Why is architecture and building so different in Europe?

Lloyd Alter lloydalter November 20, 2019

CC BY 2.0 Building a new community in Munich/ Lloyd Alter

Mike Eliason, an American architect working in Germany, explains.

Mike Eliason is an architect from Seattle who is known to TreeHugger for his strong opinions and his praise of dumb boxes. He has a story to tell about the difference between construction in Germany and the USA and posted a tweet; I took him up on his offer and here it is.

I've been enamored/obsessed with construction costs, quality, and product innovation in Germany and Central Europe vs. the U.S. since I spent a year in Freiburg, working for a firm designing low-energy projects incorporating mass timber with passive heating and cooling systems. When I moved back to the US, I ended up in Seattle, where I dove headfirst into [Passivhaus](). I wasted years of my life trying to convince jurisdictions, builders, and institutions to build to Passivhaus standards, largely to no avail.

In 2018, I worked on [a small office project in Seattle]() for Patano Studio, incorporating Brettstapel, known in the U.S. as [Dowel Laminated Timber](). It was fortuitous – the last project I worked on in Freiburg also incorporated Brettstapel. It only took 14 years for the U.S. to catch up – and only then due to advancements that were being made by a single firm in British Columbia, [StructureCraft]().

Dowel Laminated Timber/ Lloyd Alter/[CC BY 2.0]()

After that project, I decided I couldn't take the glacial pace of progress in the US anymore. We quit our jobs, packed up our family, and moved to Bavaria, where I have been working since April. It has been educational. There has been a massive shift in the architecture world since I last worked here. The quality of so many projects in this region – public and private – is, compared to the U.S., ridiculous. But what is even more notable is how common innovative energy efficiency products are being utilized. Energy Efficiency is no longer a priority to be argued *for,* but to be argued over *how* that efficiency is to be achieved.

For years, the U.S. has been lagging on construction innovation and quality over countries like Germany, Switzerland, and Austria. Recently, though, even China has taken massive steps on construction innovation. I believe this is in part due to procurement differences (e.g. RFPs v. built competitions), but also government and institutional mandates, as well as support for R&D. In many ways, it feels like the whole ecosystem here in Germany is designed to elevate projects that are less expensive, more energy efficient, and of a much higher quality than nearly everything in the U.S.

Procurement: Requests for Proposals (RFPs) stifle innovation, competitions reward it.

The project procurement process, especially for social housing projects, institutional, and governmental projects, is largely driven by [juried design competitions]() resulting in actual buildings. There are numerous forms, open or restricted, one-stage, multi-stage. Some, like [EUROPAN](), are restricted to architects under 40. Competitions allow the public or its representatives to select solutions that exceed the bare minimum of the brief. They are far from perfect, but tend to result in high-quality, well-designed projects, elevating the quality of life for users and residents.

The predominant procurement process in the U.S., Request for Proposals (RFP), stifle creativity and innovation. There are no guarantees that projects will be of a high quality, nor is there generally incentive to exceed program requirements (e.g. meet Passivhaus), ensure projects work contextually, or push innovation. RFPs largely result in the same firms that excel at one or two project types winning that work and churning out banal projects that meet the minimum requirements of the brief. They are also are a means to prevent younger firms from breaking into markets, even though they may have the adequate experience for that particular project type.

Lloyd Alter/ Apartments and bikes can be enough, and can be pretty nice/CC BY 2.0

