



Biomass As Energy - Avoiding Risks and Promoting Sustainability

by Charlene Easton & Susan Herbert

March 1, 2010 World-wide, the biomass¹ fuel market is growing. Governments are setting policies to achieve GHG emissions reductions, to decrease dependence on coal and crude oil, and to secure “renewable” supply for vastly growing energy demands. Biomass will be an important component of this necessary renewable supply. For example, the European Union Renewable Energy Directive² (RED) sets binding targets for all Member States such that the EU will reach a twenty percent share of renewable energy by 2020; the UK government has set targets stating that twelve percent of all heat will be generated from a renewable source by 2020; and in China, where nearly fifty percent of 250 million rural households rely on burning firewood and various agricultural wastes to heat homes and cook meals, the demand for energy amongst urban and rural industries and households continues to grow.³ Biomass is set to increasingly contribute to meeting energy targets and needs around the world.

Because of this potential growth, responsible biomass supply chain managers and purchasers should begin factoring in the vast environmental and social complexities of global biomass supply chains into their purchasing decisions. The following examples illustrate the nature of environmental and social issues, risks and opportunities that may be encountered in this complex decision making process.

Land Conversion: Demand for biomass as a fuel source can lead to increased competition for the land, territories and resources of indigenous peoples and local communities, increased competition of the land for food production, and heightened pressure to convert biologically significant forest, wetlands and grasslands areas into fuel yielding crops. Many certification programs for biomass and biofuels already require that the raw materials cannot come from specific types of converted lands (e.g. those with high biodiversity value – primary forest, protected areas and bio-diverse grasslands – and with high carbon stock value - older growth forest, peat-land and wetlands).⁴ Only recently have these certification programs begun to incorporate criteria examining issues such as local food security and traditional land use rights. Purchasing decisions will need to begin to actively question the previous uses of the lands that are or will be used to cultivate and harvest biomass sources.

Job Creation: Biomass demand can spur value-creation and the development of new enterprises, technologies and jobs. As an example, two decades ago, Malaysian palm agricultural by-products were considered ‘economic waste’⁵ with associated disposal pollution problems. Today their use as a renewable energy supply ranks amongst the top three value-creation uses for palm biomass. Others include consumer product production and the extraction of fine chemicals. New enterprises and jobs have been created to tap into uses of palm biomass product.⁶ Responsible supply chain managers will need to assess if economic prosperity is being added to the local or regional communities from which they purchase.

Energy and Carbon Savings: Energy and carbon are complex concepts to measure. The true carbon footprint of energy crops, for example, can only be assessed by quantifying and verifying the consumption of such inputs as conventional fuels, the fertilizers and pesticides used for production, the materials and energy used for processing, and the fuels used for transportation. In a recent study, “Life Cycle Assessment of Biodiesel Production from Palm Oil and Jatropha Oil in Indonesia”, Nazir and Setyaningih conclude that biodiesel production for palm oil consumes much higher fossil-based energy than jatropha oil.⁷ While full life cycle assessments may provide the most detailed and balanced view of energy

and carbon trade-offs, these studies can be highly resource intensive and not practical to implement for many organizations. At a minimum, supply chain managers will need to begin asking basic energy/fuel usage questions of their supply chains.

Public Consent to Operate: Consumers expect a level of integrity, community generosity and transparency in business that surpasses that required by regulations. While many biomass sustainability standards with goals of improving consumer confidence are still in their infancy, both governments and global NGOs are increasingly taking the lead in monitoring the economic, environmental and social performance expected by these standards. A relatively comprehensive list of international biomass sustainability standards and certifications schemes can be found at www.bioenergywiki.net/Sustainability_criteria.⁸ Responsible biomass purchasing will need to acknowledge and incorporate the ground-breaking work already achieved by these standards.

Human Rights and Worker Safety: Consumers also expect that the most basic of human rights and worker safety are being upheld and protected by businesses and governments - the prohibition of slavery, underage and forced labour; the right to life, liberty and security; the freedom of association and the right to organize; and the prohibition of cruel or degrading treatment. While many industrialized countries already have regulations addressing fundamental human rights, fair labour practices, and worker health and safety, and have functional justice systems supporting their ongoing implementation, these are not the countries from which much of the global biomass supply originates.

Despite international treaties and best efforts, many biomass operations are still being directly linked to some of the worst breaches of human rights. For example, the November 2010 report released by Tulane University’s Payson Center for International Development and Technology Transfer reveals a lack of progress in the West African cocoa industry (a source of cocoa wastes for biomass pelleting) to eliminate human rights abuses including child trafficking, child labour, and unacceptable labour standards.⁹ Responsible supply chain management will need to, at a minimum, be asking questions about if and how workers’ rights are being protected.

Water - The Next Big Challenge: Water is a critical input to biofuels production, and is used in large volumes for feedstock production (irrigation) and processing. Other concerns include the impacts associated with nutrient-rich agricultural runoff and wastewater from processing. The extent of water impacts

from biofuel production depends on feedstock type, geography, irrigation methods, farming systems, and the characteristics of the watersheds within the production and processing zones.¹⁰ While these are significant challenges for the biofuels sector, in November 2010 the International Union for the Conservation of Nature (IUCN) and the oil and gas industry came together to tackle the risks associated with biofuel production, particularly the added stress it can put on dwindling global water supplies. Biomass purchasers will need to also be looking at the potential water use and watershed impacts created by harvesting, cultivation and processing of fuel feedstocks.

Emerging Ecosystem Services Markets: Over the long term, schemes like REDD+ and the Wildlife Premium Market Initiative¹¹, both highlighted at the December 2010 United Nations Climate Change Conference held in Cancún, Mexico, can help reduce environmental and social risks, and improve confidence in the biomass supply chain. The same countries with the potential to benefit from these market schemes may also be suppliers of biomass and biofuel feedstocks, and carry associated sustainability risks.

