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## What You Don't See

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## What You Don't See

*Follow the supply chains of architecture and you'll find not just product manufacturers but also environmental polluters and elusive networks of financial power and political influence.*

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BRENT STURLAUGSON

SEPTEMBER 2018

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North Antelope Rochelle Mine, Powder River Basin, Wyoming. [Wild Earth Guardians]

In the corporate literature of Georgia-Pacific, the slogan “What You Don’t See Matters” refers to the branded building products — DryPly, Ply-Bead, Plytanium, PlyFrame, etc. — that are used in countless light construction projects. In the larger contexts of industrial-capitalist supply chains and environmental sustainability, the phrase takes on new meaning. “What you don’t see” in the production of these plywood components includes four tons of sub-bituminous coal leaving a single mine in Wyoming every second; 22 tons of coal burning at a single power plant in Georgia every minute; and, 62,000 tons of carbon dioxide entering the atmosphere every day as a result of these processes. Needless to say, it “matters.”

Here I would like to argue that it matters in particular for the profession of architecture: that any full accounting of environmental, economic, or social sustainability has got to consider not merely individual buildings and sites but also the intricate product and energy supply chains that are crucial to their construction. Equally important are the elusive and often secretive networks of financial power and political influence that are underwritten by the billion-dollar construction industry.

## Follow the Coal

It is revealing, for instance, to consider the extractive operations, transport networks, and material transformations that must be activated in order to produce a piece of plywood. The place to start is the Powder River Basin, a landscape of rolling grasslands in northeast Wyoming that is home to the North Antelope Rochelle Mine, the largest surface coal mine

in the world. In 2014, coal production in the United States topped one billion tons, of which 400 million came from the Powder River Basin, and 120 million from North Antelope Rochelle.<sup>1</sup> Resource extraction of this magnitude requires not just sophisticated technology and specialized knowledge; it requires also the historical and cultural conception of resources as valuable. Here is an early assessment by the United States Geological Survey, from 1883, when the country was emerging as a modern industrial power, and coal mining fueled the national economy.

It is a somewhat trite but true statement that coal is the most important of all mineral substances in its bearing upon the material prosperity of any country, and it is none the less familiar that coal is the principal mineral product of the United States. ... This country is now second on the list of coal producers of the world, and it is a question of no very distant time when it shall have achieved the first place in point of annual output. It possesses within its borders a larger coal-bearing territory than any other (at least with the possible exception of China, whose coal is undetermined), and the production will no doubt continue to grow.<sup>2</sup>



Coal seam, North Antelope Rochelle Mine, Powder River Basin, Wyoming. [Peabody Energy]



Dragline and haul truck at the North Antelope Rochelle Mine, Powder River Basin, Wyoming. [Peabody Energy]



Coal train near the North Antelope Rochelle Mine, Powder River Basin, Wyoming. [Kimon]

Berlin]

Today, mining at North Antelope begins with a fleet of bulldozers scraping the vegetation and topsoil from the gently undulating landscape and exposing the gray loamy soil beneath. Draglines remove millions of tons of overburden, which are then transported by haul trucks to the edges of the deepening pit. When the coal seam is exposed, electric shovels move the coal from its prehistoric bed to the trucks, which take it to the crusher. After being pulverized into two-inch pieces, the coal is put on a conveyer belt and deposited into storage silos. Once the coal is purchased and orders are processed, the coal flows into the hopper cars of freight trains which pass through the belly of the silo. One of the largest orders of sub-bituminous coal from North Antelope comes from Plant Scherer, more than 1,800 miles away.

