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Fossil Fuels Are Killing Us

It was February 9th when the media reported a truly mind-boggling fact: “Air pollution caused by the burning of fossil fuels such as coal and oil was responsible for 8.7 million deaths globally in 2018, a staggering one in five of all people who died that year, new research has found.” That’s from the London Guardian.

The article notes that “Scientists have established links between pervasive air pollution from burning fossil fuels and cases of heart disease, respiratory ailments and even the loss of eyesight. Without fossil fuel emissions, the average life expectancy of the world’s population would increase by more than a year, while global economic and health costs would fall by about \$2.9 trillion.”

This death toll is separate from and in addition to the death and suffering caused by the climate disruption that is also linked to the burning of fossil fuels. The cause of these 8.7 million deaths is just “good, old-fashioned” air pollution. Let’s put the numbers in perspective.

About 2.5 million deaths have been attributed to COVID-19 over the past year. Air pollution is killing 8.7 million people every year.

You can do the math: The burning of fossil fuels is killing about three-and-one-half times as many people each year as are dying from COVID-19.

“The enormous death toll is higher than previous estimates and surprised even the study’s researchers,” the Guardian reported.

Breaking Down the Science

What’s the method for calculating which deaths are due to air pollution around the world? (You may ask.)

Well, it’s big science, using big data that (to be honest) is pretty hard for the layperson to understand. But let’s have a look anyway.

The study was published in the journal *Environmental Research*, and was the result of a collaboration between scientists from Harvard University and three British schools: the University of Birmingham; the University of Leicester; and University College London.

The report, called “Global Mortality from Outdoor Fine Particle Pollution Generated by Fossil Fuel Combustion: Results from GEOS-Chem,” is 33 pages of pretty technical language. Such as this paragraph: “A recent meta-analysis of the association between long-term PM2.5 and mortality applied techniques involving flexible penalized spline concentration-response function (CRF) in a multivariate random effects and meta-regression model.”

The authors rely on methods like the chemical transport model GEOS-Chem (as the title says). GEOS-Chem is “a global 3-D model of atmospheric chemistry,” and is “a grass-roots open-access model owned by its users.” “PM2.5” refers to tiny particles of air pollutants known as “fine particulate matter.”

Particulate matter, or PM, consists of microscopic solid particles or liquid droplets which are small enough to enter the lungs. PM suspended in the atmosphere in large concentrations is considered to be air pollution. Long-term exposure to particulate matter results in heart disease, risk of decreased lung function, exacerbation of asthma, lung cancer, etc. And this is what’s behind the 8.7 million premature deaths every year that the study revealed.

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Greetings,

Greenhouse gas emissions from the burning of fossil fuels are the primary driver of climate disruption. But in addition to the threat to the planet posed by climate change, a major new study reveals that the air pollution produced by the burning of fossil fuels is killing humans at an astounding rate. 'Way more than the pandemic. This story has not gotten nearly the attention it deserves. So this issue of Nygaard Notes gives it some attention.

Also in this issue, I offer a hint of what it might mean to think globally and act locally when it comes to addressing the existential threat posed by an economy that is based on the extraction and combustion of fossil fuels. The air pollution PLUS the disruption of the Earth's climate is big and it's now and it demands that we change the way we think, the way we act, and the way that we organize our society.

There's lots of inspiration in this issue, I think. And I'm a little worried about the 10 zillion inspiring things that I had to leave out! Well, a small newsletter can't cover everything, can it?

If you enjoy this edition of the Notes, please write to me and tell me why. If you don't like it, write to me and tell me how I fell short. Or just write and say "Hi." Hearing from readers is the fun part of publishing Nygaard Notes. Thanks for being a part of it!

Nygaard

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The February 9th study uses the Global Exposure Mortality Model (GEMM), and they use “epidemiological evidence... to relate increased population exposure to premature mortalities.” They tell us that “This is the first regional application of the adjoint sensitivity analysis method to characterize long-term air pollution exposure.”

I don't know what an adjoint sensitivity analysis is (I'm just quoting it because I like the sound of this type of scientific language!). But at the bottom of page four of the 33-page study they tell us in plain language that these millions of “premature mortalities” don't just happen. They are the result of burning fossil fuels. Here's how they put it:

“Using the chemical transport model GEOS-Chem, we quantified the number of premature deaths attributable to ambient air pollution from fossil fuel combustion. Improved knowledge of this very immediate and direct consequence of fossil fuel use provides evidence of the benefits to current efforts to cut greenhouse gas emissions and invest in alternative sources of energy. It also helps quantify the magnitude of the health impacts of a category of PM2.5 that can be more readily controlled than other

kinds of PM2.5 such as dust or wildfire smoke.”