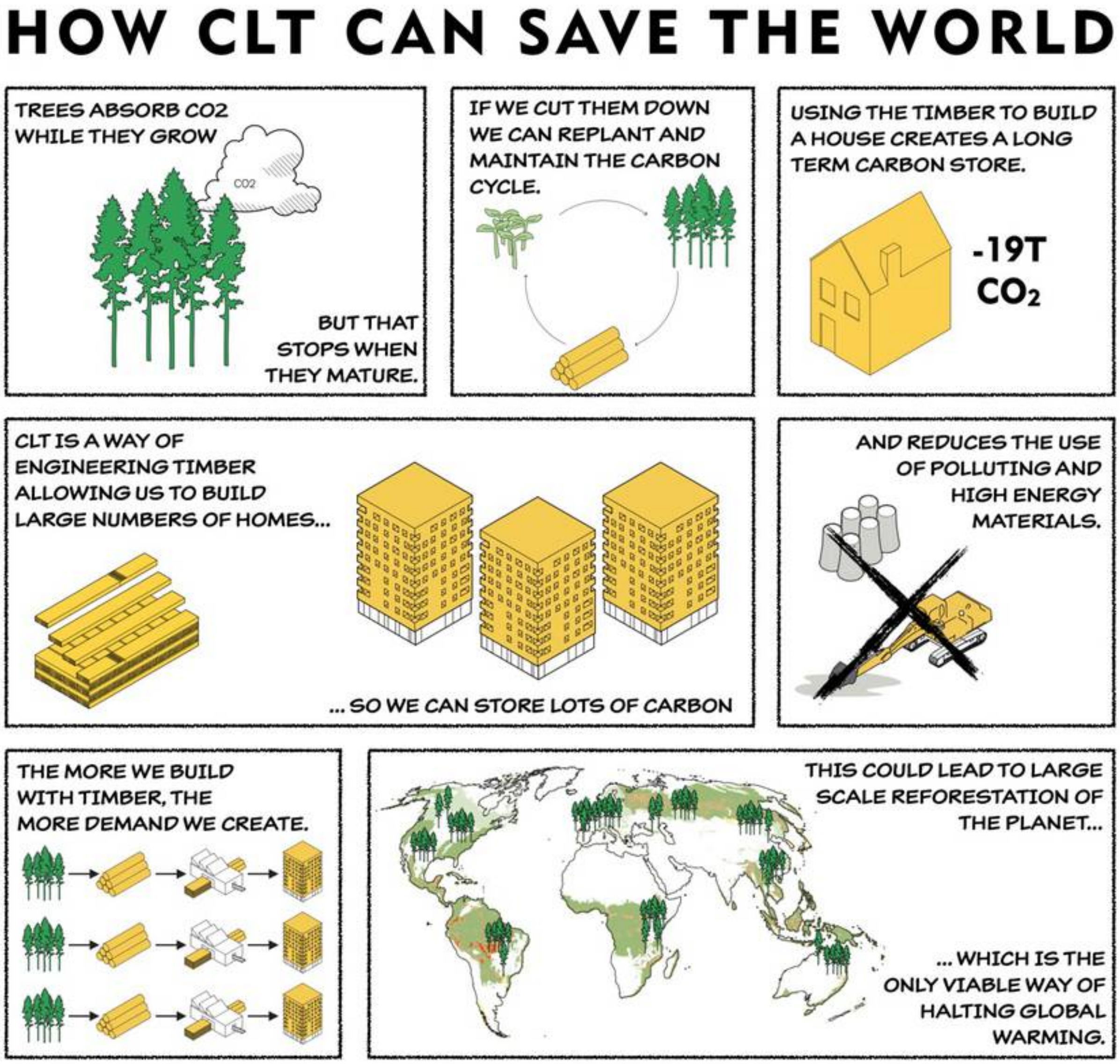
As an example, Vienna's Bauträgerwettbewerbe (developer competitions) for social housing are scored on the ecological aspects of buildings (as well as cost, planning and urban quality, and social mix). The more energy efficient or sustainable a submitted design is, the more likely it is to place or win. This small tweak has resulted in several projects that meet Passivhaus, as well as prioritizing decarbonized forms of construction. This is the reason Lloyd and I were so impressed with the quality of projects there during the 2017 Passivhaus Conference. The Bauträgerwettbewerbe also equalizes the playing field, giving younger firms a shot at a project they likely would never get in the U.S.

Innovation results from governmental directives and promotion.

The European Union has several pieces of legislation focusing on buildings. One is the Energy Performance of Buildings Directive (EPBD), which mandates a number of topics, including deep energy retrofit timelines, the promotion of high performance building products, and Energy Performance Certificates/reporting requirements. Another is the Nearly Zero Energy Buildings (nZEB) directive, requiring that all new buildings from 2021 have a very high level of energy performance. To contrast, the most progressive energy codes in the U.S. won't require Passivhaus levels of performance until around 2030, and no U.S. jurisdictions require energy performance certificates.

The EPBD, along with national and regional mandates, has helped elevate high performance building standards like Passivhaus. It has pushed manufacturers to tweak and even retool their products to meet more stringent building envelope requirements. As a result, the industry around thermal protection here has flourished.

Similar requirements and investment in R&D in China have also resulted in a Passivhaus boom, including over 70 different windows. The U.S., introduced to Passivhaus a decade before China, has five – and most of these are imported windows, or frames, assembled in the U.S. The Passivhaus component database lists hundreds of products that meet or exceed the requirements – and not just windows - but membranes, insulation, ventilation systems (for buildings of all sizes), doors, and even assemblies. Most of these products are not available in the U.S. and there are very few manufacturers tweaking assembly lines for better performing products, as there is no economic incentive and/or requirement for them to do so.



