



## **THE BLESSINGS OF BIOMASS**

The intention of this document is to gain needed understanding of the enormous potential offered by the full range of biomass industries, and to present suggestions on how this potential can be achieved. Business as usual is an impassable road block. A cultural change is urgently needed if we hope to restore strength to the economy, the nation and its people.

### **Optimizing the Advancement of Biomass Industries**

The BLESSINGS OF BIOMASS are readily available to all Americans, especially those in rural communities where all forms of biofuels, biopower, biothermal, and biobased products are emerging. Urbanites are contributing in their own way with window boxes, backyard, schoolyard, rooftop and community gardens. However, these blessings are not fully attainable without a coordinated national effort to ensure that communities, people, the environment, climate change and wildlife are paramount considerations with sustainability as the foundation for all biomass industries. Moreover, the critical importance of business and profit making cannot be neglected. The best balance can be assured by a higher level of collaboration amongst all involved in advancing the full range of biomass industries in rural America with urban populations adding to the food supply, gaining better understanding of the importance of nutrition, body weight and exercise in advancing public health, and better appreciation of natural systems in their lives. The slogan, "Leave No Child Inside," is becoming more popular. All biomass industries are now beginning to move forward with an enlightened understanding of the needs of our nation, its people and the environment.

In achieving this balance, we need more respect for and response to authority, particularly in times of great need. This was the case in WWII when the world was fighting for its freedom. This is the case today as America fights for its economic security. A decision by a duly elected or appointed authority should lead to action, not the beginning of discussions about the issue. In our democratic society, there are checks and balances to avoid serious mistakes. Of equal importance is the imperative for authorities to encourage individual creativity, contributions, and determinations in advancing America out of the current economic recession. This is the power of biomass. It permits essentially everybody, even a child, to participate -- eating right, a tomato plant, or a small patch of lettuce -- along with an ever broadening array of bioenergy industries, are important contributions to healing our nation.

### **Opportunities for the United States**

- Quality job creation and rural economic development;

- Generation of basic “new wealth industries” with major economic multipliers;
- Development of an integrated approach to biomass production;
- Reduction of US overseas debt;
- Optimization of land use to sustainably increase all forms of biomass;
- Determinations to promote increased soil vitality;
- Climate stabilization via carbon sequestration and replacement of fossil fuels;
- Opportunities for states that lack advantages in producing other forms of renewables (solar, wind, etc.);
- Enhancement of wildlife habitats, watersheds, wetlands and riparian buffers; and
- Community based solutions for local and national energy requirements.

This potential, however, can only be realized and lasting if a complete range of biomass industries – food, feed, fiber, fuels (biofuels, biopower, biothermal energy), fertilizers and feed stocks for chemicals – are implemented on a fully sustainable basis. The well being of people, rural communities and natural systems must be paramount in the advancement of these industries. Biomass industries touch the lives of all Americans and it is important that they better understand the relationships. Biomass applications range from the White House organic garden, school yard and roof top gardens; grass fed cattle and free range chickens; municipal waste for compost and/or energy; landfill gas and animal waste to biogas and power; fuel pellets for combined heat and power; forest and other biomass waste for power generation; feed grains, vegetable oils and waste oils/greases to biofuels; cellulosic biomass and algae to biofuels including gasoline and diesel type fuels made from biomass; to an increasingly wide range of biobased products from car parts to pharmaceuticals- essentially everything in between that isn't glass or metal. Biomass production can be seen as an integrated approach, where all co-products and by-products of production can be used or sold as commodities for other industries and the market. This is what makes biomass a truly renewable and recyclable process of production.

All biomass proponents must now recognize that biomass industries are **inseparable** because they are all **dependent** on optimized land use, vitalized soil and abundant water – from a tomato plant on the porch, to huge integrated biofuels, biopower or biothermal plants -- biorefineries .