The Robert W. Scherer Power Plant, located on 3,500 acres in Monroe County, Georgia, is the largest coal-fired power plant in the United States. Each year, Plant Scherer burns nearly twelve million tons of coal, all of which comes from the Powder River Basin, more than two million from North Antelope alone.<sup>3</sup> The plant, which opened in 1982, is also the single largest emitter of greenhouse gases in the nation; Environment America has labeled it America's "dirtiest power plant."<sup>4</sup> The North Antelope coal that arrives at Plant Scherer is transported from Wyoming to Tennessee via the Burlington Northern Santa Fe line, the largest rail freight network in North America; there it's transferred to the Norfolk Southern line for the trip to Georgia. As the train approaches the power plant, the tracks gradually rise and the train makes a grand loop in front of the facility. Once elevated, the hopper cars release their cargo from below, much like the silos that loaded them. While on this loop, the train does not stop, depositing a constant stream of fuel into what is known as "the pit." John McPhee captures this scene in his book *Uncommon Carriers*, where he describes "a long yard with five parallel tracks, where five coal trains could, if necessary, be parked, or 'staged,' waiting to advance and drop their coal at Plant Scherer." He continues:

That should have suggested the dimensions of the scene to follow, but the significance of the yard did not really register with me, and the effect was near total when we bent around a long curve and the dense curtain of pines seemed to open theatrically from left to right, revealing a loop of track at least a mile in circumference around an infield filled with a million tons of coal (earthmovers and bulldozers crawling like insects on the coal), and, on the far side of the loop, a trestle forty feet in the air and eight hundred feet long, and behind the trestle a pair of rectangular buildings a quarter of a mile over the ground and close to three hundred feet high but dwarfed beneath the overbearing immensity of four hyperbolic cooling towers that came into view one at a time, their broad flared rims five hundred feet above the ground, and two smokestacks a thousand feet high, reaching above the scene like minarets. It was an electrical Xanadu in homage to a craven need, its battlements emitting cumuli of steam.<sup>5</sup>

From this immense "infield," the million tons of coal are conveyed into pulverizers that crush it to a fine powder. This powder is then blown into a central furnace where it burns at 3,000 degrees Fahrenheit, converting water into steam that powers four generators. At full capacity, Plant Scherer consumes 8,000 gallons of water per minute to produce 3,600 megawatts of power, or approximately four billion gallons of water and 20 million megawatt

hours of electricity annually.<sup>6</sup> One of the largest consumers of electricity in the state, and in fact in the whole United States, is Georgia-Pacific.<sup>7</sup> Among its many manufacturing facilities is Madison Plywood, about 50 miles north of Plant Scherer.



Robert W. Scherer Power Plant, Juliette, Georgia. [via Wikimedia]

Madison Plywood, located in Morgan County, east of Atlanta, is one of more than a dozen facilities across the country that have made Georgia-Pacific the nation's leading plywood producer. Opened in 1979, the Madison plant harvests local loblolly pine. Transforming the soft coniferous wood into the familiar building product — thin wood sheets consisting of multiple plies of veneer glued together — requires a series of energy-intensive processes.<sup>8</sup> After the trees are cut down with powerful chainsaws or hydraulic shears, the logs are conveyed into debarking machines; the debarked logs are then soaked in hot water — about 200 degrees Fahrenheit — for several hours to soften the wood and make it easier to cut. The logs are then sliced by a lathe into long sheets of veneer at the rate of 300 to 800 feet per minute; from there the veneers are fed into dryers where jets of extremely hot air — about 300 to 400 degrees Fahrenheit — remove excess moisture. In the last stages, the veneers are glued, cross-laminated, compressed, and sawn, before being bundled and stamped.

The amount of non-renewable energy required to produce the plywood that's stacked up in countless lumber yards worldwide is immense but quantifiable.<sup>9</sup> What's harder to measure are the deleterious health effects that can follow from the release of toxic chemicals into the atmosphere. According to the Toxics Release Inventory compiled by the U.S. Environmental Protection Agency, the Madison plant has, in the past decade, released significant amounts of lead, methanol, diisocyanates, and dioxin, substances which variously can cause cancers, developmental disorders, respiratory failure, and diseases of the heart, liver, and brain.<sup>10</sup>

## Follow the Money

Georgia-Pacific, founded in 1927, has grown from a local lumber company in Augusta to become one of the largest building products manufacturers in the world. Today, the multinational corporation employs more than 35,000 people on three continents; 2,600 of these employees report to work in the administrative headquarters at the Georgia-Pacific Tower in downtown Atlanta. When it opened, in 1982, the 52-story high-rise — designed by SOM and located on the site of the theatre where *Gone with the Wind* had its world premiere in 1939 — was celebrated as an early step in the modernization of Peachtree Street. In 2012, the granite-clad tower received LEED Silver Certification.



