



**DEFINING BIOMASS—  
A COMPARISON OF DEFINITIONS IN LEGISLATION**

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## **Defining Biomass— A Comparison Of Definitions In Legislation**

### **The Evolving Concept of Biomass**

The term “biomass” has been a part of legislation enacted by Congress for more than 30 years and has evolved over time, resulting in a variety of differing and sometimes conflicting definitions. These definitions are critical to the research, development, finance and application of biomass to produce energy.

A number of factors—rising fuel prices, environmental concerns, sustainability issues—led policymakers to adopt legislation that encourages biomass conversion into liquid fuels and electricity.

Generally speaking, biomass is organic matter that can be converted into energy. Common examples include:

- *Food crops*
- *Crops for energy*
- *Crop residues*
- *Wood, wood waste and byproducts*
- *Animal wastes.*

Over the past few years, the term biomass has grown to encompass algae, construction debris, municipal solid waste, yard waste and food waste. The term remains highly flexible and open to divergent interpretations.

The discussion of biomass definitions lately has centered around: i) the types of forestry products considered eligible biomass sources, ii) the lands where biomass removal can occur, specifically Federal and Indian lands, and iii) the kinds of wastes that qualify as biomass, specifically municipal solid waste (MSW) and construction and debris (C&D).

### **The Legislative History of Biomass**

The term biomass was first introduced by Congress in the Powerplant and Industrial Fuel Use Act of 1978, and first defined in the Energy Security Act of 1980.

Recent major legislation that addresses biomass:

- *The Food, Conservation, and Energy Act of 2008 (“2008 Farm Act”)*
- *The Energy Independence and Security Act of 2007 (EISA)*
- *The Energy Policy Act of 2005 (EPACT)*
- *The American Recovery and Reinvestment Act of 2009 (ARRA).*

The definitions of biomass differ from one statute or bill to the next, and even within each statute or bill, as some have multiple definitions.

Sixteen biomass definitions exist within recently enacted statutes, the Tax Code, and a Treasury Guidance on investment tax credit cash grants in lieu of the tax credits. The 2008 Farm Act and EISA definitions are typically regarded as the most comprehensive. The ARRA does not define biomass, but it does contain a crucial provision regarding the removal of biomass from Federal lands. An additional five definitions exist in pending energy bills.

These biomass definitions are built into provisions and programs that support research and development, encourage technology transfer, enable financing and reduce technology costs for landowners and businesses. Thus, the nature of the definitions influences the extent to which biomass can be researched, developed, financed and applied to produce energy.

## **Current Definitions of Biomass**

Note that some definitions have been shortened, but not altered in meaning, for the sake of succinctness.

### **EPACT (2005)**

Six distinct definitions in EPACT:

1. EPACT Title II, Sec. 203(b)(1): “The term ‘biomass’ means any lignin waste material that is segregated from other waste materials and is determined to be nonhazardous by the Administrator of the EPA and any solid, nonhazardous, cellulosic material that is derived from - (A)... forest-related resources... (B) solid wood waste materials... not including municipal solid waste (garbage), gas derived from the biodegradation of solid waste, or paper that is commonly recycled; (C) agriculture waste... (D) a plant that is grown exclusively as a fuel for the production of electricity.”

2. EPACT Title II, Sec. 206(a)(6)(B): “The term ‘biomass’ means any organic matter that is available on a renewable basis, including agricultural crops and trees, wood and wood wastes and residues, plants (including aquatic plants), grasses, residues, fibers, and animal wastes, municipal wastes, and other waste materials.”

3. EPACT Title II, Sec. 201(a)(1): “The term ‘biomass’ means nonmerchantable materials or precommercial thinnings that are byproducts of preventive treatments, such as trees, wood, brush, thinnings, chips, and slash, that are removed - (A) to reduce hazardous fuels; (B) to reduce or contain disease or insect infestation; or (C) to restore forest health.”

4. EPACT Title IX, Subtitle C, Sec. 932(a)(1): “The term ‘biomass’ means - (A) any organic material grown for the purpose of being converted to energy; (B) any organic byproduct of agriculture... that can be converted into energy; or (C) any waste material that can be converted to energy, is segregated from other waste materials, and is derived from - (i)...

forest-related resources... (ii) wood waste materials... But not including municipal solid waste, gas derived from the biodegradation of municipal solid waste, or paper that is commonly recycled.”