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The North American market is about 15-20 years behind Germany and Austria on mass timber, though the last few years have seen a strong surge. This is in large part actually driven by Canada. Cross Laminated Timber, and Dowel Laminated Timber are now well known, but there are many other products available in the E.U. that are not. Prefabricated buildings and wall assemblies have also been normalized here for decades, especially in Sweden. This innovation extends to even retrofit programs, like Energiesprong, which started in the Netherlands as a whole-house retrofit system, paid through the savings in energy costs. Originally meant for single family and rowhouses, it has recently expanded in to the multifamily market as well.

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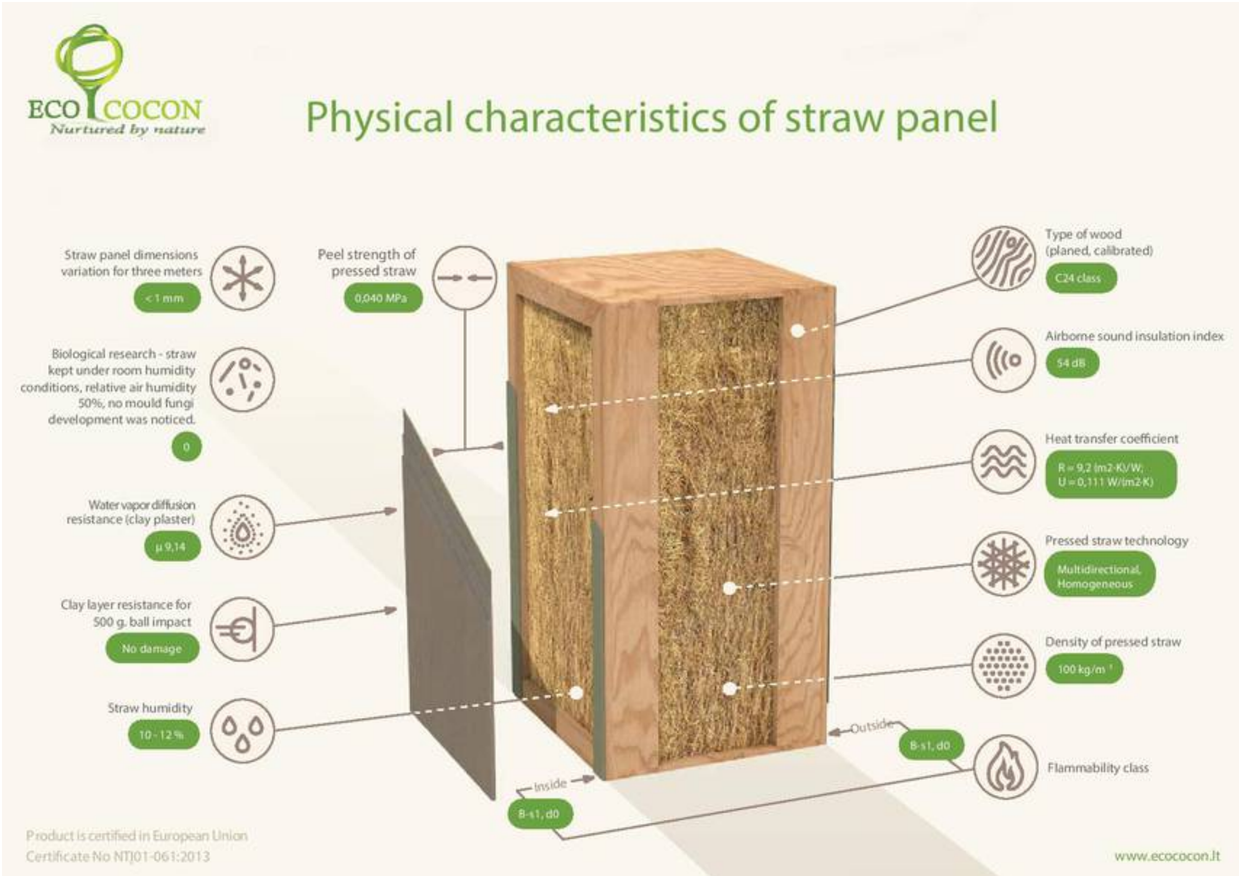
The effects of these policies can be found everywhere. Take the lowly brick. Louis Kahn famously asked the brick what it wanted to be. In the E.U., where energy codes are requiring thermally efficient envelopes, the brick wants to be a Passivhaus. Thus, you can incorporate Passivhaus-certified multicellular bricks (like these packed with spruce sawdust, perlite, or stone wool), and design stunning, low-energy, foam-free facades. Or the Schöck Isokorb products, used to reduce or eliminate thermal bridging of the exterior envelope. These are standard in nearly all of our projects (even non-Passivhaus ones), engineers are adept at using them, developers don't balk at incorporating them; it's just part of the ecosystem, thanks to funded mandates.

