

Sustainable Biodiesel Alliance

Principles and Baseline Practices for Sustainability

Sustainability is the ability to meet the needs of the present without compromising the ability of future generations' abilities to meet their own needs.ⁱ

"Sustainable biodiesel is biodiesel that is produced in a manner that, on a life-cycle basis, minimizes the generation of pollution, including greenhouse gases; reduces competition for, and use of, natural resources and energy; reduces waste generation; preserves habitat and ecosystems; maintains or improves soils; avoids use of genetically modified organisms; and provides community economic benefit that results in jobs and fair labor conditions."

Introduction

The Sustainable Biodiesel Alliance (SBA) is a 501(C)(3) non-profit organization dedicated to making the biodiesel industry a viable and long term solution to our dependence on petroleum. We believe that this can only be accomplished if done sustainably. There are several sustainability criteria development efforts currently underway globally for the biofuels sector. In its work to develop sustainability criteria and standards, the SBA is committed to working with other organizations to ensure wherever possible consistency of criteria and harmonization of indicators. However, the SBA is unique in that its criteria and standards development process is of and for biodiesel stakeholders - those actually farming, producing, distributing and using biodiesel.

As a result, in this first phase of developing baseline sustainability practices, we are providing an approach that emphasizes practical, achievable steps and market-driven assessment. Our desire is to develop practices that can be implemented immediately while research and technology continue to emerge and evolve. This approach recognizes short-term limitations of infrastructure and supply in achieving some sustainability goals, but embraces continuous improvement to ensure that criteria encourage initiative and movement ever closer to real sustainability.

As with our whole program, this document will evolve as data, policy, research and technology related to biodiesel sustainability become more readily available.

SBA Process

The following document lays out principles, which are intended to serve as the ultimate goals for all participants in the lifecycle of biodiesel fuel. The principles are followed by baseline practices. The baseline practices are intended to as "threshold," or initial practices that can be expected to contribute to sustainability. Over the next year, as the SBA gathers information from pilot programs and participating SBA members, more specific sustainability standards and indicators will be developed. These standards will ultimately serve as the criteria for a SBA Certification program. The SBA has sought to include representatives from all segments of the biodiesel industry, in an open and accessible forum, to discuss the definition and dynamics of sustainability as it applies to environmental, social and economic concerns. The SBA created four work groups representing the industry segments of biodiesel feedstock, production, distribution and commercial end users. The following document is the result of the workgroup development process.

SBA Principles Environmental

- 1. Greenhouse Gas Emissions:** Sustainable biodiesel results in net GHG emissions reductions compared to fossil fuels when analyzed via a life-cycle assessment. Fossil energy used in growing, transporting and processing biodiesel must be considered. Converting land from wilderness or grasslands to plant biodiesel feedstock crops also releases GHG and is not sustainable.
- 2. Energy Conservation:** Sustainable biodiesel production improves energy and resource conservation. Wasteful use of fossil fuels should not be replaced with wasteful use of biodiesel. Instead, significant reductions in total consumption, together with increased conservation, shall be a priority.
- 3. Soil:** Sustainable biodiesel does not degrade or damage soils and should contribute to long-term maintenance and improvement of soil quality.
- 4. Water:** Sustainable biodiesel production does not contaminate or imperil water resources, but contributes to improved water quality and efficient utilization.
- 5. Air:** Sustainable biodiesel production and use improves air quality and does not lead to increased air pollution as compared to fossil fuels.
- 6. Biodiversity Conservation:** Sustainable biodiesel production does not lead to the destruction, degradation or declassification of high conservation value areas; areas of high biodiversity; habitats of rare, threatened or endangered species; or rare, threatened or endangered ecosystems. Protected areas, including grasslands, wetlands, forests etc. should not be declassified or appropriated for biodiesel crop production. At the landscape level, sustainable biodiesel production systems contribute to the conservation and maintenance of native biological diversity.ⁱⁱ
- 7. Genetically Modified Organisms (GMOs):** Sustainable biodiesel is derived from non-GMO feedstock. However, if GMOs are used for the production of biodiesel, it shall be made transparent, so that producers and consumers can make informed decisions.
- 8. Agrochemicals:** Sustainable biodiesel crop production minimizes, and eliminates whenever possible, the use of dangerous agrochemicals. Agrochemicals that are hazardous to the environment, workers, and local communities will not be used. Chemicals used are non-persistent and chemicals that are endocrine disrupting, carcinogenic or mutagenic in humans should be phased out. Preference should be given to the selection of crops and cropping systems that are productive and sustainable without reliance on agrochemicals.
- 9. Next Generation Feedstock (Feedstock that is currently under development but not yet used commercially in the US such as algae):** Should be developed with the consideration of the aforementioned principles.