5. EPACT Title XIII, Subtitle A, Sec. 1307, Sec. 48B(c)(4): “The term ‘biomass’ means any - (i) agricultural or plant waste, (ii) byproduct of wood or paper mill operations, including lignin in spent pulping liquors, and (iii) other products of forestry maintenance... Exclusion - the term ‘biomass’ does not include paper which is commonly recycled.”

6. EPACT Title XV, Subtitle A, Sec. 1512 (r)(4)(B): “The term ‘renewable biomass’ is, as defined in Presidential Executive Order 13134... any organic matter that is available on a renewable or recurring basis (excluding old-growth timber) including dedicated energy crops and trees, agricultural food and feed crop residues, aquatic plants, animal wastes, wood and wood residues, paper and paper residues, and other vegetative waste materials. Old-growth timber means timber of a forest from the late successional stage of forest development.”

Summary:

These six EPACT definitions present different ideas of biomass. EPACT Title II, Sec. 206 (a)(6)(B) is more expansive and vague than EPACT Title II, Sec. 210 (a)(I), for example, which limits the definition of biomass to forestry biomass sources only. Biomass is a “waste material” of one kind or another in some definitions, such as EPACT Title II, Sec. 203(b)(I), but “any organic matter” in others, like EPACT Title II, Sec. 206(a)(6)(B).

EPACT makes no mention of whether biomass can be removed from Federal lands, as in the 2008 Farm Act and EISA.

Some definitions pointedly exclude certain materials, like recyclable paper and MSW (EPACT Title II, Sec. 203(b)(I)), while others make no mention of such materials (EPACT Title XV, Subtitle A, Sec 1512 (r)(4)(B)). EPACT seems to exclude MSW, and makes no mention of C&D.

## **EISA (2007)**

There are three definitions in EISA, two of which, while listed separately, are identical in wording and substance:

1. EISA Title II, Sec. 201(I)(I): “‘Renewable biomass’ means each of the following: (i) Planted crops and crop residue harvested from agricultural land... (ii) Planted trees and tree residue from actively managed tree plantations on non-Federal land... (iii) Animal waste and animal byproducts. (iv) Slash and pre-commercial thinnings that are from non-Federal forestlands... but not forests or forestlands that are ecological communities with a global or State ranking... (v) biomass obtained from the immediate vicinity of... areas... at risk of wildfire. (vi) Algae. (vii) Separated yard or food waste.

2 and 3. EISA Title XII, Sec. 1201 and EISA Title XII, Sec. 1203(e)(z)(4)(A): “The term ‘biomass’ - (i) means any organic material that is available on a renewable or recurring basis,

including - (I) agricultural crops; (II) trees grown for energy production; (III) wood waste and wood residues; (IV) plants (including aquatic plants and grasses); (V) residues; (VI) fibers; (VII) animal wastes and other waste materials; (VIII) fats, oils, and greases...; and (ii) does not include (I) paper that is commonly recycled; or (II) unsegregated solid waste.”

Summary:

These three EISA definitions create a wide-ranging articulation of what constitutes biomass.

The EISA Title II, Sec. 201(I)(I) definition prohibits biofuel feedstocks from Federal lands, and denies the use of Federal lands for biomass removal. The 2008 Farm Act and ARRA, in contrast, enable the use of Federal lands to remove biomass.

The EISA Title XII, Sec. 1201 and Sec. 1203(e)(z)(4)(a) definitions exclude commonly recycled paper and unsegregated solid waste as biomass.

The EISA Title XII, Sec. 1201 and Sec. 1203(e)(z)(4)(a) definitions, which emphasize “any organic material,” are much broader and apparently less restrictive than the Sec. 1201(I)(I) definition, which limits biomass to waste materials of one kind or another.

EISA excludes unsegregated solid waste, but makes no mention of MSW or C&D. EPACT, in contrast, pointedly excludes MSW as a form of biomass.

## **United States Tax Code (as of 2007)**

Four definitions:

1. Tax Code Title 26, Subtitle A, Chapter I, Subchapter A, Part IV, Subpart D, Sec. 45(c)(2):  
“The term ‘closed-loop biomass’ means any organic material from a plant which is planted exclusively for purposes of being used at a qualified facility to produce electricity.”