I guess it isn't exactly plain language, but one needn't be a scientist to understand what they are talking about: Humans are causing millions of deaths by burning fossil fuels, and it's only humans who can do something about it.

As Always: Race and Class

It may seem tempting to think that, since we all breathe the air, *we are all in this together*. But the Guardian quotes Neelu Tummala, an ear, nose and throat physician at George Washington University School of Medicine and Health Sciences, who points out that, as our recent experience with COVID 19 has taught us, “The air we breathe impacts everyone's health but particularly children, older individuals, those on low incomes and people of color. Usually people in urban areas have the worst impacts.”

(About those “urban areas”: The U.N. estimates that 55 percent of the humans on the planet live in urban areas. Other estimates say the figure is much higher than that, perhaps as high as 75 percent, or even 84 percent. Calculating this is trickier than you might think!) →→

Time to Mobilize for Survival

On the day he was inaugurated, President Biden announced his COVID-19 strategy, saying “Our national plan launches a full-scale wartime effort to address the supply shortages by ramping up production and protective equipment, syringes, needles, you name it. And when I say wartime, people kind of look at me like, ‘Wartime?’ Well, as I said last night, 400,000 Americans died. That’s more than have died in all of World War II. Four-hundred thousand. This is a wartime undertaking.”

That’s strong language. I think we all basically know what he means by “wartime undertaking,” especially when he invokes WWII. The WWII mobilization asked citizens to drop everything and work to support a national effort to ensure the survival of the nation (or so many people believed). And history shows that an extremely high percentage of the population contributed, leading to a designation of that generation of United Statesians as *The Greatest Generation*.

Most people would agree that a global pandemic deserves a robust response. Four-hundred thousand (2.5 million worldwide) is a lot of people, after all. But consider the study that I discussed in the previous essay. The one that tells us that air pollution caused by burning fossil fuels kills almost that many every year in the United States. That is, perhaps 367,000, if U.S. deaths are proportional to the U.S. share of ➔➔

global population. Or we could look at it on a global scale, and note that air pollution caused by burning fossil fuels kills 400,000 people around the globe every 17 days. And, remember, these are deaths caused specifically by air pollution. But the problem is bigger than that.

Air Pollution Is Not Climate Change

The Guardian article I’ve been discussing was virtually alone in making a crucial connection that many people may not make on their own. The paper quoted George Thurston, an expert in air pollution and health at the New York University school of medicine. Thurston, who was not involved in the air pollution study, remarked that “The death toll outlined in the study may even be an underestimate of the true picture. Overall, however, this new work makes clearer than ever that, when we talk about the human cost of air pollution or climate change, *the major causes are one and the same – fossil fuel combustion.*” (I added the emphasis there.)

The Guardian gave the final word to one of the co-authors of the study, a geographer at University College London named Eloise Marais, who underlined Thurston’s point and called out for action, saying “Fossil fuels have a really large impact upon health, the climate and the environment and we need a more immediate response. Some governments have carbon-neutral goals but maybe we need to move them forward given the huge damage to public health. We need much more urgency.”

Much more urgency, indeed! As the United States, under its new president, mobilizes to address the ongoing threat of the COVID-19 pandemic, lurking in the background are the twin threats of air pollution and an increasingly-unstable global climate system. Both of which are the result of the burning of fossil fuels. In order to deal with these twin perils, we will need a mobilization greater than the amazing mobilization we saw in WWII. And it will have to be global in scale.

We’ve just seen that air pollution is a current and immediate crisis that is killing us at a ◆ to page 4

Fuels ➔➔ It’s worth repeating the main point here: The air pollution created by burning fossil fuels is killing an estimated 8.7 million people around the planet, with the “worst impacts” being felt in “urban areas,” where most human beings actually live.

It seems like this, in itself, should be enough to dominate the front pages every day. But of course air pollution is not the only environmental crisis we’re facing. Global climate disruption—also caused by the burning of fossil fuels—calls us to mobilize a dramatic, revolutionary response the likes of which we’ve never seen. ♦

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nearly-unfathomable rate. And our disruption of the global climate is also current and immediate, as recent events in Texas remind us. The New York Times reported in a February 21st story on the winter storm disaster in Texas that “The crisis carries a profound warning. As climate change brings more frequent and intense storms, floods, heat waves, wildfires and other extreme events, it is placing growing stress on the foundations of the country’s economy: Its network of roads and railways, drinking-water systems, power plants, electrical grids, industrial waste sites and even homes. Failures in just one sector can set off a domino effect of breakdowns in hard-to-predict ways.”