Social

- 1. Food Security:** Sustainable production of biodiesel does not jeopardize food security by displacing land or water used for growing critical food crops with biodiesel feedstock crops.
- 2. Local Communities:** Local communities are an integral part of the development of the sustainable biodiesel industry. Local strategies for biodiesel production with citizen input are created. Local consumption of sustainable biodiesel is prioritized and encouraged.
- 3. Communities and Workers:** Family and small, holder farmers are not to be

displaced to grow or harvest biodiesel feedstock. Farmers should receive fair compensation for the biodiesel feedstock they produce. The health and safety of workers and communities should be protected. In addition, fair / livable wages for agricultural workers and workers at biodiesel production facilities are ensured.

4. Local consumption: Local consumption is encouraged and prioritized.

Sustainable Biodiesel Feedstock

Sustainable Feedstock Categories

1. Soil Quality and Conservation
2. Water Resources Quality and Consumption
3. Ecosystem Protection - Biodiversity
4. Climate – Emissions & Sequestration Potential
5. Energy Use
6. Fair Wages & Working Conditions – Farmer, Farm Worker
7. Community Benefit – Localization
8. Waste & Rendered Oils
9. Next Generation Feedstock

I. Soil Quality and Conservation

A. Principle:

1. Sustainable Biodiesel contributes to long-term maintenance and enhancement of soil quality.

B. Background Assumptions:

1. The agricultural production of biodiesel feedstock crops can result in degradation and depletion of soil quality and quantity.

Degradation can include:

- Soil erosion, runoff and leaching
- Minimal soil infiltration and storage of rainfall
- Soil nutrient loss
- Soil structure loss
- Limited soil response to disease and insect pressure
- Limited microbial diversity

2. Healthy and productive soils help increase rainfall infiltration and storage in the soil and require fewer imported nutrients.

C. SBA Baseline Practices:

1. Sustainable biodiesel feedstock producers shall -
 - Control and minimize soil erosion by employing practices designed to prevent wind and water erosion.
 - Enhance soil organic matter levels, help reduce soil compaction, and promote carbon sequestration in soil (which helps counteract atmospheric change due to greenhouse gas emissions) by the following practices:

- Reduce tillage where possible
- Rotate crops
- Recycle organic residues and materials back to the soil to increase soil organic matter levels
- Plant cover crops when practical
- Identify significant aspects and impacts related to Soil Quality, develop improvement programs and monitor results.

II. Water Resources Quality and Consumption

A. Principle:

1. Sustainable biodiesel production must protect water quality and conserve water resources.

B. Background Assumptions:

1. Soil sediment is the major source of water-body impairment in streams and lakes.
2. Soil sediment contains phosphorus and pesticides.
3. Drainage tiles are a major factor in stream pollution by nitrate. Eventually nitrate travels to ocean estuaries such as the Gulf of Mexico causing accelerated phytoplankton growth. Anaerobic zones then form because of phytoplankton decay.
4. Root zone drainage is necessary in much of the root zone for growth of crops.

B. SBA Baseline Practices:

1. Sustainable biodiesel feedstock producers shall –
 - Prioritize selection of crops that do not need irrigation
 - Adopt water-conserving strategies such as mulching, soil moisture monitoring and irrigation management, based upon weather conditions, soil moisture, and plant need. Use best management practices and scouting to minimize nutrient use and loss, and to minimize pesticide use.
 - Use best management practices and scouting to minimize nutrient use and loss, and to minimize pesticide use.
 - Place buffer strips around waterways to help prevent migration of soil and farm chemicals into surface waters.
 - Implement water use planning to help track and monitor water usage and eliminate waste.
 - Identify significant aspects and impacts related to water resources, develop improvement programs and monitor results.

III. Ecosystem Protection and Biodiversity Potential

A. Principle:

1. Sustainable biodiesel production does not lead to the destruction,

degradation or declassification of high conservation value areas; areas of high biodiversity; habitats of rare, threatened or endangered species; or rare, threatened or endangered ecosystems. Protected areas, including forested areas, will not be declassified or appropriated for sustainable biodiesel crop production. At the landscape level, sustainable biodiesel production systems contribute to the conservation and maintenance of native biological diversity.

B. Background Assumptions:

1. Forests, grasslands and other habitats and ecosystems can be damaged by encroachment of biomass crops.
2. In some cases protected lands have been declassified or appropriated for biomass crop production.
3. Native ecosystems can be negatively impacted by biomass crop production.

