Chapter 18 – Construction – Next In Line

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Build Build Build!, Doing Better, So Where Are We Now?, References

Build Build Build!

Does it seem like there's always a construction project going on? Like you can't go from point A to point B without passing some big project, new homes, new apartment buildings, shopping malls, data centers, schools, hospitals, more roads, projects to widen roads that are already there? I don't care if you're walking, biking or driving in your town or across the country, it never seems to end. The list goes on and on. More urban sprawl, new developments full of huge homes outside of town, where there used to be fields, forests and trees. It's not your imagination. There *is* always more construction. And more. And more. And not only are we constantly taking yet more land from wildlife, we're consuming incredible amounts of resources and energy with all this construction, to the point where it's our second largest carbon emissions source in the U.S., after our food, at 16.6% of gross emissions.

Table 1 - Breakdown of U.S. Carbon Emissions of Construction, mmt CO_2e/Year, 2020

Category	Non-Combustion Emissions	Electricity	Combustion	Transp. On-Site	Land	Transp. Off Site	Total, mmt CO_2e (% of gross)*
Electricity	1.77	54.2	1.23	1.13	0.85	0.78	60.0 (0.82%)
Transportation	0	0	0	131	0	2.46	134 (1.84%)
Cement	44.2	5.01	27.4	6.86	0.59	6.73	90.8 (1.25%)
Iron and Steel	13.25	20.6	30.8	1.79	0.80	5.65	72.9 (1.00%)
Aluminum	0.48	2.45	1.29	0.02	0.004	0.020	4.27 (0.06%)
Glass	0.48	0.63	0.95	0.003	0.034	0.094	2.19 (0.03%)
Wood	0.04	13.3	71.3	1.17	194	2.43	282 (3.87%)
Plastic and Rubber	5.57	7.19	13.4	0.028	1.01	1.11	28.4 (0.39%)
Paints and Coatings	0.047	0.035	0.008	0	0.001	0.001	0.09 (0.001%)
Roofing	0.52	2.40	1.64	0.012	0.10	0.37	5.05 (0.07%)
Porcelain	0	0.52	0.61	0.002	0.006	0.064	1.19 (0.02%)
Rock	0	5.28	1.24	1.24	15.3	144	167 (2.29%)
Asphalt	27.8	0.87	9.52	0.03	9.23	8.74	56.2 (0.77%)
Gypsum	0	0.035	0.008	0.008	0.101	0.95	1.1 (0.02%)
Insulation	3.92	4.29	11.5	0.057	0.32	1.17	21.3 (0.36%)
Refrigerant	168	0.05	0.02	0	0.0014	0.0015	168 (2.31%)
Machines	0.57	1.33	1.71	0.04	0.00044	0.11	3.76 (0.05%)
Land	0	0	0	0	70.8	0	70.8 (0.97%)
Electricity and Natural Gas Transmission	0.27	0	0	42.2	0	0	42.5 (0.58%)
Total	266	118	173	186	293	175	1,211 (16.6%)

** Gross U.S. CO_2 emissions in 2020 was 7,286 mmt.*

You can see that construction adds up like a shopping list. Which it is. Especially if you happen to be a construction contractor. While construction uses up a lot of energy at the construction site and in transportation to the site, construction consumes massive amounts of resources in the form of materials and supplies. Annually, the construction industry bulldozes through a whopping 2,625 million metric tons of materials. It also consumes massive amounts of land, in the form of increased annual settled land in the U.S. and in logging for wood, to the tune of 123 million acres/year in the U.S.,[1] both of which take yet more land from wildlife, and remove the all-important carbon sinks as we convert native lands and forests to barren swaths of dirt, with or without buildings on them. The loss of carbon sinks are shown in the "Land" column, which makes up the biggest overall emissions of construction.

The next biggest pieces of construction, after land and wood, are refrigerants and rock (from large rocks to pebbles), each comprising 2.3% of our gross emissions. The lion's share of the refrigerant footprint is the chemical reactions, in which the reactions between the petrochemicals used to make the products release CO_2e. For the rock, it's mainly the transportation of the rock to the construction site, since rock is heavy, and a lot of it is used.

Cement and Iron and Steel play huge roles in construction materials, mainly in chemical reactions when they are manufactured, and energy consumed at the industrial plants. And then there are all the other little bits and pieces of resources and materials that make up any construction effort.