Well, certainly our disruption of the global climate is placing stress on “the economy.” But it’s also killing hard-to-calculate numbers of people as it wreaks havoc on various life-sustaining infrastructure and systems. And although it is terribly difficult to calculate, a close reading of the news gives a hint of the scale of the current and future death toll associated with a global economy that is addicted to fossil fuels.

For instance, the website LiveScience.com reported in 2019 that “In 2014, the World Health Organization (WHO) estimated that climate change would lead to

about 250,000 additional deaths each year between 2030 and 2050, from factors such as malnutrition, heat stress and malaria.” The article noted that this is a conservative estimate, for a number of reasons. For example, “the WHO estimate didn’t take into account illnesses and deaths tied to disruptions in health services caused by extreme weather and climate events...”

The article also notes that “Climate change could also force more than 100 million people into extreme poverty by 2030, according to World Bank estimates, which in turn, would make them more vulnerable to the health effects of the changing climate.”

Forbes Magazine reported in 2019 that “More people will die from climate-driven temperature changes in 2100 than the number who die today from all infectious diseases combined, a leading economist told members of Congress last week.”

Which brings us back to the idea of a “wartime undertaking” such as the one promised by the President on Inauguration Day.

The WWII mobilization brought about a conversion of the U.S. economy from peacetime to wartime production. The mobilization that we need now will have to be even more ambitious. ♦

8.7 Million Deaths: The Local Angle

As I was putting together this issue of Nygaard Notes here in Minneapolis, I turned on the radio and heard this news report:

“The Minnesota Pollution Control Agency (MPCA) has issued an air quality alert due to fine particles for east-central and southeast Minnesota, effective Friday, February 19, at 6 p.m. through Sunday, February 21, at 12 p.m.. The affected area includes the Twin Cities metro, St. Cloud, Rochester, Albert Lea, Winona, and the tribal nation of Prairie Island.” The report warned that the act of breathing on this particular weekend would be “unhealthy for sensitive groups such as people with asthma.”

Here are a few additional details about this alert from the MPCA:

“Light winds and poor atmospheric mixing will produce an increased level of fine particles beginning Friday evening, through the overnight, and into Saturday.”

“There are people who are more likely to be affected when fine particle pollution reaches an unhealthy level: People who have asthma or other breathing conditions like chronic obstructive pulmonary disease (COPD); People who have heart disease or high blood pressure; Children and older adults; People of all ages who are doing extended or heavy physical



→ → activity like playing sports or working outdoors.”

The MPCA noted that “people with these conditions may experience symptoms like chest pain, shortness of breath, wheezing, coughing, or fatigue.”

The Alert included some “Pollution Reduction Tips,” which they prefaced by saying that “The main source of fine particle pollution is any activity that uses fuel.” They are referring, of course, to *fossil* fuel, and here they decline to mention that the U.S. economy is structurally and systemically dependent on the burning of fossil fuel.

This is where the MPCA could have reminded us that this dependence, left unchecked, is not only the explanation for this month’s Air Quality Alert in Minnesota, but is guaranteed to increase the frequency and severity of future Air Quality Alerts in every state and, indeed, around the world (however they are detected and/or reported).

Instead, they proceed to place the responsibility squarely on the shoulders of individual Minnesotans by telling us that “Conserving energy and buying clean, renewable energy are great lifestyle choices to help reduce overall pollution.” So they advise us to: “Reduce vehicle trips; Use public transport or carpool when possible; Postpone use of gasoline powered lawn and garden equipment on air alert days. Use battery or manual equipment instead; and Avoid backyard fires.”

If you’d like to know what an Air Quality Alert looks like, here is where you’ll find the one featured in this edition of the Notes:

www.pca.state.mn.us/featured/air-quality-alert-friday-feb-19-through-sunday-feb-21

Systems, Structures, Neighborhoods

A Reuters news story from this past December puts our local air quality problems in a larger context, telling us that “A study conducted in 2013 during the administration of President Barack Obama, a Democrat, detailed a number of problems with the U.S. air monitoring network. The report proposed improvements including boosting monitoring near

major polluting infrastructure, sampling for more pollutants, and doing more urban field studies to better understand block-to-block variability in air quality. But the weaknesses largely remain today because neither the Obama nor the Trump administration invested more in the monitoring network. Over the past five years, the number of government monitors nationally has declined by 4% as state and local environmental agencies cut spending, according to federal Environmental Protection Agency figures. Federal grants to state and local air-quality agencies have not increased in 15 years, according to testimony earlier this year by the National Association of Clean Air Agencies, a nonpartisan group based in Arlington, Virginia.”

www.reuters.com/article/usa-pollution-airmonitors-specialreport-idUSKBN28B4RT

Speaking of “major polluting infrastructure,” Nygaard Notes World Headquarters (i.e., my home) is located just blocks from the campus of the 50,000-student University of Minnesota, which gets most of its power from “University Building #059,” also known as the “Southeast Steam Plant,” which produces heat and power for the campus by burning natural gas, fuel oil, coal, and wood.