C. SBA Baseline Practices:

1. Sustainable biodiesel feedstock producers shall -
 - Protect biological diversity and protect previously undeveloped habitats
 - Use native species when possible and farming systems in a way that does not deplete soil nutrients or reduce soil biodiversity
 - Avoid using genetically engineered crops unless proven safe by independent third party certification.
 - Ensure genetically engineered organisms are not released into the environment during processing
 - Use of GMO must be reported and documented
 - Identify significant aspects and impacts related to ecosystem protection, develop improvement programs and monitor results.

IV. Climate – Emissions and Sequestration Potential

A. Principle:

1. Sustainable biodiesel crop production and oil seed processing does not increase GHG emissions and should increase the sequestration potential of current land use when possible.

B. Background Assumptions:

1. The production of biodiesel feedstock can negatively impact the climate by damaging or eliminating valuable carbon sinks.
2. Excessive tillage and fertilizer/agrochemical applications can lead to increased emissions.
3. Seed oil extraction can produce air emissions.

C. SBA Baseline Practices:

1. Sustainable biodiesel feedstock producers shall -
 - Use marginal lands or existing croplands versus forests, grasslands or pristine ecosystems for biodiesel feedstock crops
 - Not displace critical food crops, rather should rotate with food crops when possible
 - Select crops and crop rotations based in part upon optimizing carbon sequestration value
 - Not displace critical food crops, rather should rotate with food crops when possible
 - Utilize the highest biodiesel blend practical or available in all diesel equipment
 - Utilize minimal tillage for feedstock production
 - Consider carbon mile distance to crush and market (see local definition)
 - Evaluate and select extraction technology for minimum air emission impact
 - Sample soils to determine appropriate levels of application of fertilizers and chemicals
 - Identify significant aspects and impacts related to emission sequestration, develop improvement programs and monitor results.

V. Energy Use

A. Principle:

1. Sustainable biodiesel production improves energy and resource conservation. Wasteful use of fossil fuels should not be replaced with wasteful use of biodiesel. Instead, significant reductions in total consumption, together with increased conservation, shall be a priority. The production of sustainable biodiesel should utilize alternative and renewable energy to improve energy and resource conservation.

B. Background Assumptions:

1. Production of biodiesel feedstock requires input of energy
2. Transportation of feedstock consumes energy
3. Seed oil extraction is energy intensive

C. SBA Baseline Practices:

1. Sustainable biodiesel feedstock producers shall-
 - Determine baseline energy usage and monitor efficiency with continuous improvement as a goal
 - Use biodiesel and renewable fuels (sustainable biofuels, wind, solar) when possible
 - Use the most energy efficient crush technology available. Evaluation of technology must include energy use and air emission profile.
 - Identify significant aspects and impacts related to energy use,

develop improvement programs and monitor results.

VI. Recycled and Rendered Fats, Oils and Grease

A. Principle:

1. Sustainable biodiesel is produced from sustainable feedstock.

B. Background Assumptions:

1. Waste and rendered oils and fats can be an ideal sustainable feedstock for biodiesel production because they are recycled or are waste products
2. It is estimated that biodiesel made from waste and rendered oils and fats is 4 times more energy efficient, and has lower lifecycle GHG emissions compared to virgin feedstock production. **NREL*
3. Biodiesel from waste grease reduces a source of sewer overflows in municipalities, thereby making the use of waste-grease derived biodiesel a solution to an environmental problem.
4. There are 3 separate commodity definitions of grease defined by the Department of Commerce: yellow, brown and white grease. These may each be used as a biodiesel feedstock depending on availability of technology but requires different pre-processing techniques.

C. SBA Baseline Practices:

1. Sustainable biodiesel feedstock producers shall-
 - Procure and handle waste and rendered oils within state and local regulations
 - Handle waste and rendered oils in a manner that avoids spills, minimizes nuisance odors and inhibits vermin infestation
 - Information regarding the operations of production and rendering systems shall be transparent.
 - Producers of rendered fats and oils must provide a safe and fair working environment for employees
 - Consider distance (carbon miles) from source in the sourcing decision
 - Ensure proper storage of oils and frequent pick up, In order to minimize the energy required for pre treatment. This can be accomplished by consolidating pick up points for waste vegetable oil.
 - Identify significant aspects and impacts related to recycled and rendered fats, oils and grease, develop improvement programs and monitor results.

VII. Fair Wages and Working Conditions

A. Principle:

1. Fair wages, non-discriminatory and safe working conditions are

provided for workers in sustainable biodiesel feedstock production.