Georgia Pacific Tower, Atlanta. [atexplorer]

A couple of years ago the company announced that the Georgia-Pacific Tower would undergo a major renovation, which the city of Atlanta has incentivized by issuing \$150 million in municipal bonds and offering more than \$7 million in tax breaks. Georgia-Pacific had already invested \$65 million in Madison Plywood, with the goal of ensuring its place in the multibillion-dollar engineered wood industry.<sup>11</sup> Capital for the headquarters renovation and facility expansion came from its parent company, Koch Industries. Run by Charles and David Koch, the company now ranks as the second largest privately-held U.S. corporation, with revenues of more than \$100 billion. In 2005, Koch acquired Georgia-Pacific for \$13 billion; in the process it took the publicly traded company private. Which, as journalist Daniel Schulman points out, is very much in keeping with how the Wichita-based conglomerate has assembled its holdings. “They prefer to operate quietly, to run, as David once put it, ‘the biggest company you’ve never heard of,’” writes Schulman in *Sons of Wichita*, his revealing biography of the family. Schulman continues:

But Koch Industries’ products touch everyone’s lives — from the gas in our tanks to the steak on our forks and the fertilizer that helps our crops grow, and from the drywall, windowpanes, and carpets in our homes and offices to the Brawny paper towels and Dixie cups we keep in the pantry. ... A day doesn’t pass when we don’t encounter a Koch product, though we often probably don’t know it. Koch Industries is omnipresent.<sup>12</sup>

That the consumption of everyday products, and more broadly the financial power of Koch Industries, intersects with national politics becomes clear if one follows the trail of money from the brothers’ Kansas hometown to numerous election campaigns, libertarian think tanks, and conservative political action committees (not to mention universities and cultural organizations). As Jane Mayer wrote recently, in *The New Yorker*, “For the past four decades they have tapped their vast fortune ... to finance a private political machine whose reach and size have been described as rivalling that of the Republican Party. By lavishly underwriting candidates, policy organizations, and advocacy groups — often through untraceable donations — they have pulled American politics toward their own arch-conservative, pro-business, anti-tax, and anti-regulatory agenda, particularly in the environmental area.”<sup>13</sup> Several months ago the Kochs publicized their plans to spend up to \$400 million in campaign contributions for this year’s midterm elections, a 60 percent increase over their spending on the 2016 presidential campaign.<sup>14</sup>



A common sight at a lumberyard in America.  
[Brent Sturlaugson]

The interconnections of construction industry money and influence become yet more intricate when we consider that the Georgia-Pacific Tower draws some significant portion of its electricity from Plant Scherer, which is jointly owned by several utility companies. The largest of these is Georgia Power, which is the leading subsidiary of Southern Company, the second largest private utilities provider in the U.S. In recent years, Southern Company has drawn attention, indeed notoriety, for sponsoring research that denies the role of humans in causing climate change. In particular the company has funded the work of the Harvard-affiliated aerospace engineer Wei-Hock “Willie” Soon, for which the “deliverable,” as Soon described it, was a series of studies arguing that global warming was caused by the sun. Soon’s research is also supported by the Koch brothers. As reported in *The Guardian*:

A prominent academic and climate change denier’s work was funded almost entirely by the energy industry, receiving more than \$1.2m from companies, lobby groups and oil billionaires over more than a decade, newly released documents show. Over the last 14 years Willie Soon, a researcher at the Harvard-Smithsonian Center for Astrophysics, received a total of \$1.25m from Exxon Mobil, Southern Company, the American Petroleum Institute and a foundation run by the ultra-conservative Koch brothers, the documents obtained by Greenpeace through freedom of information filings show. According to the documents, the biggest single funder was Southern Company, one of the country’s biggest electricity providers that relies heavily on coal.  
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Further up the supply chain, the flow of capital returns to the hole in the ground in the Powder River Basin. The North Antelope Rochelle Mine is operated by Peabody Energy, the world’s largest private coal company. Founded in Chicago in 1883, Peabody, which has its corporate headquarters in St. Louis, operates almost two dozen coal mines in the United States and Australia. Its recent history has been turbulent. In spring 2016 North Antelope laid off 235 employees, or fifteen percent of its workforce; the company president described this as an effort “to match production with customer demand.” Two weeks later, due to what a company spokesperson called “an unprecedented industry downturn,” Peabody filed for bankruptcy protection.<sup>16</sup>