## Favorable Conditions

The American Advantage:

- Favorable weather, plentiful land resources and generally adequate water supply;
- High quality farmers, ranchers and foresters;
- The development, implementation and mobilization of new technologies in agricultural and forestry sectors -- the US is a world leader in these sectors:
- Leading scientists, engineers, and financiers;
- Ample land that warrants better management;
- Well developed transportation, distribution, and communications systems;

- Supportive governments at the local, state and national level;
- Greater awareness of the importance of self reliance within families and communities and a greater sense of independence This has resulted in a growing appreciation for natural systems leading to greater support for renewable energy and energy efficient practices; and
- Increased funding at the national and state level for integrated renewable energy projects.

## **A Perceived “Set-Back”**

The United States has always served as the “breadbasket” of the world because of our ability to produce and maintain a large and constant agricultural output. Current issues now being faced in the agricultural sector are no different than problems previously experienced -- with the exception of the food versus fuel issue relating to corn-based ethanol. This has become the center of attention for the biomass industries. There are more faults surrounding this issue than pockets to hold them:

- 1) Attacks against fuel ethanol by those who would benefit from its demise – competition in the fuel market (this goes back well over a century) and competition in the corn market;
- 2) The pile on phenomenon by environmental and public interest groups that have generally opposed the corn-ethanol industry from the outset;
- 3) A lack of general understanding that about half the beneficial feed value of a bushel of corn going through an ethanol plant to produce 2.8 gallons of ethanol is recovered in the form of distillers grains fed to cattle. Ethanol is made from starch. The protein, oil, nutrients and fiber in the corn ends up in the distillers grains. It can be argued that less starch fed to beef cattle ends up with reduced fat in the meat, which then makes for a more healthy food. Little if field corn is used as food for humans;
- 4) The operators of most ethanol plants were slower than necessary in reducing the amount of fossil energy used in the plant to make ethanol, to reduce water usage, and to increase efficiencies;
- 5) The slowness of some corn farmers in shifting to conservation tillage and other energy and water conserving, and soil building farming practices;
- 6) The failure of the oil/auto industries and EPA to arrive at more optimized blends of ethanol in gasoline and engine designs as achieved in Brazil to boost the performance of ethanol; and
- 7) The slowness of EPA in recognizing the public health benefits of reducing toxins like the aromatics in gasoline that can be replaced with ethanol to gain needed octane. If ethanol is done right, from the soil to the tail pipe, it is superior to gasoline in servicing our nation, it is here now, and getting better.

## **Land Grant Universities**

The United States contains a network of Land Grant Universities that encompass cutting-edge agricultural, animal and forestry expertise, technology, and economic development specialists.

These universities also include Historically Black and Tribal Colleges and Universities that are now of increasing importance due to their historic closeness to the land. Working with the Departments of Interior, Agriculture, and Defense, these colleges and universities should boost their expertise in forest, tree, and plant management on lands under the auspices of DOI, USDA, and DOE, as well as other public and private lands in manners fully acceptable to the owners. Co-operatives could be formed similar to those in the agricultural sector. The 4-H program and Future Farmers of America, with the assistance of the Land Grant University system and State Departments of Education, can expand their experiential forms of education to reinforce “hands-on” educational practices throughout the nation, including in urban schools. Again the slogan, “leave no child inside” is an important part of the cultural change now emerging in the US. In the world of biomass, Land Grant Universities are hubs for innovation, which directly affect industry, in addition to setting new behaviors in the markets through an emerging, environmentally conscious workforce.

## **Investment Considerations**

In order to rise to the challenges and opportunities in biomass within our country it is imperative to appreciate that major financial institutions are obligated to focus on returns to investors. They therefore seek out projects that meet those criteria. The simplicity of major solar, wind, and geothermal project investments, uncomplicated by all the variables involving the biomass industries, are generally preferred. Also, investors are aware that while the cost of electricity from solar and wind will likely continue to decline – because the base resource is free and technology improvements will continue – the cost of electricity from biomass will likely rise with increased demands for the resource.

Although wind, solar, and geothermal projects produce energy efficiently, biomass is the only renewable which can supplement our renewable energy stocks, implement sustainable forestry management systems, improve agricultural practices, and launch community development tools, and to do so better than any other energy industry.