B. Background Assumptions:

1. Unsafe, discriminatory and hostile working environments are not sustainable

C. SBA Baseline Practices:

1. Sustainable biodiesel feedstock producers shall-
 - Create and support a fair and safe work place
 - Follow the law regarding employment of minors and discrimination when hiring new employees and managing existing employees.
 - Set goals for workplace safety and establish rewards.
 - Implement all aspects of health and safety laws and regulations and continually look for ways to improve workplace safety.
 - Provide fair and livable wages to all employees based on job descriptions and location
 - Meet all applicable OSHA regulations regarding safety of workers
 - Support or be neutral to labor organizations.
 - Meet OHSAS 18001:2007

VIII. Community Benefit – Localization

A. Principle:

1. Local communities are an integral part of the development of the sustainable biodiesel industry. Local strategies for biodiesel production with citizen input are created. Local community benefit is prioritized, because the power of local businesses can transform communities for the better by working cooperatively toward a shared vision. **BALLEⁱⁱⁱ*

B. Background Assumptions:

1. Locally owned facilities are more than employers and profit-makers; they are neighbors, community builders and the starting point for social innovation. **BALLE*
2. Independent family farms can benefit from feedstock production.

C. SBA Baseline Practices:

1. Sustainable biodiesel feedstock producers shall-
 - Purchase feedstock primarily from local producers
 - Make local purchasing of other goods and services a priority

IX. Emerging Fuels and Technologies Next Generation Feedstock

A. Principle:

1. Research and development of sustainable, emerging fuels and technologies is critical for biodiesel industry growth. These technologies shall be developed with the consideration of the aforementioned principles.

B. Background Assumptions:

1. Feedstock that does not compete for food must be developed sustainably.
2. Genetically modified organisms and invasive species, when not adequately contained, can damage and destroy ecosystems.
3. The environmental and social ramifications of GMO use are still undetermined, as GMO use has yet to be proven safe by independent third party research.

C. SBA Baseline Practices:

1. Sustainable biodiesel feedstock producers shall-
 - Conform to all applicable feedstock principles and practices
 - Not use genetically modified or invasive species for emerging fuels feedstock unless proven safe by third party evaluation.
 - Implement control efforts to ensure containment of GMO and other invasive species.

Sustainable Biodiesel Production

Sustainable Biodiesel Production Categories

1. Air Emissions
2. Water
3. Waste Handling & Reduction
4. Plant Energy
5. Plant/Worker Safety
6. Sustainable Purchasing
7. Administrative
8. Social
9. Quality

I. Air Emissions

A. Principle:

1. Sustainable biodiesel production minimizes the release of pollutants into the air.

B. Background Assumptions:

1. Biodiesel production can result in the release of air contaminants. These contaminants can have negative impacts on environmental and public health.

Targeted air pollutants include:

- VOC's – volatile organic compounds – (methanol is a VOC)
 - Particulates
 - NOx
 - Sox
 - CO
 - GHG
 - Nuisance odors
2. Biodiesel plant emissions typically result from:
 - Fugitive methanol emissions
 - Process and auxiliary combustion driven equipment such as forklifts, generators boilers for process heat, plant space heating (not process), power take-off (PTO) equipment (unloading trucks), etc.
 3. Methanol releases may occur at the following points in a typical biodiesel production process, dependent on controls implemented:
 - From headspace when tanks are filled [methanol and glycerin storage tanks, mix and reactor tanks, glycerin or wash water transport (truck)]
 - From piping leaks – if present
 - From open exposures

B. SBA Baseline Practices:

1. Sustainable Biodiesel Producers shall-
 - Obtain an air permit from local/state/fed authority (specific requirements vary).
 - Determine the level of fugitive emissions if possible. (Methanol release is typically measured in pounds. "Density" or weight per gallon of pure methanol [6.63 lbs/US gallon (source: Methanex) Methanol purchased less methanol (pure) recovered = fugitive emissions + amount consumed in process]
 - Calculate potential to emit (typically through material balance calculations) when it is not possible to determine exact levels of fugitive emissions.
 - Disclose precautions that are taken to avoid fugitive emissions (typically required by law).
 - Control the release of Methanol vapors
Methanol vapor control strategies include:
 - Install Vapor Recovery Systems on all tanks, including transports
 - Install Methanol Recovery Systems on both esters and glycerin.
 - Contain and dispose waste methanol if no recovery equipment is available
 - Install Nitrogen Blanketing System on storage tanks, methoxide mixtank, and reactor
 - Establish "closed" production system – must have no open vents, ports, or man ways on storage or processing tanks

- Use dry disconnects on transfer hoses
- Identify significant aspects and impacts related to air emissions, develop improvement programs and monitor results.