As it happened, the filing has had an unexpected upside for the energy giant; in what the *Los Angeles Times* characterized as a “collateral benefit” of the bankruptcy, a federal judge in St. Louis ruled that the company was immune to a California lawsuit that sought damages due to decades of greenhouse gas emissions.<sup>17</sup> Since then, following the election of a president



who pledged to “end the war on beautiful, clean coal,” Peabody has reorganized and recovered; its chief executive has been rewarded with an ample stock bonus even as the company settled a dispute with retired mineworkers that reduced its pension obligations by almost 90 percent.<sup>18</sup>



North Antelope Rochelle Mine, Powder River Basin, Wyoming. [Bureau of Land Management]

In describing some of the processes by which coal mined in Wyoming comes to supply a coal-fired power plant in Georgia, which in turn provides power to a nearby plywood manufacturer, I have sketched only the most basic components of the supply chains of a single resource and single commodity. And likewise, in tracing how the profits from energy generation and product manufacturing can then be deployed to influence electoral politics, which in turn affect our national policies and personal lives, I've offered but a glimpse into what some have called the “legalized bribery” that is endangering American democracy.<sup>19</sup> Any full accounting of these processes and networks would of course be infinitely more complicated, and the effects far more consequential.

So why does all this matter for the profession of architecture? I would contend that what's at stake is nothing less than disciplinary relevance. To ignore these matters — these networks of materials, energy, power, money — is to distance oneself from phenomena that are at once directly related to building construction and of universal concern. In recent months the planet experienced a global heat wave as record high temperatures were set from the Arctic Circle to the Sahara Desert. Income inequality is growing so extreme that economists predict that in a dozen years “the wealthiest one percent will own two-thirds of the world's wealth.”<sup>20</sup>

Thus it's vitally important that architects, both as responsible citizens and creative professionals, strive to expand the boundaries of pedagogy and practice. Schools of design could enrich their programs by offering courses and sponsoring research in which sustainability is understood to comprise not only constructed sites but also zones of extraction, manufacture, and assembly. Likewise professional architects could exert collective pressure in order to expose wasteful or nefarious environmental practices and labor abuses associated with the building industry, and they could boycott the offenders. But more important than any particular strategy is the recognition that the status quo — as exemplified by the LEED certification system with its manipulatable criteria, or by the proliferation of green design competitions that produce fantastically skillful renderings of

projects that will never be built — is not sufficient. Intensifying environmental and political crises demand that we enlarge the frameworks for action and responsibility.

