



*“Linking Citizens of Louisiana with Opportunities for Success”*

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Southern University and A & M College System  
**AGRICULTURAL RESEARCH AND EXTENSION CENTER**

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***Report Submitted to: Louisiana House Committee on Agriculture, Forestry, Aquaculture,  
and Rural Development***

February 7, 2025

RE: Findings regarding sugar cane bagasse in Louisiana

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Louisiana Department of Agricultural and Forestry: Hon. Dr. Mike Foster

**EXECUTIVE SUMMARY:**

Louisiana has 55-60% of the sugar cane acreage in the US, generating annually about 5,000,000 tons (Table 1) of bagasse (a waste product from sugar cane), about 3 times more material than all beef cows in Louisiana would consume as hay in a year if it could be fed to cows. Currently, the primary use for bagasse is using approximately 30% of this product as fuel to produce electricity to power the sugar cane refineries (Testimony to the House Ag Committee by Commissioner Mike Strain). The “mountains” of bagasse waste accumulate outside some of these sugar refineries (lawyer/ lobbyist for the American Sugar Cane League) and because the product is so high in lignin (an insoluble plant fiber), the degradation process takes many years. The team working on this problem identified several potential uses detailed in this report.

1. Use modern, more efficient furnaces that produce less particulate matter to burn all bagasse on-site, selling excess electricity to the grid or a companion industry needing electrical power.
2. Use available chemicals to treat bagasse for use as a garden/horticultural mulch.
3. Pellet bagasse as a replacement for cottonseed hulls, a roughage source in beef and dairy cattle diets.
4. Treat/blend/pellet bagasse or bale to use as a hay substitute in beef cattle diets.
5. Use high-temperature pyrolysis to “burn” bagasse as a fuel source, generating substantial amounts of electricity and “graphene” as a salable co-product.



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### **NARRATIVE:**

Louisiana leads the nation in sugar cane acreage with approximately 510,000 of the total 928,000 ac in the US (55-60% of the total sugar cane acreage), and the acreage has increased from 700,000 ac in the 1980s. Bagasse is a high-fiber by-product that remains after juices are squeezed from sugar cane. A primary fiber in bagasse is "lignin," which is considered indigestible. Further, lignin fibers wrap themselves around other fibers (cellulose and hemicellulose) and render those fibers indigestible as well. Effectively, 60% of the bagasse is "indigestible," resulting in "mountains" of bagasse outside some refineries. These mountains are unsightly and become "homes" to numerous ground-dwelling varmints.

Current estimates are that about 30% of bagasse is burned as a fuel source at the sugar mills to generate power for sugar processing (Dr. Mike Strain). Many of these furnaces are old and inefficient, but this is of little concern since the amount of available bagasse far exceeds what is needed to fuel the furnaces.

*CONCLUSION 1. A simple remedy to the "bagasse mountains" issue is to simply burn all the bagasse as a fuel source at the sugar refineries. If excess electricity could be sold to the power grid, all bagasse could be used for power generation. These sugar mill refineries could replace old, inefficient furnaces with more modern, efficient, cleaner-burning furnaces that would help meet power needs in the State of Louisiana. However, current regulations do not allow this source of electricity to be sold to the grid.*

During our deliberations, we met with Dr. Brad Ives, LSU Energy Center. We would recommend the LSU Energy Center be commissioned to study the value of bagasse as an energy source when used in these modern furnaces. Based upon that value, the efficiency of bagasse for all other uses suggested in this report will be based. Burning bagasse on-site would completely solve issues of bagasse accumulation, but it is possible other ventures may be more economically advantageous. If not, we have still gotten rid of all the bagasse if allowed to burn for electricity.