II. Water Resources

A. Principle:

1. Sustainable biodiesel production does not contaminate and utilizes water resources efficiently.

B. Background Assumptions:

1. Biodiesel production can create effluent water during production
2. Effluent water criteria monitored by biodiesel facilities include:
 - FOG (Fats, Oils, Grease),
 - BOD (Biological Oxygen Demand),
 - TSS (Total Suspended Solids),
 - COD (chemical oxygen demand),
 - pH levels

C.SBA Baseline Practices:

1. Sustainable Biodiesel Producers shall-
 - Obtain all required local/state/federal water and wastewater permits.
 - Perform calculations and testing to identify the volume and constituents of proposed discharges.
 - Understand the controls, systems and regulations that need to be in place to accommodate both storm water events, and spill control.
 - Minimize or eliminate wastewater.
 - Discharge process water to municipal waste treatment facilities, treat and apply to land, send to commercial composting facilities, treat and re-use, evaporate on site, or handle in any other environmentally responsible manner.
 - Determine appropriate local conditions to maximize local benefit.
 - Identify significant aspects and impacts related to water resources, develop improvement programs and monitor results.

III. Waste Handling and Reduction

A. Principle:

1. Sustainable biodiesel production ideally does not create waste. Wastes that are created are recycled. If waste cannot be recycled then it is disposed of in an environmentally responsible manner.

B. Background Assumptions:

1. Biodiesel Production can generate significant wastes from a variety of sources including but not limited to:
 - Waste methanol
 - Packaging
 - Waste chemicals
 - Glycerin and contaminants
 - Tank bottoms
 - Absorbent
 - Filters, rags
 - Office waste and recyclables
 - Ash from boilers

C. SBA Baseline Practices:

1. Sustainable Biodiesel Producers shall-
 - Eliminate waste where possible
 - Inventory and analyze solid and liquid waste
 - Know where waste is going
 - Handle waste in an environmentally responsible manner
 - Measure methanol efficiency (see air emissions)
 - Eliminate off gassing from solid and liquid waste products
 - Establish measures for continued improvement
 - Identify significant aspects and impacts related to waste handling and reduction, develop improvement programs and monitor results.

IV. Plant Energy

A. Principle:

1. Sustainable biodiesel production utilizes renewable energy for improved energy and resource conservation and reduced greenhouse gas emissions. Wasteful use of fossil energy cannot be replaced with wasteful use of renewable energy. Instead, significant reductions in total consumption; together with increased conservation, is a priority.

B. Background Assumptions:

1. Plants use energy for processing activities and standard operating activities; activities include but are not limited to:
 - Process heat (heat feedstock storage tanks, reactor vessels, wash water and stored glycerol). Process heat sources may be a boiler, solar, or electric.
 - Electrical sources for process related and general operations (lighting, security lighting, running lab equipment, running processing equipment)
 - Transportation of feedstock consumes energy

SBA Baseline Practices:

1. Sustainable Biodiesel Producers shall-

- Audit energy use and establish a baseline for continued improvement
- Increase plant efficiency to reduce energy consumption
- Use biodiesel or renewable energy to fire boilers, generators and on-site equipment
- Use renewable energy sources on-site whenever possible (geothermal, renewable electricity, wastes and/or biodiesel, as well as purchasing renewable credits)
- Employ cogeneration (combined heat and power – hot exhaust gas used to provide heat from combustion to provide electric) using waste energy from a third party (co-locating to use waste steam, landfill gas) whenever possible
- Use passive solar, day lighting, and energy efficient bulbs
- Refer to LEED^{iv} standards for energy efficiency
- Monitor energy consumption (Kwh/gallon output, BTU/gallon output) and energy balance (energy input and output) actively.
- Identify significant aspects and impacts related to plant energy, develop improvement programs and monitor results.

V. Sustainable Sourcing

A. Principle:

1. Sustainable biodiesel plants support other industries that are locally owned and environmentally responsible. Sustainable biodiesel is produced from local feedstock.

B. Background Assumptions:

1. Biodiesel can have the greatest economic impact and the smallest environmental footprint by sourcing locally. This keeps more dollars in the local community and reduces carbon miles of materials and feedstock.