## P

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### NOTES

1. In 2014, the United States produced more than one billion tons of coal, twelve percent of which derived from the North Antelope Rochelle Mine. U.S. Energy Information Administration, *Annual Coal Report*. ↩
2. United States Geological Survey, *Mineral Resources of the United States* (Washington: Government Printing Office, 1883), 1. To promote coal production, the USGS published handbooks on existing deposits and produced detailed structural studies of particular mines. The agency also created a publication branch that managed printed media, including texts, maps, illustrations, and photography. By 1903, the agency had distributed nearly four million copies of its publications. See United States Geological Survey, *The United States Geological Survey: Its Origin, Development, Organization, and Operations* (Washington: Government Printing Office, 1904), 31. ↩
3. Plant Scherer consumed 11,840,152 tons of Powder River Basin coal in 2014; 2,438,864 tons came from North Antelope Rochelle Mine; U.S. Energy Information Administration, “[Form EIA-923](#),” (2014). ↩
4. See Jordan Schneider, Travis Madsen, and Julian Boggs, *America’s Dirtiest Power Plants: Their Oversized Contribution to Global Warming and What We Can Do About It* (Environment American Research and Policy Center, September 2013). ↩
5. John McPhee, *Uncommon Carriers* (New York: Farrar, Straus and Giroux, 2006), 233. For another account of Plant Scherer operations, see Jeff Goodell, *Big Coal: The Dirty Secret Behind America’s Energy Future* (Boston: Houghton Mifflin Company, 2006). ↩
6. In 2014, Plant Scherer produced 18,884,492 megawatt hours; U.S. Energy Information Administration, “[Form EIA-923](#),” (2014); that year the United States electric power production was 4,093,606,000 megawatt hours, of which 1,581,710,000 megawatt hours came from coal, or 39%; U.S. Energy Information Administration, “[Electric Power Annual 2014](#),” February 2016. ↩
7. In the United States, the consumption of electricity is dominated by the building sector; Department of Energy, “[2011 Buildings Energy Data Book](#),” March 2012. ↩
8. At a conference where I presented an early version of this work, several industrial political ecologists questioned my focus on plywood. They argued that building materials like steel and concrete required more energy than plywood to produce. This a fair critique, but I remain committed to highlighting the energy consumption of systems that are often touted for their “sustainability.” ↩
9. Some plants use biomass energy from the timber harvesting process to replace the nonrenewable energy sources used at other stages of plywood manufacturing. ↩

10. See the [Toxics Release Inventory Facility Report for Madison Plywood](#). ↩
11. J. Scott Trubey, "Georgia-Pacific Plans Renovation, More Jobs for Downtown Tower," *Atlanta Journal-Constitution*, March 17, 2016. Dionne Kinch, "Atlanta issues bonds to renovate Georgia-Pacific building," *Atlanta Journal-Constitution*, March 21, 2016. "Georgia-Pacific Planned Investments at Madison Plywood Facility to Total \$65 Million," *PRNewswire*, 18 August 18, 2014. ↩
12. Daniel Schulman, *Sons of Wichita: How the Koch Brothers Became America's Most Powerful and Private Dynasty* (New York: Grand Central Publishing, 2014), 4. ↩
13. Jane Mayer, "One Koch Brother Forces the Other Out of the Family Business," *The New Yorker*, June 7, 2018. See also Julia Lurie, Daniel Schulman, Tasneem Raja, "The Koch 130," *Mother Jones*, November 3, 2014. ↩
14. See [Open Secrets, Center for Response Politics](#). PBS, "Koch brothers network planning massive spending increase for 2018 midterms," January 29, 2018. ↩
15. Suzanne Goldenberg, "Work of Prominent Climate Change Denier Was Funded by Energy Industry," *The Guardian*, February 21, 2015. Justin Gillis and John Schwartz, "Deeper Ties to Corporate Cash for Doubtful Climate Researcher," *New York Times*, February 21, 2015. ↩
16. Peabody Newsroom, "Peabody Energy Reduces Approximately 235 Positions at North Antelope Rochelle Flagship to Continue to Match Production With Demand," March 31, 2016. Peabody Newsroom, "Amid Prolonged Industry Downturn, Peabody Energy Takes Major Step to Strengthen Liquidity and Reduce Debt Through Chapter 11 Protection," April 13, 2016. ↩
17. Michael Hiltzik, "How a bankruptcy filing shielded a big coal company from California's climate-change lawsuits," *Los Angeles Times*, November 28, 2017. ↩
18. Jim Christie, "Bankrupt Peabody and pension plan reach \$75 mln settlement," *Reuters*, March 15, 2017. ↩
19. See Fred Wertheimer, "Legalized Bribery," *Politico*, January 19, 2014. This is one of countless articles which focus on the intensifying role of money in American politics, especially following the Supreme Court's 2010 Citizens United decision, which rules that that political spending by corporations was a form of free speech and thus protected by the First Amendment. ↩
20. Dominic Frisby, "Wealth inequality is soaring — here are the 10 reasons why," *The Guardian*, April 12, 2018. See also Facundo Alvaredo, Lucas Chancel, Thomas Piketty, Emmanuel Saez, and Gabriel Zucman, *World Inequality Report*, 2018. ↩

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