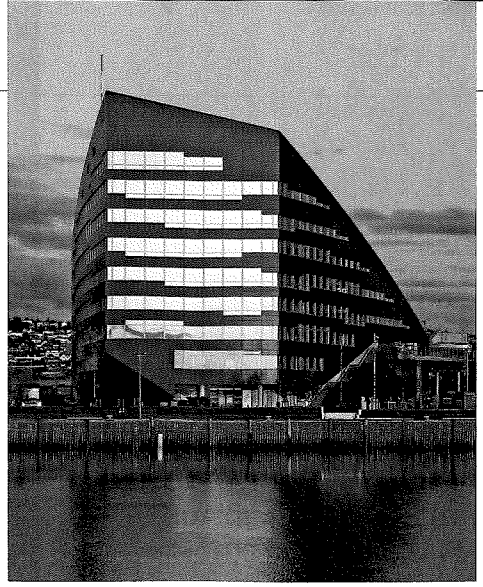
Thanks to advances in electronics that make solar-energy-generating components thinner and lighter, as well as materials innovations that can hide the components behind attractive, translucent coatings, these

SNØHETTA

components can now be built into the panels that make up a building's outer skin, and they can be retrofitted into older buildings. In the German town of Bochum, a 12-unit apartment building that dates back to the 1930s was updated with solar skin panels that now supply the building's 45-kilowatt-hour-per-square-foot electricity consumption—with plenty of energy left over to pump back into the local grid.

Another rapidly improving energy-gathering technology is heat pumps, which enlist a circulating gas that is expanded and compressed in a way that grabs heat from outside air, soil or water—even if it's cold—and releases it indoors. (Reversing the process provides cool air during the summer.) Heat pumps had long been useless in colder regions, but the best ones today rely on new types of gases and more powerful compressors to work in below-zero temperatures. Because they run on electricity from the grid, rather than from burning natural gas, they save on emissions, and they are typically four times more efficient than conventional electric heat. Boston University's new computing and data science center, a 300-foot-tall, 345,000-square-foot tower that opened last year, depends entirely on heat pumps to get through the city's often-brutal winters.

Producing energy is only half the recipe for ultra-sustainability in new buildings or to bring higher levels of sustainability to existing buildings, says ZGF's Berg. "Energy generation is really the second step," she says. "The first step is to reduce the amount of energy the building needs." For starters, that means state-of-the-art insulation to keep heat in or out and efficient LED lighting—steps that are now the rule in new buildings and being retrofitted into many older ones. Further reductions are being made with special design features for managing sunlight and ventilation. For example, these features were instrumental in achieving the low energy needs of the new California Air Resources Board headquarters building designed by ZGF. To maintain comfortable indoor temperatures, motorized shades regulate sunlight entering the building through its giant skylights, and fans move air from cooler to warmer areas. To go even further, notes Berg, some buildings are now being designed to capture prevailing winds as natural ventilation systems.



ENERGY PRODUCER Trondheim's Powerhouse Brattørkaia, above. A bird's-eye view of solar panels on the building's roof, opposite.

Building Smarter

Electronic smarts are playing an increasingly large role in ultra-sustainability, too, both in a wide range of new buildings and in updating older buildings. Often at the heart of smart building systems are sensors that track where people are in a building—and where they aren't. "The heating and cooling systems can find out there's nobody on the fourth floor, and dramatically cut back on the heated or cooled air that's being sent there, as well as on the lighting," says Katie McGinty, chief sustainability officer at Johnson Controls, which produces smart building systems. "Cars today are computers on wheels, but until now too little of that digitization has made its way into buildings."

In addition, smart buildings, whether old or new, can monitor minute-to-minute price changes on the electric power grid and adjust heating and cooling timing to take advantage of dips and spikes in the price. As more building occupants plug in electric vehicles, notes McGinty, the buildings can even look for opportunities to sell some of the available battery power in the EVs back to the grid at peak prices, recharging them when prices drop. And if there's solar power onsite, a building can work that into the mix, too, storing some of the solar electricity in batteries when it's sunny, and using it or selling it to the grid when it's cloudy or prices go back up.

Because adding highly efficient solar panels, heat pumps and insulation enables new and retrofitted buildings to generate more green energy than they consume, they're in a position to provide the excess to others. Many already do that by selling the excess to the grid, helping the grid reach its own renewable energy goals. Increasingly, buildings are striking deals that enable more direct green-energy sharing with neighboring buildings and facilities, as the Powerhouse building in Trondheim did.

As prices continue to fall, ultra-sustainability measures are expected to continue to gain ground among developers of all sizes and budgets, making buildings more of a climate asset than a liability.

▸ **David H. Freedman** *is a freelance science journalist and author. Follow him on X @dhfreedman*