FORGOTTEN WASTE

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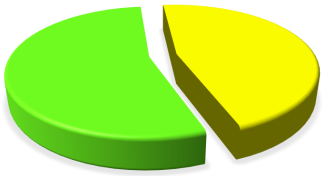
Forgotten Waste

Our World is drowning in waste and the focus on this dilemma tends to be directed at waste minimization, recycling and repurposing of resources. The focus is primarily plastics from household and industrial waste, all manmade. But what about the massive "forgotten" waste stream that is mostly of natural origin, wood and vegetative waste? This is the forgotten waste and a serious problem, as it is piling up by the day and it directly affects our environment, likely more so than manmade waste because of its sheer volume.

Data from the World Bank tells us that approximately 20% of all waste in the World is vegetative waste. But, that does not include the millions of trees classified as tree mortalities from droughts and kills by beetles and other pests. This waste stream is constantly increasing, as disposal solutions are diminishing for several reasons. The USEPA estimated a few years back that we collect a total of 50 million tons of vegetative waste. This is just the "curbside" collection and does not include our forests. In the pie chart to the right, green represents approximately 27 million tons of green waste dumped into US landfills. The yellow segment represents the amount of green waste that is being recycled in the US, about 23 million tons. So today with all our efforts we are not even recycling 50 percent of our vegetative waste. But the real scare is, this does not include any of the waste from our state and national forests and parks. These forests are full of trees and brush that have died from drought and insect infestation. Today there is no reliable estimate of how bad this is across the entire US or the world, primarily because it is enormous. Take California, the Sierra Nevada mountain range, the US Forest Service in 2016 did a count of the dead standing trees. They found 102 million in just that one range, in that one state. That is approximately 800 million tons of vegetative waste. This is not unique to the US, other countries, especially Canada, Europe, Japan and Australia have similar problems with vegetative and wood waste.

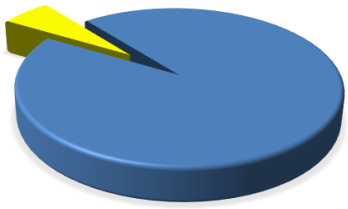


Where does it come from?

There are two primary sources we need to be concerned about; a) Collected and b) Tree Mortality

a) Collected waste is as described above, essentially the waste collected throughout our communities that is generated from landscaping and building. This is the waste most people think we are taking "care" of but as the USEPA numbers show, we are not. This is the vegetative waste we see at our homes and our neighbors' homes. Sometimes it includes waste from maintenance in our city parks and along our roads. It is the waste we generate within our communities.

b) Tree Mortality, this is the waste that is literally killing us, as witnessed in the California wildfires. Many people debate the reasons for the significant tree mortality, but that is not the issue here. There are at least two major problems with all these dead and dying trees; 1) loss of our carbon absorption, CO_2, to support the production of oxygen and, 2) wildfire. In areas that have experienced significant tree mortality people are holding their collective breaths in hopes a wildfire does not break out. Wildfires in these areas are almost impossible to control and they are ferocious as they have all the "fuel" they could ever want. Their destruction is complete we are left with nothing more than barren land, sometimes ever sterilized soil. Which means regrowth will be painfully slow. This barren land contributes to mud slides and loss of habitat for wild animals. And the problem is almost unfathomably large. Remember the "pie chart" above? Here is another one (right). In this pie chart the yellow is from above, the total of 50 million tons collected each year in the USA, the blue represents the 800 million tons manually counted by the US Forest Service during 2016 in the Sierra Nevada mountain range in California. That is one relatively small area in California, in comparison to all of North America but it gives you an idea how almost unbelievably vast this problem really is. Almost every state and all provinces in Canada have the same problem to varying degrees. We need to eliminate in-place and replant without impacting our air quality with smoke. The point here is, we need to stop squabbling about the tiny bit of vegetative waste at our landfills and start moving forward with real efforts for both our communities and our forests. This will be a slow and expensive effort but the sooner we get started the sooner we will have an impact.



