

# **Writing on Timber: Seeing the Sustainable Forest for the Trees.**

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### **Are trees important to mankind?**

A printer, among other things, Benjamin Franklin was the first paper merchant in America, and helped to start 18 paper mills. In 1883, Philadelphia resident Charles Stillwell invented a machine to make brown paper grocery bags. By 2000, more than 20 million paper grocery bags were used annually. Beyond that, every year each person in the United States uses 749 pounds of paper, that is 187 billion pounds per year and by far the largest per capita consumption rate of paper for any country in the world [even more if one considers "quantitative easing"].

And world consumption of paper, about 300 million tons per year, has grown 400% in the last 40 years. Paper recycling accounts for 40% of this demand, but nearly 40% of trees cut are used in paper of some form, at a rate of nearly 4 billion trees per year going to the paper industries alone. As a result, many environmentalists believe that the world's forests are being cut down faster than they can be re-grown. This paper will examine sustainability as it pertains to trees.

### **Alternatives for Paper**

Paper production is the heaviest user of forest products, but does it need to be? Research shows success in wood-free paper, made from plants such as cotton, hemp, and a similarly fibrous plant called kenaf. But paper mills are hesitant to convert to using non timber plant matter to make paper because existing methods process only trees. Converting a paper mill to process these wood pulp alternatives would cost tens of millions of dollars and require coordination with suppliers and perhaps customers, and so they are understandably reluctant to commit. Without an incentive, entrepreneurial innovation, or industry plan, we will likely be using wood derived paper for a little while longer, perhaps indefinitely, and need a renewed focus on recycling.

### **America Leads the Way**

The iconic Paul Bunyan ("Bonyenne" is an old French-Canadian expression meaning "Good Grief") fell trees with abandon. And as his represented lumberjacks cleared the way for progress, building the America as we know, there was no need to consider the loss of trees. But in the middle of the last century, American lumber producers realized that they needed to practice conservation, and that managing their forests correctly actually lowered costs and increased profits. Replacement forests were planted in configurations that made harvesting easier, and for the most part, the farming concept was extended to lumber as a crop. Much of the 747 million acres of forest land in the United States is managed, reserved, protected, or regulated. In 1998 alone, over 1.6 billion tree seedlings were planted in the United States. Initiatives such as the Sustainable Forestry Initiative help to make sure that we in America practice environmental stewardship.

Unfortunately, in the remainder of world, tree farms provide only 16% of the supply and the remainder impacts old growth forests including rain forests, which are impossible to replace because of their maturity. For a domestic example, a 4,700 year old bristlecone pine tree in Nevada was growing when the Egyptians built the pyramids. But the loss of trees, while critical, is not the only challenge.

### **The Multiplier Effect**

Compounding the issue is the fact that making wood into a final product creates waste, and a lot of it. According to the U.S. Environmental Protection Agency (EPA), pulp and paper mills are among the worst polluters to air, water and land of any industry in the country. According to the Worldwatch Institute, every year worldwide wood use releases millions of pounds of highly toxic chemicals such as toluene, methanol, chlorine dioxide, hydrochloric acid, formaldehyde, and greenhouse gasses into the environment. Wood use is so immense not only because of paper but because wood pulp is found in many surprising places, such as rayon material, laundry detergent, camera film, and rubber products. An E-factor input to output analysis for paper would undoubtedly show unfavorable results, but green chemistry efforts may offer relief.

Trees solve a myriad of problems, and eliminating them will only make living more difficult for all life, including humans, here on planet Earth. Perhaps we should rethink using lumber to make paper. To demonstrate this point, architect and designer William McDonough says: "Here is a design assignment. Design something that: makes oxygen, sequesters carbon, fixes nitrogen, distills water, accrues and stores energy as fuel, makes complex sugars and foods, creates microclimates, changes colors with the seasons, and self replicates. Why don't we knock that down and write on it."

And what is worse, we may not have identified all of the problems that we are facing with our environment, because our present actions may not have had sufficient time to demonstrate their impact. The problem with this is, the conditions that led to mankind's rise to the top of the food chain, including all of the carbon sources we are burning through today in the 10,000-year-old geological time period we call the Holocene epoch, took millennia to create, say 540 million years give or take a few million. We are consuming these resources at an alarming rate according to the U.S. Energy Information Administration.

### **A Time of Our Own**

And because of what we as mankind have been able to achieve in our relatively diminutive existence, some now believe that we are no longer in the Holocene, but are in a time of our own creation. Literally. In 2000, Paul Crutzen, an eminent atmospheric chemist, realized that we are actually living in some other age, one shaped primarily by people. Trawlers scrape the floors of the seas, dams impound sediment by the giga-ton, forests are removed, rivers are dammed or rerouted, deserts are irrigated, mile-deep mines are dug and mountains are removed, islands are made, and as a result of our lack of pollution controls, glaciers are melting, ice caps are shrinking, our protective ozone and Van Allen layers are impacted, air mixture is changing, sea salinity, levels and temperature is changing, and desert and indeed inhabitable zones are changing. Even the space around the planet is polluted with "space junk" and a satellite belt so tight a cosmic shoe horn is required to add another [discussion of the polluted programming that some of those satellites convey is beyond the scope of this paper].