C. SBA Baseline Practices:

1. Sustainable Biodiesel Producers shall-
 - Operate efficient used equipment when possible
 - Use LEED^v certification as a guideline for construction
 - Consider carbon miles when sourcing materials (See local definition)
 - Use renewable chemicals such as bio-methanol or bio-ethanol when available
 - Use recycled methanol or ethanol from other industrial sources when available
 - Source materials as well as office supplies from local businesses. Local, then regional, then domestic.
 - Look to other groups for purchasing guidelines such as: www.bcorporation.net and www.epa.gov
 - Source feedstock from local sustainable providers when possible.

(See feedstock guidelines)

VI. Community Benefit

A. Principle:

1. Local communities are an integral part of the development of the sustainable biodiesel industry. The health and safety of workers and communities should be protected. In addition, fair / livable wages for agricultural workers and workers at biodiesel production facilities are ensured. Local community benefit must be prioritized, because the power of local businesses can transform communities for the better by working cooperatively toward a shared vision. **BALLE*

B. Background Assumptions:

1. Sustainable biodiesel production can be beneficial to local communities
2. Social benefit is often sacrificed for economies of scale

C. SBA Baseline Practices:

1. Sustainable Biodiesel Producers shall-
 - Integrate local communities into the development of the sustainable biodiesel industry.
 - Create local strategies for biodiesel production with citizen input
 - Ensure fair wages for workers at biodiesel production facilities
 - Communities and farmers producing biodiesel should have, to the greatest extent possible, ownership of biodiesel production and processing facilities.
 - Retain income generated from biodiesel production to the greatest extent possible, within local producing communities from the feedstock to processing
 - Prioritize local consumption over transporting or exporting biodiesel or biodiesel feedstock away from the communities and regions that produce them

VII. Plant/Worker Safety

A. Principle:

1. The health and safety of workers and communities, both present and future, are protected in sustainable biodiesel production.

B. Background Assumptions:

1. Worker safety can be affected by worker training, plant design and working conditions.

C. SBA Baseline Practices:

1. Sustainable Biodiesel Producers shall-
 - Implement documented Safety/Health Plan and Standard Operating Procedures
 - Use proper worker safety training (includes follow up training)
 - Conduct regular safety meetings this includes but is not limited to:
 - Standard hazardous material training (8 hr per employee including all staff who work onsite – office, janitorial, etc.)
 - Conduct frequent safety meetings, audits, and drills
 - Meet all applicable building codes
 - Meet all applicable Fire Codes (NFPA)
 - Store all methanol and caustic materials in high hazard areas (create finite hazardous area)
 - Keep equipment well maintained and in good working order
 - Provide clearly identified location and number of personal protective equipment, defibrillators, spill kits, first aid, wash-down/eyewash equipment etc.

VIII. Quality

A. Principle:

1. Sustainable biodiesel is produced to the highest quality standard and meets or exceeds ASTM D6751 (current version)

B. Background Assumptions:

1. Biodiesel is produced utilizing many different processes and many different feedstocks. If not carefully monitored, this can result in inconsistent quality. Without quality fuel, additional resources will be used to rectify problems and negatively effect sustainability.

C. SBA Baseline Practices:

1. Sustainable Biodiesel Producers shall-
 - Maintain a documented quality program. An example of a documented quality program is BQ9000. However, individual producers can implement their own comprehensive quality program.
 - Report delivered cloud point and meet customer requirements
 - Keep certificates of analysis on file for all fuel in inventory and all inventory sold in the past 12 months.
 - Take samples with a minimum 90-day retention time.
 - Follow handling guidelines described in NREL's^{vi} Biodiesel Handling and Use Guidelines
 - Verify cleanliness of transport tanks before filling
 - Educate end users on impacts of vehicle age on biodiesel performance.

Sustainable Biodiesel Distribution

Distribution Categories:

1. Quality
2. Emissions
3. Sourcing / Procurement

I. Quality

A. Principle:

1. Biodiesel is produced to the highest quality standard and meet or exceed ASTM D6751 (current revision).

B. Background Assumptions:

1. Biodiesel is produced utilizing many different processes and many different feedstock types. If not carefully monitored, this can result in inconsistent quality being distributed to end-users.
2. Biodiesel must be handled, blended and stored properly to prevent the degradation of quality.
3. Biodiesel must be produced to a reliable standard of quality, in order to ensure consumer confidence and continued industry growth.