Bad Landfill Decisions

Regulatory changes like banning organic waste from landfills with no alternatives are just not logical yet they are happening everywhere. You can not force a recycle if there is; a) no method, and b) no market. This has caused a very serious unforeseen nightmare worldwide. Where is this waste to go? Many people are under the false impression that we have options for recycling our vegetative waste. We do not. There are very few options and those options have extremely limited markets for their recycled product. Grinding into chips/mulch is one option but most consumers know not to use "landfill" mulch because of the cross seed contamination and the invasive species along with insect larvae. Even if you use the treated mulch or specialized mulch from certain trees, that is not making any impact on this overall problem. Grinding uses an inordinate amount of diesel fuel, whole log grinders will consume up to 100 gallons of fuel an hour. Looking around the country we will find massive amounts of useless mulch piles that stem from indiscriminate grinding and chipping. These mulch piles present a fire danger as they are subject to spontaneous combustion. Compost is another alternative and works in limited areas but also comes at a heavy environmental price with multiple grindings, windrow turnings and the putrefaction as it decays into a useful material. Even then the marketable amounts are so small it does not come close to helping eliminate this waste.

Certainly we should recycle wherever it is practical but we must not impose impossible rules on our communities mandating methods of recycling until we understand if the recycled product can be used. I know of one US community that demanded all vegetative waste be chipped and made available as a recycled product free to their community. An incredible mistake. There was almost no market (even free) for this material. So now this community has wasted hundreds of gallons of diesel fuel grinding this material and produced significant negative emissions from grinding and stockpiling. As this material decays it releases large amounts of methane gas and then as vegetative waste will do naturally, it spontaneously combust. The pile burned for weeks, wood chip pile fires are very difficult to put out. Now the negative environmental impact is off the charts. The point is, don't grind it if you can't use it.

Unfortunately there are few options and the few that exist do not begin to help with the amount of waste we are collecting. We have other markets in firewood, pellets for heating stoves and some construction materials but as you see from the first pie chart above, all combined they don't handle half our "collected" waste. Now add in the natural waste from our forests and parks.

What do we do with it?

We need to eliminate it. One day we may have more options but today we do not and we are getting buried. So how do we eliminate it? You might think that Biomass Energy would be an obvious solution. You would be partially right.

The problem is today's Biomass to Energy plants are not sustainable, not even with healthy governmental subsidies and tax breaks. They are designed to maximize energy production, not waste elimination. As an example, in California at one time approximately ten years ago there were as many as 66 biomass plants. Today there are less than 10. They require significant preprocessing of the waste material at a high economic cost and a high environmental cost. But fundamentally they are solving the wrong problem. They are trying to solve a non existent energy problem, we should be solving our waste problem. I certainly understand the logic behind trying to extract every BTU from the waste, but we have good options for alternative energy in wind and solar that are developing nicely. Today our problem in the world of biomass waste is not efficient energy extraction but rather efficient waste elimination that also extracts some energy. Which is exactly the philosophy behind Air Burners' newest biomass energy system called the PGFireBox.®

Best technology to eliminate wood and vegetative waste.

In the world outside the cities and towns we should be looking to Mother Nature. At Air Burners we look to the natural methods for help in design. If we are mimicking a natural event we are more likely to have a positive impact on the environment. As an example what are the natural methods of protecting our forests. Answer - fire. Since the beginning of time the natural method is a lightning bolt setting a fire that burns uncontrolled except by wind, rain and natural barriers. Wildfire would burn away all the fallen branches, young growing scrub and brush and it would destroy colonies of invasive insects. Leaving in its wake tall healthy trees, biochar (carbon into the soil) and a healthy forest. Today we can't let the wildfires run free, we have people in the way and the dense smoke from open burning is bad for our already suffering environment. In addition, for reasons still being debated, we have large amounts of undergrowth that would allow some of these fires to migrate into the trees and burn them down.

