

AGENDA ITEM #XI.A.



BDO Zone Ratings

**Accelerating development of clean fuel production facilities in the U.S.:
Bioeconomy Development Opportunity Zone Ratings**

Jordan Solomon
President & CEO, Ecostrat
Chairman, BDO Zone Initiative





A **BDO Zone rating** is a standards-based assessment of biomass feedstock and infrastructure attributes of a region with respect to development potential of new biofuel, renewable chemical, biogas or bioproduct manufacturing plants.

The **BDO Zone Initiative** enables regions to leverage local biomass assets to attract new bio-based manufacturing plants-- and create jobs.



www.bdozone.org

BDO Zone Ratings Due Diligence

- BDO Zones undergo rigorous and extensive due diligence using a standardized framework of over 100 transparent and validated risk indicators.

The 3 Pillars of BDO Zone Designations

Feedstock surplus

Data indicating at least a 3x Biomass Availability Multiple of excess sustainable feedstock available to support typical intake of new biofuels, biochemical and biomaterial production plants.

Committed suppliers

Evidence supporting long-term commitment to supply both quantity and quality by local farmers, forestry companies, food waste generators, haulers and municipalities.

Sound infrastructure

The OZ must have suitable transportation, logistic, operating and supporting infrastructure to meet the requirements for new facility construction and operations.

- “A” and “AA” BDO Zone Ratings identify optimal zones for new biobased development.

Recognized, Credible, Transparent, Standards-based Ratings Framework



- BDO Zone Ratings are issued within the framework of the *US Standards for Biomass Supply Chain Risk*.
- 6 years development by US Department of Energy (USDOE)/ Idaho National Labs, Ecostrat, and a 65 member, \$60B capital market ratings review committee.
- >\$6MM funded by USDOE's Bioenergy Technologies Office (BETO).

Download at
www.ecostrat.com/standards



Barnwell County, SC BDO Zone 'A' Rating

- 'A' rated BDO Zone for woody biomass.
- Strong supply chain attributes; well-developed operating infrastructure for new plant development.
- Ratings upgrade to 600,000 bone dry tons Q3 2022
- Currently in discussion with major SAF company for \$1B plant development!

Bioeconomy Development Opportunity Zone Risk Rating Report | BDO ZONE Designation: Barnwell County, SC Date of Issue: Nov-16-2021

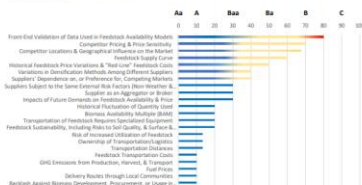
BDO ZONE Rating: A

Bioeconomy Development Opportunity Zone Risk Rating



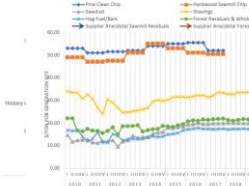
Assessing Development Opportunity Zone Risk Rating Report | BDO ZONE Designation: Barnwell County, SC Date of Issue: Nov-16-2021

Figure 1 - Risk Indicators (sorted by risk level)



Assessing Development Opportunity Zone Risk Rating Report | BDO ZONE Designation: Barnwell County, SC
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Figure 2 - Average Forest & Sawmill Residuals Pricing



With the low exception of Free Clear Chips, prices for all residual types increased in the first quarter of 2022 through the end of the available data (Q4 2021 or Q3 2022). Free to 2017, Free Clear Chips prices dropped in price by roughly 2%, from \$50 to \$48 per ton in generation one. During the same time period, non-Free Clear Chips prices rose 4% increase in price, from \$49 to \$50.30 per ton FOB generation one. Free Clear Chip Hardwood Chip prices were fairly consistent through the available data.

Average Sawmill prices have increased by 54%, from \$12.85/ton in 2010 to \$19.28/ton generation one in the first quarter of 2022. While Free Chips experienced a 26% ton average price during that time span, from \$19.30 to \$24.22/ton FOB generation one. The 26% overall increase observed in Sawmill residuals is the most significant. While this increase represents a fairly small percent increase, from \$13.20 to \$19.28/ton FOB generation one, it is significant in the context of the current market. Particularly from 2011 to 2021, Shreveport average prices spiked and fell regularly. They have been increasing fairly consistently.

Internal data from previous Forest residual studies conducted in the region confirm that Chip prices have increased in the short term. Variables in the region previously used (Clear 1) \$18/ton FOB generation one in August 2013, representing an 17% increase in price 4 months to today's price of \$19.28/ton generation one.