Additionally, the variables involved in biomass projects – the soil, water supplies, the weather, the farmers, ranchers and foresters, their families, changing government programs, communities and institutions – are considered detriments when deciding the viability of loans to biomass projects. This is particularly true when the projects are modest in size with a focus on “bottom up” values to the community. Often these communities strive to embrace economies of “ownership, integration, diversity and values” instead of economies of scale. These “externalities” are generally considered troublesome in the decision making process of firms operating on financial returns on investments. Fortunately, the US Department of Agriculture, the States and the Land Grant Universities have programs accommodating these important externalities.

These financial considerations highlight the increasingly important role of Land Grant Universities in addressing the needs of farmers, ranchers, foresters, entrepreneurs, and start up businesses to harness the vast potential of biomass in a comprehensive manner. These

educational institutions are obligated to uphold mandates to serve agriculture and forestry interests and therefore should be the primary source for assistance in launching new biomass businesses that will well serve communities and the states. In this service to the nation, these universities and colleges should utilize the capabilities of other colleges, vocational, and technical schools in their states in order to capture the momentum now taking root in the US and develop the labor force needed to service the plethora of renewable energy industries now being commercialized. There is also a cultural change underway, born out of necessity, and biomass is a major key in this change because it involves so many natural systems from people to microbes. Fortunately, the Land Grant Systems are equipped to lead as centers for intellectual exchange which will allow, if maximized, the economic power and sustainability of biomass. This requires collaboration and yet-to-be achieved full cooperation from the governor of a state to the president of the land grant system and all other institutions of higher education and beyond, right down to individual farmers and gardeners. In this process, there is room for proprietary rights and patents, but there is an urgent need for optimized sharing and collaboration in the exchange of ideas and scientific/technological advances.

This was the case in WWII and should be the case today. In the speedy and well-grounded commercialization of biomass industries, there is a growing need for the services of the Sun Grant Initiative that is vital to the rapid development and commercialization of a wide range of sustainable industries and their co- products. The Initiative is worthy of major expansion.

## **Corporate Leadership**

In a modern society, major advances will not occur without the participation of “big business”. ADM and Cargill were essential in the advance of the biofuels industry. Poet, ICM, Abengoa, and major co-operatives earned their way into the “Big League”. The enlightened future ahead demands the exploration of common grounds beneficial to the agricultural and forestry sectors, where the “get big or get out” mantra is replaced with honest calculation of all externalities, and cooperative programs beneficial to the community are green “credit” for their contributors.

The indirect land use issue placed on corn ethanol in determining its “full fuel cycle carbon footprint” sets the stage for including societal, community, environmental, and climate change factors. There is a brave new world ahead.

## **Governance and Leadership**

For the United States to take full advantage of its biomass resources, it must include: high quality leadership of farmers, ranchers, and foresters; engaged land grant universities; state governments; a willing federal government; and adequate government funding. It is imperative that a deliberate effort be made by the federal and state government to optimize the performance of all institutions available to support the rapidly emerging biomass industries. The coordination amongst the many biomass sectors is a complicated and sizable task; however this provides leadership opportunities within several sectors of industry, governmental agencies, and private/public entities.

## Sources of Support:

- The Departments of Agriculture, Energy, Interior, Transportation, Defense, Commerce and the Environmental Protection Agency. There is already an applicable Memorandum of Understanding relating to forestry operations between USDA, DOE, and DOI. On May 5th, 2009 President Obama established the Biofuels Interagency Working Group to focus on biofuels;
- The Departments of Agriculture, Energy, Environment and Economic Development, in the states;
- The Governor's Biofuels Coalition;
- The Land Grant University System, state and local banks, and investment groups;
- The Sun Grant Initiative;
- Environmental and public interest groups working with governments and biomass businesses to ensure the speedy advance of environmental assessments- and environmental impact statements when needed- to ensure optimized environmental benefits while not delaying projects needlessly;
- Organizations, associations, businesses and groups committed to environmental enhancements including wildlife, watershed, wetland and riparian barrier improvements and greenhouse gas stabilization; and
- Governmental **Team Work** to optimize the benefits of a project, speed the due diligence process (making needed improvements if the projects so warrant and rejecting those so warranting ), seek ways to reduce costs through collaborative efforts with state and county governments and local service providers, and help in organizing and obtaining needed financing, etc.