Mankind is bringing about change at the planetary level. Dr Crutzen, and colleague Eugene Stoermer, suggested this age be called the Anthropocene, that is, the new age of man. Now, the most common way of distinguishing an age in geological time is with fossils records. For future geologists, the Anthropocene will be pretty easy to identify, by some particularly distinctive fossils such as cities and the remains of certain living creatures. But of greater concern are the

fossils that will not be found. Scientists warn that if current ecological trends continue, such as the destruction of rain forests, climate change and extinctions will follow before long. A changing hydrologic cycle will have unpredictable effects on the weather and our habitat and sustaining features, such as moderate temperatures and the availability of water, and therefore food, so those extinctions could include mankind. Deforestation and forest degradation have been shown to account for 25% of greenhouse gas emissions, a percentage that is comparable to that of the transportation sector at 33%. If we do not soon curtail contemporary Bunyan-esk clear cutting, "good grief" will not be an adequate descriptor for the problems we will face.

In a time devoid of trees, our only chance of survival will come from geoengineering, but this is a path best left untried. Once we start meddling with the geosphere, there is no going back and the first major mistake will be our last. Think back to the 2010 flash crash and consider if you would want to anyone programming our planet. I'll stick with the trees, thank you. [pun intended]

### **A World of Opinion**

Trees are probably the single most powerful and prolific tool for practicing sustainability, which I also refer to as environmental stewardship. In America, the tone toward sustainability in general is mixed at best, and climate change is still unaccepted by the uneducated or ethically deficient [such as in the case of certain politicians]. Only with catastrophic events does our media bring sustainability to the limelight, and even then, sustainability is not the focus. BP's Deep Horizon oil spill is a recent example. In Brittan, an early 2007 Ipsos MORI poll found that 19% of the public cited sustainability, cast as pollution, as a serious issue. Then came the recession, and since 2008 the share of voters who think that pollution is an important concern has fallen to around 4%. In Australia, that sentiment is echoed; Australians want environmental stewardship as long as it does not cost too much. Yet Australia nets \$5billion a year from tourists visiting the very natural features that would be destroyed by climate change.

Fortunately, despite civilian indifference, the world governments have embraced sustainability and are quietly pursuing sustainability goals. Brittan's government has cancelled plans to expand Heathrow airport, opting instead to build high-speed railways, and is encouraging its citizens to reduce carbon-dioxide emissions. The 1997 Kyoto Protocol set up a framework for carbon credits as a way to begin to limit and control green house gas emissions worldwide. In 2005, at the 11th Conference of the Parties (COP-11), the Coalition of Rainforest Nations initiated a request to consider 'reducing emissions from deforestation in developing countries.' The matter was referred to the Subsidiary Body for Scientific and Technical Advice (SBSTA). President George Bush challenged the proposal but failed in his attempts. In the December 2010 Cancun Agreements, the SBSTA was asked to prepare an implementation plan for Reducing Emissions from Deforestation and Forest Degradation (REDD).

### **A World Takes Action (Better REDD Than Dead)**

REDD is a set of processes and steps designed to use market and financial incentives to reduce the emissions of greenhouse gases from deforestation and forest degradation, and deliver "co-benefits" such as biodiversity, conservation, and the reduction or elimination of poverty. REDD is an "offset" scheme using carbon markets, and thus will produce carbon credits. This example of sustainability innovation takes into account the holistic view of the situation. "Carbon offsets" are any emission reduction or elimination projects that compensate for the other emissions. The

“carbon credits” generated by these projects may then be used by governments, corporations, and NGOs to meet their targets within the carbon markets. REDD is being promoted by the World Bank and the UN in order to set up the framework for the carbon market, by enlisting such entities as the World Bank's Forest Carbon Partnership Facility, the UN-REDD Programme, and Norway's International Climate and Forest Initiative. However, the real implementers of REDD will be the indigenous people and forest-dependent communities whose livelihoods are derived from forests. Peru and Nepal are already participating in REDD programs. Please refer to Appendix: The Details of REDD.

In order for REDD to work, verification of compliance must be performed. Boots on the ground use portable Light Detection And Ranging (LIDAR) systems to verify and count trees, but this process can be slow, and difficult to perform in rough terrain. Other methods use eyes in the sky, but these methods are expensive. High-resolution satellite pictures of billions of trees costs more than \$100m a year. Planetary Skin Institute (PSI), a not-for profit organization set up by Cisco Systems, and NASA, might help cut that budget. The PSI's Automated Land-change Evaluation, Reporting and Tracking System (ALERTS) is one of several tools being developed to monitor the health of forests and other ecosystems. ALERTS uses data from both of NASA's Moderate Resolution Imaging Spectroradiometer (MODIS) cameras, data-mining algorithms developed at the University of Minnesota, and a lot of computing power sponsored by Cisco Systems.