I wonder if the authors of the Obama-era study I just mentioned took a look at the “block-to-block variability in air quality” in my neighborhood. If they did, they didn’t mention it to me. But they should have. Why? Well, I can see the Southeast Steam Plant from my front porch. And I’m certain that I am inhaling—even as I type these words—some of the fine-particle pollution that it produces. And that is true even though today is a good day, a day when no Air Quality Alert has been announced.

The immediate cause of the unhealthy air on that particular weekend in Minnesota was “light winds and poor atmospheric mixing.” Light winds are a part of nature. But the toxic air pollution that results in Air Quality Alerts is not a part of nature. It’s a result of the burning of fossil fuels, a human decision that kills 8.7 million people every year. And that’s the real problem here, the one that requires us to mobilize on a scale far greater than we mobilized to defeat fascism in the 1940s. ♦

Protect, Repair, Invest, and Transform

What would it take to convert a fossil fuel economy to a renewable, non-toxic, fair and just economy? Well, that's a question to be addressed in future issues of Nygaard Notes. But for now I'll refer you to the writings of a few people who articulate quite well the scale and depth of the transformative change we need.

The author Jeremy Lent lays out a vision of what could be in the Spring 2021 issue of YES! Magazine. In a 32-page article entitled "What Does An Ecological Civilization Look Like?" you'll find the following succinct statement, a statement that gives just a hint of the profound changes that will be required of us as the 21st Century unfolds:

"We need to forge a new era for humanity—one that is defined, at its deepest level, by a transformation in the way we make sense of the world, and a concomitant revolution in our values, goals, and collective behavior. In short, we need to change the basis of our global civilization. We must move from a civilization based on wealth accumulation to one that is life-affirming: An Ecological Civilization."

The subtitle of Lent's essay says: "A society based on natural ecology might seem like a far-off utopia—yet communities everywhere are already creating it."

It's true! For example, some activists in the communities to which he refers got together last June and produced a remarkable document called "*Protect, Repair, Invest, and Transform: A People's Orientation to a Regenerative Economy*." Lent uses the term "Ecological Civilization." *A People's Orientation* says "Regenerative Economy." Whatever we call it, we're talking about transformative change on a scale we have never seen.

The 49-page *People's Orientation* document is a sort of guide to thinking strategically about how to put theory into practice. In the Introduction the authors call for us to "Listen to the Frontlines!", reminding us that "Indigenous Peoples, as members of their Indigenous sovereign nations, Asian and Pacific Islander, Black, Brown and poor white marginalized communities must be heard, prioritized, and invested in if we are to successfully build a thriving democracy

and society in the face of intersecting climate, environmental, economic, social, and health crises. A just and equitable society requires bottom-up processes built off of, and in concert with, existing organizing initiatives in a given community. It must be rooted in a people's solutions lens for a healthy future and Regenerative Economy. These solutions must be inclusive—leaving no one behind in both process and outcome."

A People's Orientation is chock-full of deep and fascinating ideas and proposals. Their five pages of "Working Definitions" ground the reader in some terms and concepts that you may have heard but never got quite clear in your mind. Pages 10-11 lay out an ecological metaphor for organizing that I found very useful.

All in all, *A People's Orientation* may be the best thing you can read right now if you want to think in a more strategic and principled way about transforming our Individualistic and Competitive society into one that is Social and Cooperative. ♦

"Quote" of the Week: "There Are Moments of Clarity"

This issue's "Quote" of the Week comes from the introduction to a remarkable document published this past June with the title "*Protect, Repair, Invest, and Transform: A People's Orientation to a Regenerative Economy*." In the Introduction they state that:

Transforming our economy is not just about swapping out elected leaders. We also need a shift in popular consciousness. There are moments of clarity that allow for society to challenge popular thinking and status quo solutions. Within all the challenges that this pandemic has created, it has also revealed what is wrong with the extractive economy while showcasing the innate resilience, common care, and original wisdom that we hold as people.