## Next Steps to Capture the Full Potential of U.S. Biomass

- The expansion of the Memorandum of Understanding between the Departments of Agriculture, Energy, and Interior with a focus on woody biomass to include the Departments of Transportation, Defense, and Commerce along with the Environmental Protection Agency in order to incorporate all forms of biomass in the charter. Designate the Department of Agriculture as the lead agency.
- Request that a parallel structure formed at the state level to encompass agriculture, forestry, energy, education, environment, economic development, National Guard and other pertinent departments. Defense organizations should be involved because of the need to reduce dependence on oil and the national security benefits of dispersed energy production. A lead department should be designated, and the "Biomass Coordinating Council" (BCC) should be tasked with the responsibility to accelerate the development and commercialization of all pertinent biomass industries within each state, and provide support services to accomplish these goals.
- Request that the Land Grant, Historically Black and Tribal Colleges and Universities work in full concert with state-level BCCs to interface with farmers, ranchers, foresters, and land owners to promote optimized and sustainable land use practices as well as promote water conservation.

- Request that the Land Grant Universities and Historically Black and Tribal Colleges and Universities work collaboratively with junior colleges, vocational and technical schools, as well as coordinate an experiential academic agenda with grade schools K-12 to ensure the availability of a fully educated, trained, and committed cadre of workers, technicians, and managers to advance the full range of biomass industries within the state. This should include the work of organizations such as 4-H Clubs, and the Future Farmers of America to boost the levels of experiential education in schools. These highly respected programs should increasingly embrace the full range of biomass industries. These efforts are of major value in producing the next generation of much needed scientists and engineers.
- Increase funding levels for the Sun Grant Initiative with a greater focus on rapid commercialization of profitable and sustainable biomass industries by encouraging a broader range of support services for these industries.
- Encourage a bio industry-wide effort to focus attention on support for internationally acceptable criteria providing carbon credits for sequestering carbon in biomass and in soils, and for biomass products whose full cycle carbon footprint is less than the footprint of like products produced from fossil materials. This includes biofuels, biopower, biofertilizers and biobased products.
- Pass into law at the federal and state level a workable and more universal definition of biomass that maximizes opportunities to utilize, in a fully sustainable way, all forms of biomass for the production of energy or energy related products, in a manner that will enhance the forests, wildlife, soils, natural systems, and water supplies while meeting all federal and state air and water quality regulations. Such statutes are essential in un-complicating and speeding the development of the needed wide range of bio-industries. There are ample federal, state, association, and business programs and procedures already in place to ensure environmental and wildlife enhancement. By un-complicating procedures and promoting cooperation among a wide range of stake holders, stewardship will prove to be most effective in achieving national goals.
- Encourage the use of “feed in tariffs” as a way of un-complicating processes leading to increased reliance on the production of renewable energy electricity.
- Promote “smart-grid” technology that encourages disbursed energy production for reasons already mentioned.
- Promote the rapid expansion of piston engine technology for both ethanol and biodiesel to cost-effectively outperform fossil fuels when costs, emissions, national security, and carbon footprints are included in the calculus. Because biomass industries mean biofuels (ethanol and biodiesel) to most Americans, it is important that they advance as quickly and sustainably as possible in order to set the pace for other biomass industries.
- Promote blender pumps that give drivers a choice of ethanol blends (No ethanol, E-10, E-30, E-40, E-85).
- Advance the minimum blends of ethanol in gasoline from E-10 to E-12, and then E-15 as soon as possible.
- Support the development of advanced biofuels including “drop-in” biodiesel, jet fuels, and green gasoline.