To calculate how much carbon the world's tropical forests are storing, a Woods Hole Research Center team took data from patches of forests studied on the ground, and combined them with images from MODIS, and with data from an instrument called the Geoscience Laser Altimeter System (GLAS), which bounced laser beams off the Earth's surface. GLAS's main job was [GLAS unfortunately is no longer operational] measuring the height of ice sheets, but the data that came back from forested areas contains a lot of information about the height of the canopy and the density of that vegetation. That allowed the team to turn the two-dimensional images from MODIS into three-dimensional models. From these, it is possible to estimate the mass of the plant matter, and thus the quantity of carbon stored in an area. As management guru Peter Drucker once said, what gets measured gets managed. Once measured and managed, it can be accounted for, by the carbon market, or by applying the other metrics in meaningful ways, and guide management decisions to maximize outcomes.

### **Conclusion**

So, to answer the original question: Trees are not only important to mankind as a resource, they are crucial to our survival, as shown above. With our indicators and metrics defined, we can measure the impacts and benefits, as expenses and assets, that trees contribute to our environment and indeed to our profit margins.

Our environment absolutely affects business. And holistic thought is required to understand this, and especially to uncover the details that inevitably become issues. [A potential irony occurred to me, I wonder if the treaties and programs described above were documented and signed on paper?] How ironic that "tree-huggers" would become the new capitalists. America's first sustainability practitioner, among other things, Benjamin Franklin would be proud.

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### Appendix: The Details of REDD

REDD encourages developing countries to participate in accordance with their respective capabilities and national circumstances, based on:

- **Access:** The modalities should create incentives for developing-country parties undertaking REDD+ actions to participate in and benefit from an international REDD+ mechanism, taking into account their respective capabilities and national circumstances.
- **Simplicity:** The modalities should establish a clear and straightforward process. They should limit data and formal requirements to those necessary to ensure the integrity of Reference levels (RLs). Principles applicable to REDD+ RLs are submitted by UNFCCC parties for adoption
- **Objectivity:** The submissions should rely on sound science and limit the room for bias. Relevant guidelines from the Intergovernmental Panel on Climate Change (IPCC) should be taken into account concerning inclusion of GHG emissions by sources and removals by sinks.
- **Empirical Basis:** Projections should be based on historic emissions and removals, adjusted to national circumstances as required to improve accuracy.
- **Transparency:** Party submissions and the data they contain should be public. Entities approving RLs should publish the rationale for their decisions. Stakeholders should be consulted and their comments taken into account prior to submission.
- **Independence:** Conflicts of interest among those developing, reviewing, and approving RLs should be identified and avoided.

Further, REDD policies will provide important economic incentives for forest conservation. REDD will produce the following benefits:

- **Cuts pollution substantially right away**, without waiting for new technologies. With the right economic incentives for forest protection, deforestation can be reduced drastically in the short term.
- **Provides more overall greenhouse gas reductions** at a lower cost than policies without REDD
- **Creates positive incentives** for major developing countries to participate in global emissions reductions. The world's fourth largest overall emitter, Brazil, has already slowed its deforestation by 40% and has committed to an 80% reduction from the 1996–2005 average by 2020.
- **Ensures emissions reductions.** REDD reductions at the national level are far more certain than one-off "offsets" to achieve global emissions cuts, because REDD is tied to a national commitment to absolute reduction in a country's overall emissions. (As critics have pointed out, local forest project "offsets" can be erased by increased emissions elsewhere, including in neighboring forests.)
- **Protects unique ecosystems.** Since tropical forests are home to at least half of all plant and animal species, deforestation threatens the biological diversity of the entire world.
- **Promotes development** by giving forest dwellers new sources of income to improve living standards while maintaining traditional ways of life. This is the soundest and most just route forward for the threatened indigenous peoples who inhabit the world's remaining tropical forest lands.
- **Helps U.S. industries support climate change legislation**, since REDD would lower the costs of reducing emissions. Without REDD and other international credits, U.S. compliance costs would almost double, according to the U.S. EPA.
- **Provides greater transparency.** Bringing efforts to stop deforestation into a global system and a soundly constructed global carbon market will provide greater transparency and protections at both local and national levels. Regulated markets demand the accurate, transparent monitoring and measurement that today's satellite observing technology can deliver.
- In a national-level REDD program, a country that commits to reducing deforestation below an established baseline would receive **valuable credits** in carbon markets for reducing carbon emissions. Requiring a national baseline eliminates the shortcomings that critics have pointed out in a handful of local one-off forest projects. Independent satellite observations and spot ground inspections of forested areas would reliably verify that the national commitment is in fact being met.