Think about that. What can we do? After all, 16.6% of our gross carbon emissions against a target of 80% reduction is a big prize. One thing that dawns on me, that won't be a surprise to the reader at this point, would be our population growth. I mean, seriously, do ya think we'd need all these new homes and apartments and shopping malls and roads and schools and hospitals and data centers if we weren't growing our population? Well, maybe the data centers, since the main issue there is greedy big corp cramming yet more technology down our throats that we didn't know we needed because we didn't need it. Take AI (artificial intelligence), which just got added as a default on a recent Microsoft Update, that I didn't ask for and didn't want, that uses 10 times as much energy as a basic Google search, that's worked just fine for the past two decades. Now I have to append every search with "-ai" to keep AI from sucking yet more energy when I'm asking a simple question. Rant over. Sorry.

So, I'm thinking most of this insane construction footprint is driven by population. In fact, without a specific way of proving it, I'm going to estimate that we'd only need about 20% of our current construction if we stopped growing our population. This is a very subjective swag, and it might be on the high end, but I prefer to be conservative with guestimates like this. It could actually be more like 10 – 15%, but let's go with 20% for now, and be glad if it's actually lower. I say 20% based on just my personal observations. If we didn't need to accommodate population growth, we'd be down to upgrades, home improvements and add-ons, and general improvements and replacements of obsolete buildings, as well as general road maintenance, without necessarily widening them. Think about that. Do you think I'm that far off?

If our construction footprint is 80% driven by population growth, then it stands to reason that if we stop growing our population, then we can cut our carbon footprint of construction by 80%, or 80% of 16.6%, which is 13.3% of our gross emissions. 13.3% goes a long way towards reducing our overall

emissions by 80%. Sadly, we're not likely to get instant gratification on construction like we can with food. That's because of all the people who have already been born who are and will be coming of age and need a home in the next couple decades. Even though, arguably, a new-born, for instance, needs most of the other resource the second they pop out into the world. The actual truth lies somewhere in between, and, technically, per the modelling presented in Chapter 3, we need to get to 80% reduction in carbon footprint per capita in the U.S. by 2050, so we still have a few decades to gradually reduce construction. And, if we reduce rather than grow our population, this will fall into place just fine.

Doing Better

If we can manage to stop growing our population and actually reduce it like we really need to do, we will reduce construction and its emissions. We'll also hit the obscenely overpaid construction moguls who are ruining our environment and our democracy with their own greed directly in the balls as the bottom falls out of the construction industry, year by year. Think about the possibilities. More on that in Chapter 25. In the meantime there are plenty of ways to improve on what we're building now. Buildings need to be more efficient, following LEED[2] Building Certification requirements and current International Energy Conservation Code[3] requirements. Not only do these require more efficient buildings in terms of energy and water usage, they also require more responsible building materials and building materials management, in which recycling and re-use of demo and scrap is required, for a circular economy rather than just sending everything to the dump. More cement, metal and asphalt are getting recycled, and this trend needs to continue. All of it needs to be recycled. We have a long way to go here, and these improvements will drive reduction in carbon emissions of construction.

I recently did a small home insulation project to save energy, and I didn't want to use yet more plastic or Styrofoam for that, so I found some hemp insulation on-line. It was hard to get, there was only one company in the U.S that had it, but I got it, and am glad I went to the trouble, because it meant that much less plastic insulation in this world.

Straw bale homes are another growing thing that avoids plastic insulation.

So Where Are We?

On construction, since Hilary and I had two children, maintaining a population status quo by replacing ourselves, I feel just fine about not "eating" the 80% of construction that accommodates additional people in our world in our own personal carbon footprint per capita. After all, constant growth is just not my damn fault. Since our mere existence requires, to a point, a level of scrapes and remodels, I think it's fair to make construction simple by saying that if you have 2 or fewer children you are helping to stop and reduce population growth, which reduces construction. Those with 3 or more children are blithely making the problem worse. After all, a couple who chooses to have 3 children rather than 2 then contributed to a 50% growth in population, which also washed out another couple

who chose to not have children, or to stop at 1. By this reasoning, when summing up our carbon footprint, those with 3 or more children can take the responsibility of a carbon footprint of construction of 16.6%, the entire footprint, while those with 2 or fewer children can take 20% of that, or 3.3%. That works out to a CO_2e reduction of 13.3% against our goal of 80% reduction of gross emissions to save the planet. Combined with a 14.8% reduction in our carbon footprint of food from the previous chapter, this puts Hilary and I at a total of 28.1% total reduction in carbon footprint so far! Yay!!