C. SBA Baseline Practices:

1. Sustainable Biodiesel Distributors shall-
 - Purchase fuel that meets the federal standard ASTM D6751 or EN 14214
 - Follow handling and storage guidelines described in NREL's ^{vi}Biodiesel Handling and Use Guidelines
 - Keep samples and certificates of analysis for all fuel in inventory
 - Train employees to read and interpret certificates of analysis
 - Implement quality resolution program

II. Emissions

A. Principle:

1. The distribution of sustainable biodiesel reduces GHG emissions when compared to fossil diesel.

B. Background Assumptions:

1. Transportation of biodiesel over long distances can decrease the environmental benefits of biodiesel and increase emissions.
2. The use of biodiesel blends in diesel powered fuel transport equipment reduces GHG emissions

C. SBA Baseline Practices:

1. Sustainable Biodiesel Distributors shall -
 - Use the highest practical blend of sustainable biodiesel in diesel equipment and vehicles to reduce GHG emissions
 - Use SBA certified biodiesel when available, if SBA certified biodiesel is not available then use biodiesel produced from sustainable feedstock (see feedstock guidelines)
 - Maintain transportation equipment with all emission equipment properly functioning
 - Include language in contracts with common carrier transporters a requirement to use biodiesel blends
 - Identify significant aspects and impacts related to emissions, develop improvement programs and monitor results.

III. Sourcing/Procurement

A. Principle:

1. Locally produced sustainable biodiesel is sourced over biodiesel produced long distances from target market.

B. Background Assumptions:

1. Biodiesel produced and consumed locally has a greater positive social, environmental and economic impact than biodiesel transported over long distances.

C. SBA Baseline Practices:

1. Sustainable Biodiesel Distributors shall -
 - Consider carbon miles when purchasing and distributing biodiesel
 - Know supplier and quality
 - Source local SBA certified biodiesel when available
 - When SBA certified fuel is unavailable source locally produced biodiesel from local feedstock (see feedstock principles)
 - When SBA certified biodiesel is not available, source biodiesel produced locally from local feedstock, when locally produced biodiesel is not available source domestic biodiesel made from domestic feedstock, by a local producer.
 - Provide transparency of supplier / feedstock to the customer
 - Educate the end user about sustainability and community benefit.

Sustainable Biodiesel End User

End User Categories:

1. Quality
2. Sourcing/Availability
4. Biodiesel Blends

I. Quality

A. Principle:

1. Sustainable biodiesel is produced to the highest quality standard and meet ASTM D6751 (current revision) or EN-14214.

B. Background Assumptions:

1. Biodiesel is produced utilizing many different processes and many different types of feedstock. If not carefully monitored, this can result in inconsistent quality being distributed to end-users.
2. End Users must handle, blend and store biodiesel properly to prevent the degradation of quality.

C. SBA Baseline Practices:

1. Sustainable Biodiesel End Users shall-
 - Require producer to maintain a quality program and insure compliance through the procurement contract
 - Work with distributor and provide feedback on equipment performance
 - Keep certificates of analysis for all fuel in inventory
 - Train employees to read and interpret certificates of analysis
 - Follow handling and storage guidelines described in NREL's Biodiesel Handling and Use Guidelines
 - Sample each distribution point following diesel sampling procedures
 - Keep detailed maintenance records, and change service all equipment regularly.

II. Sourcing and Availability

A. Principle:

1. Sustainable biodiesel is sourced from certified SBA producers within the community.

B. Background Assumptions:

1. Not all biodiesel is created equal.
2. To encourage biodiesel producers to adopt sustainable practices there must be some incentive for doing so.
3. Community based, biodiesel production is more sustainable than fuel

sourced from outside the community.

C. SBA Baseline Practices:

1. Sustainable Biodiesel End Users shall-
 - Source sustainable biodiesel from SBA certified producers if available
 - Source ASTM D6751 biodiesel from local biodiesel producer using local feedstock if SBA certified product is not available.
 - Source ASTM D6751 non-food based feedstock biodiesel, if locally processed fuel is not available.
 - Consider carbon benefit of sourced biodiesel against locally sourced petroleum diesel if locally produced biodiesel is not available.

III. Biodiesel Blends

A. Principle:

1. End users run the highest blend of biodiesel practical with a goal of 100% sustainable biodiesel.

B. Background Assumptions:

1. The lower the blend the less sustainable the fuel.

C. SBA Baseline Practices:

1. Sustainable Biodiesel End Users shall-
 - Blend sustainable biodiesel at the highest concentration that will satisfy all operating requirements as determined by the individual or fleet operator
 - Use transportation fuels responsibly and efficiently

Glossary of terms

ASTM D6751 - The standard specification for biodiesel fuel blend stock (B100) is ASTM D6751. This specification is comprised of 15 tests. These tests define the required properties of biodiesel fuel at the time and place of delivery.

Biomass - organic matter, esp. plant matter, that can be converted to fuel and is therefore regarded as a potential energy source.