2. Tax Code Title 26, Subtitle A, Chapter I, Subchapter A, Part IV, Subpart D, Sec. 45(c)(3):  
“The term ‘open-loop biomass’ means - (i) any agricultural livestock waste nutrients, or (ii) any solid, nonhazardous, cellulosic waste material or any lignin material which is segregated from other waste materials and which is derived from - (I) any of the following forest-related resources: mill and harvesting residues, precommercial thinnings, slash, and brush, (II) solid wood waste materials... but not including municipal solid waste, gas derived from the biodegradation of solid waste, or paper which is commonly recycled, or (III) agriculture sources.”

3. Tax Code Title 26, Subtitle A, Chapter I, Subchapter A, Part IV, Subpart D, Sec. 45k(c)(3):  
“The term ‘biomass’ means any organic material other than - (A) oil and natural gas (or any product thereof), and (B) coal (including lignite) or any product thereof.”

4. Tax Code Title 26, Subtitle A, Chapter I, Subchapter A, Part IV, Subpart E, Sec. 48b(c)(4):  
“The term ‘biomass’ means any - (i) agricultural waste or plant waste, (ii) byproduct of wood or paper mill operations, including lignin in spent pulping liquors, and (iii) other products of

forestry maintenance. Exclusion: The term ‘biomass’ does not include paper which is commonly recycled.”

Summary:

The Tax Code definitions in Secs. 45(c)(2) and 45(c)(3) distinguish between closed- and open-loop biomass. This distinction is also made in the Treasury Guidance on ARRA Section 1603. The Tax Code definition in Sec. 45k(c)(3) appears to be the most expansive definition to date, chiefly by virtue of its brevity and vagueness.

The Tax Code definition in Sec. 48b(c)(4) is more restrictive than the definition in Sec. 45k(c)(3). Biomass is defined purely as “waste,” not as “any organic material,” as in Sec. 45k(c)(3).

### **The 2008 Farm Act**

One lengthy definition:

1. 2008 Farm Act Title IX, Sec. 9001(12): “‘Renewable biomass’ means - (A) materials, pre-commercial thinnings, or invasive species from National Forest System land and public lands... that (i) are byproducts of preventive treatments... (ii) would not otherwise be used for higher-value products... (iii) are harvested in accordance with... applicable law... (B) any organic matter that is available on a renewable basis or recurring basis from non-Federal lands or land belonging to an Indian or Indian tribe... including - (i) renewable plant material, including - (I) feed grains; (II) other agricultural commodities; (III) other plants and trees; (IV) algae; and (ii) waste material, including - (I) crop residue; (II) other vegetative waste material (including wood waste and wood residues); (III) animal waste and byproducts... and (IV) food waste and yard waste.”

Summary:

The 2008 Farm Act definition is detailed and fairly precise, compared with many others. It is the most comprehensive definition alongside the EISA definition.

The Farm Act definition allows biomass removal from Federal lands as a biofuel feedstock. Moreover, it allows the removal and development of woody biomass on Federal lands, which EISA prohibits and other definitions fail to address.

### **Treasury Guidance on Payments for Specified Energy Property in Lieu of Tax Credits under ARRA**

A single, two-part definition:

1. Guidance Part IV, Section I distinguishes between closed- and open-loop biomass. “Closed-loop biomass is any organic material from a plant that is planted exclusively for purposes of being used at a qualified facility to produce electricity,” whereas “open-loop biomass is any agriculture livestock waste nutrients or any solid, nonhazardous, cellulosic

waste material or any lignin material that is derived from qualified sources.” Those sources include “forest-related materials...solid wood waste materials... agriculture sources” but not “municipal solid waste, gas derived from the biodegradation of solid waste, or paper that is commonly recycled.”

Summary:

The Treasury Guidance definition, like the EPACT definition, excludes MSW as a form of biomass.

The Treasury Guidance definition distinguishes between closed- and open-loop biomass, which no other definitions, save those in the Tax Code, address.

The Treasury Guidance also contains no mention of biomass removal from Federal or Indian lands, unlike the 2008 Farm Act, EISA and the ARRA.

### **Provision in ARRA**

A single, short provision in ARRA:

1. Division A, Title VII, Department of Agriculture provides, “That up to \$50,000,000 of the total funding may be used to make wood-to-energy grants to promote increased utilization of biomass from Federal, State and private lands: Provided further, That funds provided for activities on State and private lands shall not be subject to matching or cost share requirements.”