*Other possible uses of bagasse:*

- 1. Use as a fuel in high-temperature pyrolysis*
- 2. Use as a horticultural mulch*
- 3. Use as a feed replacement for cottonseed hulls*
- 4. Use as a replacement for hay in beef cattle diets*

1. Use as a fuel in high-temperature pyrolysis.

Pyrolysis is a process of "burning" cellulosic materials in an oxygen-free atmosphere that yields electricity, water, CO<sub>2</sub>, and biochar. Generally, electricity can be generated for about \$0.03 per KWH. However, this is



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only of value if the operator can 1) sell the electricity to the grid or 2) have a partner company co-located that requires large amounts of electricity. Unique to pyrolysis is the "fast" pyrolysis that can be used in this process. Most companies use "slow" pyrolysis, which burns at 700 C, while "fast" pyrolysis burns at 1500 C. There are differences in electrical yield, but the primary difference is that slow pyrolysis yields about 5% graphene, while fast pyrolysis yields 99% graphene. Graphene is the strongest substance known, much stronger than steel, much lighter in weight than aluminum, and is an almost perfect conductor of electricity. As products start to use graphene, its value may (or may not) increase.

### 2. Use as a horticultural mulch.

Many horticultural mulches used in homes and gardens as well as for commercial landscaping, degrade fairly rapidly. The slow degrading of bagasse could make this a superior mulch product, plus its value can be enhanced by treating it with "Nutri-Mastic™" prior to application. Southern University has signed a Non-Disclosure Agreement (NDA) with Impact Fusion International, which manufactures Nutri-Mastic™ that requires confidentiality of their patented product. Southern has already begun research efforts using treated bagasse in a variety of horticultural crops with positive results.

### 3. Use in beef cattle diets.

- a. Cottonseed hulls replacement:
- b. Hay replacement

Using bagasse in beef cattle diets as a hay substitute could be beneficial in times of low hay inventories. However, competing on the open market with hay will be difficult given that bagasse would need chemical treatment and hauling to cattle locations and would be of lower quality than hay. There are a variety of chemical treatments of bagasse that can be attempted, including Nutri-Mastic™, anhydrous ammonia, and urea, as well as pelleting and adding corn, cottonseed meal, etc. to the pellet, forming a complete diet.

Replacing cottonseed hulls in cattle diets with treated bagasse likely has the highest potential value as cattle feed. Cottonseed hulls serve as a source of roughage, typically added at a rate of 15% in high-energy diets. Cottonseed hulls are a very expensive source of roughage, selling for around \$500 per ton. Pelleting bagasse and selling at a price below \$500 per ton may be a high value use of bagasse.



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Table 1. Sugar Cane Bagasse Production in Louisiana by Factory, 2018 – 2022.

<b>Factory</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
<b>St. Mary</b>	494,666	354,560	445,218	385,032	426,075
<b>Cajun</b>	333,882	327,466	424,586	432,822	418,168
<b>Lasuca</b>	411,623	391,073	499,645	503,808	524,885
<b>Alma</b>	505,771	476,652	627,154	562,976	591,755
<b>Enterprise</b>	775,565	638,304	709,424	561,052	624,868
<b>Raceland</b>	504,853	403,711	454,464	388,620	513,768
<b>Sterling</b>	464,275	347,313	512,726	459,148	430,780
<b>Cora, TX</b>	513,919	426,448	526,890	498,143	593,081
<b>Lafourche</b>	289,992	224,756	228,797	192,630	259,778
<b>Lula</b>	359,400	255,402	308,367	258,825	305,030
<b>Westfield</b>	392,484	304,315	304,521	302,143	375,383
<b>Total</b>	<b>5,046,430</b>	<b>4,150,000</b>	<b>5,041,792</b>	<b>4,545,199</b>	<b>5,063,571</b>

Final thoughts:

Faculty and cooperators are willing to continue efforts to find additional ways plus prove current areas of interest as listed to use bagasse since it is not clear if burning bagasse and selling the electricity to the grid can be approved.

We desire to continue efforts in the following areas:

1. Pellet bagasse, ship to have it evaluated for “fast” pyrolysis, and determine its feasibility for electricity generation and factoring in the value and use of graphene.
2. Continue studies using bagasse as a horticultural mulch for homes, gardens, and commercial ventures. Likely, this may be the venture that produces the best economic output, looking at how many bags of pine bark mulch are sold every year to homeowners.
3. Evaluate the potential of bagasse, pelleted, and mixed with other feed supplements for feeding livestock.