In time, these schemes will increase local capacity, provide incentives for governments to tackle illegal deforestation, protect high value biodiversity, provide land title for indigenous communities and enhance transparency and rigorous surveillance of forestry practices and forestry carbon stock. These schemes are not without well-documented challenges, and in themselves will not grant proof of sustainability of the chain.¹² However, the commoditization of nature is a global 'game changer', and international initiatives such as REDD+ and the Wildlife Premium Market Initiative are imperative to help grow sustainable biomass markets and trade. Purchasing programs will need to monitor the advancements being made in these areas.

Creating Shared Value at the Local Level: Progressive companies have figured out that the expansion of economic and social value go hand-in-hand. By investing in socioeconomic programs in the communities in which they operate, and providing incentives for local enterprise development driven by local needs and initiatives, environmental challenges (such as watershed protection, biodiversity and food security) become more transparent to the communities. The fostering of relatively small scale and appropriate technologies, along with 'micro-credit' programs, can help local communities improve their economic condition within their local traditions and values. It is often these local communities and indigenous people that are marginalized by national and global interests.

Biofuel and biomass production, performed in a sustainable manner, can help generate local employment and livelihoods, aid in the decline of populations in the rural communities and their migration to urban centers, and provide investment in local health care and schools for much needed social services. Responsible

supply managers will need to assess the extent to which their suppliers are practicing responsible corporate citizenship, and particularly at the local level.

Transparency: Corruption is a primary driver of illegal and environmentally unsustainable harvesting, production, conversion, export, import and procurement of timber and wood products. While both national and international laws and programs (such as the EU's Voluntary Partnership Agreements and the US' Lacey Act) are being enacted and revised in a desire to curb these practices, supply chain managers must still be vigilant in ensuring their supply has legal origins. Purchasing policies will need to consider corruption risks associated with both the countries and companies of origin.

Conclusion: Responsible supply chain managers will need to evaluate risk associated with biomass and social and environmental issues. They will want to: 1) quickly come up to speed on country-specific sustainability issues impacted by biomass; 2) develop a biomass specific sustainability purchasing policy and standards to mitigate against social and environmental risks; 3) develop supplier screens to ensure they do business with suppliers that share their values; and 4) establish mechanisms for ongoing monitoring and verification of on-the-ground realities and 'game-changing' global sustainability initiatives. To take leadership one step further, responsible supply chain managers will want to work with industry associations, industry peers and others to build relationships and combine efforts to drive improved social and environmental responsibility in the biomass supply chain.

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These companies work together to support responsible decision making in local, regional and global biomass supply chains.

Endnotes:

- 1 Biomass is defined as "organic matter available on a renewable basis. Biomass includes forest and mill residues, agricultural crops and wastes, wood and wood wastes, animal wastes, livestock operation residues, aquatic plants, fast-growing trees and plants and municipal and industrial wastes". (Opportunities and Barriers for International Bioenergy Trade, p. 43).
- 2 RED will expect member states to ensure biofuels meet both environmental and carbon saving criteria.
- 3 Quinfeng Zhang, Technical Assistance for Preparing a National Strategy for Rural Biomass for Energy Development in China, Asian Development Bank, September 2010.
- 4 Ongoing Development of Sustainability Certification Criteria Presentation, Certification and Sustainability Bio-energy Supply Chains, Rome Italy, October 21st, 2010, page 7. <http://www.bioenergytrade.org/pastevents/rome2010.html>
- 5 The waste is not an ecological or environmental waste. It can be re-cycled as compost to sustain soil fertility, or it can be used for biofuels.
- 6 Information provided by Bhd, Kok Mun Tan, Consultant at Rapid Genesis Sdn., Malaysia, December 2010.
- 7 Nazir and Setyaningih, Life Cycle Assessment of Biodiesel Production from Palm Oil and Jatropha Oil in Indonesia, Biomass Asia Workshop, Nov 29 - Dec 01, 2010.
- 8 Some of these standards are sector specific (e.g. Better Sugarcane Initiative, Roundtable on Sustainable Palm Oil, and the Forestry Stewardship Council). Others take a global market perspective (e.g. Roundtable on Sustainable Biofuels series of sustainability standards, IEA Task Force 40: FAIRBiotrade, and the anticipated International Organisation for Standardisation's ISO/PC 248, Sustainability criteria for bioenergy).
- 9 Payson Center for International Development and Technology Transfer, Tulane University. "Oversight of Public and Private Initiatives to Eliminate the Worst Forms of Child Labor in the Cocoa Sector in Côte d'Ivoire and Ghana". September 30, 2010. (<http://www.childlabor-payson.org/Final%20Fourth%20Annual%20Report.pdf>)
- 10 <http://www.iucn.org/knowledge/news/6497/Taking-on-the-water-and-biofuels-challenge> Agreements over Water
- 11 These initiatives place market value on biologically significant forests, and species. Under REDD+ regimes, countries earn carbon credits for reducing emissions from deforestation and degradation below a recognized baseline. Governments pledge money in exchange for these forest climate services with Norway taking the lead in agreements with Guyana and Indonesia. The Wildlife Premium Market Initiative plans to focus on charismatic forest-dwelling species that require large expanses of forests (i.e. tigers, jaguars, forest elephants, great apes, macaws, birds of paradise, and lemurs). It will introduce a wildlife premium linked to REDD+. Countries and local communities will be able to earn additional payments as the range of targeted species expands to include former habitat above some established baseline.
- 12 There is debate on the issue of obtaining carbon credits as a solution to the global GHG challenge, as it does not provide incentives to decrease the generation of GHGs but merely transfers the costs.