Schaumglas (Foam glass) is an insulation made largely from recycled glass, that is flame-, insect-, and (largely) water-resistant. It has been used on Passivhaus projects for years as a substitute for petrol-based foam insulation like XPS or EPS. For the last decade, it has also been available as a lightweight insulating aggregate (now available in North America as Glavel). On many high-performance projects, it is being used as sub-grade insulation, to decarbonize projects through elimination of petroleum-based foam. It was also used in a low-energy project with thermally-activated rammed earth walls, to reduce the heat loss through the wall assembly, and to keep the thermally activated layer of the wall assembly warm.

Insulating concrete (infraleichtbeton or dämmbeton) is also a thing here, and has been for years. Concrete walls, by themselves, have an effective U-value of zero. They generally require incorporation of additional layers of insulation (and finishes) for low-energy buildings. However, with the incorporation of Blähton (clay that is heated in a kiln and expands to a light weight, closed-cell sphere 4-5 times larger) by firms like Liapor, it is possible to have monolithic concrete walls that meet stringent energy codes, without any additional layers or fossil-fuel-based insulation. This is a product that was invented in the U.S. in the early half of the 20th century but is only recently being utilized for thermally efficient facades – and largely only in Europe.

Continues…

![treehugger]



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Ecococon panel

Even on the topic of straw construction, the E.U. has pulled ahead. Eco-cocon is a company out of Lithuania that fabricates structural, thermal bridge-free, energy-efficient straw panels. These panels can be utilized for low energy homes that meet Passivhaus and are quickly assembled on site. It can also incorporate clay plaster and outboard wood fiberboard insulation (another European innovation) to provide de-carbonized, low-impact, low-tech Passivhaus projects. It is also a technology that should be easily transferred to other locations.

I could go on and on…

Funding for research and Information Dissemination

Governmental and institutional research is heavily funded in the EU, with much of it also taking on a collaborative effort. One of the more prominent firms is the Fraunhofer institute – a massive non-profit that has a sizeable program dedicated to research on construction. There are additional not-for-profits dedicated solely to building performance research and information dissemination, like the Building Performance Institute Europe, which features significant research on retrofitting existing buildings. The Fraunhofer Institute and TU Berlin teamed up for research on insulating concrete. The Passivhaus Institute in Darmstadt has undertaken, and assisted with, research on high performance buildings for years. Meanwhile, from here, research on these topics in the U.S. feels like it is in the dark ages.

In under a decade, the EU's Horizon 2020 program has funded nearly €80 Billion towards research on driving innovation-led sustainable growth. Much of this has gone towards addressing climate change and green buildings. Current priorities of H2020 include decarbonizing the economy, energy efficiency, and a circular economy.

Lastly, there are a plethora of means for disseminating this information. There are clearinghouses, such as Buildup, founded as a means of assisting EU members and firms to meet the EPBD requirements. There are weekly symposia, conferences, colloquia, lectures and discussions on everything from ecomobility, Passivhaus, mass timber, to zukunft bauen (buildings of the future). The means of sharing case studies, information, and research is vastly more open, and stronger in the E.U., than in the U.S.

Form Follows Forschung (research)

I believe most of this success comes down to funded mandates. Research in Germany and the E.U. is heavily influenced by government directives, but from that, government resources are devoted to meeting these directives – resulting in training regimes, project competence, and product innovation. Things like this are just now being introduced in the U.S., but with little or no government directives or support. Even financial institutions in Germany and the E.U. are set up to fund energetic retrofits or subsidize efficient multifamily buildings, to a level that is unheard of in the U.S. There are even cooperative and government-owned banks that will fund energy efficient construction and rehabs of cooperatives, baugruppen, and other forms of non-market dwelling. There is virtually none of this in the U.S.

The U.S. government has not historically prioritized durable, high-quality construction, let alone building performance. Perhaps the most fitting and notable innovation the U.S. has produced in the last twenty years is the LEED Platinum parking garage. It is this lack of innovation, paired with a deficiency of mandates, that could derail needed, bold programs like the Green New Deal for Public Housing.

We have a lot of work to do.