- The departments of Energy, Agriculture, Interior, and the Environmental Protection Agency have made commendable efforts in developing the research, tools, and accounting practices necessary in setting the stage for a “leap forward” into successful advances for next generation biofuel plants in service to the nation. However, if past is prologue, it is highly unlikely that Presidential and Congressional goals for biofuels will be met without extraordinary actions. Therefore, please consider the following proposal for future project implementation:

- 1) Select a team of leading scientists, engineers, and project developers, including a representative from the Governor’s Biofuels Coalition with a leadership role in advancing biofuels.
- 2) This team then selects a manageable number of the most promising technologies already vetted to a degree by existing government review and financing programs.
- 3) Provide whatever funds needed to rapidly commercialize these technologies.
- 4) Strive to share expertise among those selected without violating proprietary rights.
- 5) Mobilize state and county governments to optimize this process.
- 6) Make every possible effort towards the successful completion of each project.
- 7) The speedy dispatch of funds from DOE, USDA, and Treasury with full support from OMB is essential.

- Finally and of critical importance, is the imperative that contaminated, misused, or underused land be made more productive by growing biomass. This will provide greater resources for the 6Fs (food, feed, fiber, fuel, fertilizers, and feedstocks for chemicals), better soil cover for watersheds, wetlands, riparian buffers, enhanced wildlife habitats, as well as countryside beautification, and carbon sequestration. On those lands, every effort should be made to plant fast growing trees, conserve water, and revitalize the soil with mineralized compost (or needed minerals), and biobased soil amendments like renewable urea, microbes, and biochar.

## Meeting America’s Critical Necessity

- For the near and long term, the greatest necessity the nation must resolve is employment, stable jobs, and the ability to service the national debt. This can best be done with “basic new wealth industries” that contain large economic multipliers. Biomass industries are unique in this challenge. Like all the industries depending on natural resources – mining, agriculture, aquaculture, silvaculture, all the renewable energy technologies, recycling and reuse of waste, and human creativity (all blessings of nature) – biomass is a basic new wealth industry. Biomass, however, is unique in that it must be sustainable, and regenerates itself with each growing cycle. Unlike solar or wind for instance - both of which join biomass and hydro in tapping our universe’s solar wealth - the industrial jobs created by solar and wind are stimulated during the fabrication and construction cycles, but then recedes to maintenance and upkeep. Biomass, on the other hand, creates jobs during the construction, fabrication, and maintenance cycles,

but continues on with the growing, transportation, processing, and production cycles with additional jobs through the creation of by-products and co-products.

- In a modern society where food, feed, fiber, fuels, fertilizer, and feedstocks for chemicals will be in increasing demand due to a population expansion, biomass industries will do the heavy lifting in providing a wealth of resources to meet these new demands. America should be the world leader in these biomass industries which are also our best bet in stabilizing greenhouse gasses, reducing poverty and the breeding grounds for terrorism. Again sustainability and optimized land use are paramount. In a highly competitive world, US biomass based industries enjoy international respect. We must maintain that leadership position.

## **Conclusion**

Stephan E. Ambrose, in his book *Nothing Like It in the World*, cited an Omaha Weekly Herald comment – “American genius, American industry, American perseverance can accomplish almost anything.” America did it again in WWII. We are again back to the challenge, but this time it is more difficult. Our populace is more diversified, our federal government less united, our natural resources more depleted, our nation in greater debt, and our planet facing the threat of climate change with the world calling for US leadership. There is a slogan in the Marine Corps that should prevail – “When the going gets tough, the tough gets going.” We really don’t have any choice.

## **The American Council On Renewable Energy (ACORE) and the Biomass Coordinating Council (BCC) Background**

The Biomass Coordinating Council (BCC) and the American Council On Renewable Energy (ACORE) serve as a forum through which a wide range of sectors including renewable energy industries, associations, utilities, end users, professional service firms, financial institutions, non-profit groups, universities, and other educational organizations and government agencies can interact and work together to serve common interests in the renewable energy sector.

## **Goals of the Biomass Coordination Council (BCC)**

The BCC is working to accelerate the adoption of renewable biofuels, bio-power, and bio-based products into mainstream American society through work in policy initiatives, convening, networking, and communications. BCC’s goals include reducing America’s dependence on oil and fossil fuels, creating a cleaner environment, mobilization of all available institutional resources for the advancement and adoption of biomass industries.