Find the whole inspiring document here:
climatejusticealliance.org/regenerativeeconomy/

Keeping Up With The Ecological Crisis

Those who wish to think well about the best responses to our various ecological and social crises will have to look beyond the daily news cycle. Here is a review of three good sources for news and analysis having to do with climate and other environmental news. There are plenty more sources out there; these are just three of my favorites. Enjoy.

Inside Climate News

One of the most professional teams doing environmental journalism, the remarkable journalism non-profit called Inside Climate News is the go-to website for breaking climate news and investigative environmental journalism. ICN has been around since 2007, and they know what they're doing.

<https://insideclimatenews.org/>

Readers may recall one of the biggest climate change stories of the past decade, a 2015 story about the oil giant Exxon (now Exxon Mobil). An investigation revealed that Exxon's own scientists had become aware of human-driven climate change as early as the 1970s, but concealed their knowledge and then actively promoted climate change denial in order to protect their profits. The story was broken by Inside Climate News.

But there's so much more on their large and well-organized website! The site is broken down into five sections, as follows:

1. Science: Advances in knowledge about climate change and the effects of warming on our world and way of life.
2. Politics and Policy: The political dramas and policy choices that are shaping the global response to the existential threat of climate change.
3. Justice: The systemic racial and economic inequalities that worsen the impacts of climate change on vulnerable communities around the globe.
4. Fossil Fuels: Holding industries that profit from greenhouse gas emissions accountable for actions that hinder solutions to the climate crisis their products are responsible for causing.
5. Clean Energy: The technologies and innovations enabling the decarbonization of the global energy economy and disrupting business-as-usual.

ICN also aggregates climate stories from around the world in their page called "Today's Climate," featuring headlines from around the web, every weekday.

On their page of "Projects" you'll find a remarkable collection of "Ongoing series, packages, and multi-part investigations," such as "Power Switch: What Germany's Energy Revolution Can Teach the U.S." and "Harvesting Peril: Extreme Weather and Climate Change on the American Farm" and "The Dilbit Disaster: Inside The Biggest Oil Spill You've Never Heard Of."

On their website you can sign up for daily or weekly email newsletters, or use their search function to find stories about pipelines, Gwich'in sovereignty, electric vehicles, or whatever you can think of.

Check. It. Out. <https://insideclimatenews.org/>

HEATED

I'm becoming a fan of climate journalist Emily Atkin. So much so that I—one who spends considerable time attempting to reduce the volume of emails entering my inbox—just signed up for her Monday-through-Thursday email news-thing called HEATED.

Here's what Atkin herself says about it:

"HEATED approaches climate change not as a science or environmental story, but as a high-stakes corruption, power, and disinformation story. It also approaches climate change with the alarm and moral urgency the science tells us it deserves. It rejects the "view from nowhere," which mainstream news outlets have historically favored on climate, thereby misinforming the public... No individual can solve the climate crisis on their own. But together, a well-informed citizenry can. HEATED's goal is to expose and explain the forces behind past and present inaction on climate change, to empower the public to effectively tackle the most existential threat of our time."

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Greenpeace likes her, too, saying that “Emily Atkin’s newsletter ‘Heated’ has become an invaluable resource for journalists covering the climate crisis. Atkin combines her acerbic wit with a forensic understanding of her subject. You should sign up.”

If you want to sign up, go HERE www.emilyatkin.com/heated

Climate Nexus

Founded in 2011, the strategic communications group Climate Nexus publishes climate stories on their website that are grouped into sections like Energy, Food, Health, Science, and “Private Sector.” Being a “communications group,” they also feature stories on their site with titles like “How to Talk about Climate,” and “Debunking the Top Ten Climate Change Myths.”

The layout of the website is a bit confusing, but if you hunt around you’ll find interesting sections like “Climate Signals,” “Water Hub,” and “Polling.”

The website itself doesn’t seem to be maintained all that well (the “Current Events” section includes stories from as far back as 2018!), but on the site you can sign up for their daily newsletter, “Hot News,” which is very current indeed. They describe it like this:

“Hot News summarizes the most important climate and energy news of the day, delivering an unmatched aggregation of timely, relevant reporting. It also provides original reporting and commentary on climate denial and pro-polluter activity that would otherwise remain largely unexposed.”

I particularly like a Hot News feature called “Denier Roundup,” which highlights and debunks some of the day’s more notable climate propaganda.

Check out Climate Nexus: <https://climatenexus.org/>

All in all, if you sign up for HEATED and HOT NEWS, and regularly visit the website Inside Climate News, you’ll have some important tools to use when you take action to keep the planet habitable for those who are alive today and for the countless generations yet to be born. ◆

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