Summary:

The Division A, Title VII provision explicitly allocates up to \$50,000,000 in funding to “promote increased utilization of biomass from Federal, State and private lands.”

While not a strict definition, the Division A, Title VII provision supports the 2008 Farm Act definition, which allows biomass removal from Federal lands, and contradicts the EISA definition, which prohibits the use of Federal lands.

### **Pending Definitions of Biomass**

As mentioned previously, much of the current debate around biomass definitions hinges on the types of forestry products and wastes considered biomass, and the lands available for the removal of so-called “woody biomass.”

Significant attention has been focused on the proposed biomass definitions in three pieces of pending energy legislation:

- *The American Clean Energy and Security Act of 2009 (ACES)*
- *The American Clean Energy Leadership Act of 2009 (ACEL)*
- *The Clean Energy Jobs and American Power Act of 2009 (CEJAP).*

## Definitions in ACES

Three definitions, two of which are identical:

1 and 2. ACES Title I, Subtitle A, Sec. 101 and Title VIII, Part E, Sec. 751 are an amalgamation of previous language, primarily from the 2008 Farm Act. The forestry part of the definition includes biomass from Federal lands, while excluding certain areas and systems (such as National Conservation Areas). The agricultural portion includes organic matter on a renewable basis, related waste materials, and animal, construction, food and yard waste. It also includes residues and wastes from wood, pulp and paper product facilities.

3. ACES Title I, Subtitle C, Sec. 126 is substantially identical to the previous definition, but includes “municipal solid waste and construction, demolition, and disaster debris.” This definition would replace the current EISA definition of renewable biomass.

Summary:

ACES, like the 2008 Farm Act and the ARRA, enables biomass removal from Federal and Indian lands. Advocates for the bill include groups that seek to use woody biomass from large tracts of Federal land as a source of renewable energy. Opponents are primarily environmental groups concerned about the environmental impact of such usage.

ACES would broaden the existing definitions of biomass significantly. Such an expansion arguably reduces accumulating health hazards and creates expanded feed stock availability for renewable power and fuels production.

## Definition in ACELA

One definition:

1. ACELA Title I, Subtitle C, Sec. 133 focuses on defining woody biomass, which it says includes nonhazardous organic materials such as trees, slash, brush, various residues and byproducts, wood and paper products that are not commonly recycled, and invasive species. Federal land requirements for the definition provide, among other considerations, that any harvest of materials from public lands be in accordance with applicable law and land management plans and result in quantities and through practices that ensure ecological sustainability. The definition also contains a standard agricultural component.

Summary:

The ACELA biomass definition is viewed by some as more precise than the definitions in the 2008 Farm Act and ACES. The definition seems narrower and more limiting in regards to the removal and use of woody biomass.

Nevertheless, the ACELA biomass definition still enables the use of Federal and Indian lands for the removal of woody biomass. Advocates for the bill include groups that seek to use woody biomass from large tracts of Federal land as a source of renewable energy.

Opponents are primarily environmental groups concerned about the environmental impact of such usage.

### **Definition in CEJAP**

A single definition:

1. CEJAP Title VII, Sec. 700 contains a definition of woody biomass identical to that in ACES. It also introduces an eligibility date (Jan. 1, 2009) for Federal financial and technical assistance, and any offset credits, if biomass of any kind was planted, harvested, collected, removed, managed or cultivated prior to the eligibility date. The definition also contains a standard agricultural component.

Summary:

Advocates for CEJAP include groups that seek to use woody biomass from large tracts of Federal land as a source of renewable energy.

Opponents are primarily environmental groups concerned about the environmental impact of such usage, as well as those groups that seek to use woody biomass materials prior to the eligibility date.

### **Concluding Thoughts**

Existing statutes do not offer a comprehensive definition. This is a glaring flaw in current biomass legislation. Legislation ought to consistently address MSW, C&D, biomass collections from Federal lands, distinctions between closed- and open-loop biomass, and whether biomass is merely various kinds of waste, or, more broadly, “any organic material.”

Congress does not seek to consolidate the various existing definitions in any pending legislation.

A single, universally applicable definition would streamline Federal regulations and remove any confusion regarding what materials may be used, where, and by whom. It would enable the financing of projects requiring biomass as feedstock.