BQ9000 – A third party certification system that is awarded following a successful formal review and audit of the capacity and commitment of the applicant to produce or market biodiesel fuel that meets the ASTM D-6751 Specification for Biodiesel Fuel (B100) Blend Stock for Middle Distillate Fuels. The certification process is comprehensive and includes a detailed review of the applicant's Quality System documentation, followed by

a formal audit of the applicant's conformance to its System.

Carbon Miles - The total amount of carbon gas emissions (CO₂) produced per mile when considering a given fuel, and transportation means. The following chart is an example of carbon mile calculation, it illustrates the distances that can be travelled by a variety of vehicles using petroleum diesel or a biodiesel blend while emitting the same amount of CO₂.

Fuel transport truck – (petroleum diesel) 250 miles
(5% biodiesel blend) 260 miles
(20% biodiesel blend) 296 miles
(100% biodiesel) 1135 miles
Railcar (petroleum diesel) 450 miles
Barge (petroleum diesel) 650 miles

Cloud Point - The temperature at which a clear diesel fuel becomes hazy or cloudy due to the formation of wax crystals. As temperature drops, heavier fuels such as diesel and biodiesel begin to crystallize. The crystals appear to “cloud” the fuel. Clouded fuel can clog fuel filters and temporarily disable vehicle operation.

Consumer - One that acquires goods or services for direct use or ownership rather than for resale or use in production and manufacturing. Biodiesel retail purchase.

Extraction– The process of extracting oil from seed by mechanical or chemical methods.

Distributor – One that markets, sells and/or distributes biodiesel at the wholesale level. **EN-24214** is an international standard that describes the minimum requirements for biodiesel in Europe.

End User – Large-scale biodiesel consumers. Example: Fleet managers, municipalities and retail filling stations.

Environmentally responsible - Relating to or being concerned with the ecological impact of altering the environment and taking steps to use these concerns to avoid negatively impacting the environment. When possible takes steps to improve or protect the environment.

Feedstock – A **feedstock** is a substance used as a raw material in an industrial process. Examples of biodiesel feedstock are waste grease, animal fats, and virgin seed oil crops.

GHG - The gases present in the earth's atmosphere that reduce the loss of heat into space and therefore contribute to global temperatures through the greenhouse effect. Many natural and industrial processes produce greenhouse gases.
Land Use Change

LEED - Leadership in Energy and Environmental Design, LEED is a third party certification program and the nationally accepted benchmark for the design, construction and operation of high performance green buildings and structures.

Life Cycle Assessment - A systematic set of procedures for compiling and examining

the inputs and outputs of materials and energy and the associated environmental impacts directly attributable to the functioning of a product or service system throughout its life cycle.

Local –Local systems are an alternative to the global corporate models where producers and consumers are separated through a chain of processors/manufacturers, shippers and retailers. With increasing scale of industrial systems the control of quality is increasingly decided by the middlemen while a local system redevelops these relationships and encourages a return of quality control to the consumer and the producer respectively. These quality characteristics are not only in the product, but in the method of producing

Emerging fuels/Feedstock – Technologies or feedstock that is currently under development but not yet used commercially such as algae.

NFPA - The National Fire Protection Association is a nonprofit organization whose mission is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating scientifically based consensus codes and standards, research, training, and education.

NREL – The National Renewable Energy Laboratory (NREL), located in Golden, Colorado, as part of the U.S. Department of Energy, is the United States ' primary laboratory for renewable energy and energy efficiency research and development

Sustainable Biodiesel - Biodiesel that is produced in a manner that on a lifecycle basis, minimizes the generation of pollution, including greenhouse gases; reduces competition for, and use of, natural resources and energy; reduces waste generation; preserves habitat and ecosystems; maintains or improves soils; avoids use of genetically modified organisms; and provides community economic benefit that results in jobs and fair labor conditions.

ⁱ *US Environmental Protection Agency*

ⁱⁱ **More information on indirect land use change will be included as data becomes available.*

ⁱⁱⁱ *Bartz Ann, January/February 2007. Birth of a Biodiesel Co-op. In Business*

^{iv} *Horst Scot, November 2008. LEED 2009 for Existing Buildings: Operations & Maintenance. U.S. Green Building Council*

^v *Horst Scot, November 2008. LEED 2009 for New Construction and Major Renovations. U.S. Green Building Council.*

^{vi} *National Renewable Energy Laboratory, January 2009 4th Edition. Biodiesel Handling and Use Guide <http://www.nrel.gov/vehiclesandfuels/nrbf/pdfs/43672.pdf>*