In that theme we designed our machines to burn "clean" wood and vegetative waste in a natural manner but without the smoke. Air Burners' machines do not support combustion, we develop a sheet of air over the top of our machines that traps smoke particles and causes them to be reburned thus reducing the environmental impact. Burning wood is a natural process and is generally considered carbon natural, meaning its negative impact on the environment is offset by a positive. An example would be the release of CO2. With so much attention centered around CO2 people forget that CO2 is a critical component of life. Remembering high school science the "green cycle of life" all green plants take in carbon dioxide (CO2) and release oxygen.

Its not really the CO2 from plant life that has caused our problems. As previously mentioned that has been supporting the "green cycle of life" since the beginning of time. It is the CO2 in oil and coal. That CO2 from oil and coal was sequestered in the Earth for millions of years and would still be there, except we developed them into a fuel to power our lives. Unfortunately the CO2 that comes from burning those fossil fuels has overloaded our planet. So that doesn't mean to say lets burn down all the trees because its natural. On the contrary we should be careful about burning anything, but regarding the release of CO2 from wood and vegetative waste, as soon as the tree or bush is dead the CO2 is coming out whether you burn it, grind it, compost it, bury it or leave it stand in the forest. Therefore CO2 should not impede our efforts to eliminate it. We can't waste our environmental tokens to just "repurpose" it. For instance, grinding does not eliminate the waste, 10 tons of logs just gives you 10 tons of chips and you have spent a lot of environmental tokens but if you don't have a market for it then you still need to spend more to eliminate it. We can't just grind this waste and throw it in the landfill. The point is, we need to use the best method of eliminating the vegetative waste when it is dead so that we don't create more negative environmental impact. That is why at Air Burners we are always working towards the best economical and environmental designs to do just that.

Most tried and tested elimination method available today

Air Curtain machines by Air Burners are the best and only machines tested to meet EPA standards by the USEPA and many other high level environmental agencies around the globe. For over 20 years we have been solving this problem on every continent on earth but Antarctica. Our environmental footprint is lower than any other method for eliminating wood and vegetative waste. All our machines are portable, do not require set-up and can be located on site. Bringing the machine to the waste rather than moving multiple truck loads of waste.

Now we are proud to introduce our latest development the PGFireBox.® A new era in Biomass Energy delivering from 100kW to 1 Megawatt of electrical energy and from 1 megawatt to 5 megawatts of thermal energy. Compared to biomass energy system available today the PGFireBox is focused on eliminating the waste.

The PGFireBox is portable, easily relocated if waste situation changes
The PGFireBox does not require any permanent structures like smoke stacks or concrete pads
The PGFireBox is a whole log burner and does not require any preprocessing, like grinding, of the waste
The PGFireBox can eliminate up to 200 pound of waste per kWh versus typical gasification energy system at 2 pounds per kWh
The PGFireBox is affordable, the 100kW system, perfect for landfills, is priced similar to a grinder

And as is standard with all our FireBoxes, they can return approximately 10 percent carbon sequestering biochar. Visit **www.AirBurners.com** for information and videos.

Summary

The forgotten waste, wood and vegetative waste. All is not well in our efforts to manage this waste stream. Most people believe it is being cared for, it is not. The International Panel on Climate Change IPCC list smoke/black carbon as the #2 most significant climate forcer along with methane. The black carbon particulate matter is the number one cause of snow melt and loss of our polar ice caps according to the IPCC. But the most significant point in all this, CO2 and Methane have extremely long life spans in our environment 100 years and 50 years respectively. Black Carbon/smoke particles only last 1 or 2 years in our atmosphere. We can quickly get control of these particulates and have an almost immediate positive impact on our environment. We can't do that anywhere else.

At Air Burners we make every effort to follow natural footsteps. The entire reason we exist is to provide one more important tool to help protect our environment. We have a large problem facing our communities. Unfortunately more people will die again this wildfire season. We need to stop the endless debating and start taking action.