Assessing Development Opportunity Zone Risk Rating Report | BDO ZONE Designation: Barnwell County, SC Date of Issue: Nov-16-2021

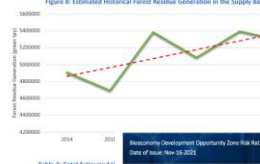


Figure 3: Estimated Historical Forest Residuals Generation in the Supply Base

Assessing Development Opportunity Zone Risk Rating Report | BDO ZONE Designation: Barnwell County, SC
Date of Issue: Nov-16-2021

Table 3: Total Estimated Residuals



The total risk rating for the BDO Zone is an average of all loaded R scores. The BDO Zone score for Barnwell, SC is 2.25 and is an 'A' designation. All scoring and rationale for each risk indicator is provided in Appendix 1.

Analyst Notes

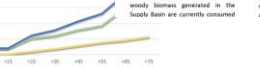
There is an abundance of woody biomass generated in the Supply Base. There is an abundance of woody biomass generated in the Supply Base. There is an abundance of woody biomass generated in the Supply Base.

Out of the 24 scenarios, one indicated current availability of Sawmill Residuals (though not provide quantities available) and one currently cannot all Residuals to existing markets (the remaining six do not respond to our inquiry). Our survey therefore suggests that approximately 10% of the 6.8 million gyle of Sawmill Residuals could be currently available to new buyers, assuming satisfactory volume is

We estimate that 3.4 million gyle of woody biomass generated in the Supply Base are currently consumed

Assessing Development Opportunity Zone Risk Rating Report | BDO ZONE Designation: Barnwell County, SC
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Figure 4: Competition within 150-mile Drive Distance



Impact Level: 10 Impact level is deemed high. Loaded R Score: Loaded R Score (Projected Volume + Impact Level) is 44.68 out of 100.

Assessing Development Opportunity Zone Risk Rating Report | BDO ZONE Designation: Barnwell County, SC Date of Issue: Nov-16-2021

Map 4: Competition within 150-mile Drive Distance



Figure 5: Competition within 150-mile Drive Distance

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Figure 6: Competition within 150-mile Drive Distance

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Figure 7: Competition within 150-mile Drive Distance

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Figure 8: Competition within 150-mile Drive Distance

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Figure 9: Competition within 150-mile Drive Distance

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Figure 10: Competition within 150-mile Drive Distance

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Figure 11: Competition within 150-mile Drive Distance

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Figure 12: Competition within 150-mile Drive Distance

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Figure 13: Competition within 150-mile Drive Distance

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Figure 14: Competition within 150-mile Drive Distance

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Figure 15: Competition within 150-mile Drive Distance

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Figure 16: Competition within 150-mile Drive Distance



- BD** | THE BIOECONOMY DEVELOPMENT
OZ | OPPORTUNITY ZONE INITIATIVE

Bioeconomy Development Opportunity Zone Risk Rating

'AA'

The Bon Wier, Texas Bioeconomy Development Opportunity Zone is rated 'AA'. Long-term outlook on feedstock quantity is deemed stable. Key supply chain risks are related to cyclic lumber markets and are likely addressable.



Transportation
CNC Center
Supplier's Design
To
Customer
Local, Provincial, & National level
Group

- Existing property and facility have excellent infrastructure including water.
- Bon Wier is adjacent to Highway 363 between Kirbyville and Bon Wier, 12 miles west of the site with access to Highway 96, and 7 miles from the intersection of Highway 96 and Highway 363.
- An incentive package has been provided by state and local jurisdictions.

Map 1: Satellite image of Bon Wier Sup



Population
Newton County has a population of median age and the Rural 12-county area has a population of approximately 386,000.

Education
Stephen F. Austin State University/Angelina College provides a university education, in the Bon Wier BDO Zone 7EN of the population has a high school diploma, which is 10% lower than the rate for the state of Texas.



Bioeconomy Development Opportunity Zone Risk Rating | BDO Zone Designation: Bon Wier, TX
Date of Issue: October 19, 2022
BDO Zone Rating: 'AA'

- 13.6 Mgt/yr of woody biomass assessed within the BDQ Zone.

- 13.6 Mgt/yr of woody biomass assessed within the BDO Zone.
- Strong growth: 5.3% of standing inventory harvested annually.
- Relatively low demand: Within the BDO Zone, total demand for fine pulpwood is ~ 5 Mgt/yr.
- Forestry labor market is healthy. No anticipated labor or skill shortages.

- Significant variation in mill residue. Mill-produced biomass

- Multiple suppliers subject to the same external risk factors: slow lumber markets can negatively impact sawmill residual and forest residue generation.

The Bon Wier, Texas Bioeconomy Development Opportunity Zone is listed below on a non-exclusive basis.

Risk Rating Grades are defined as follows: AA (very low), A (low), Ba (low-moderate), Bb (moderate), Bc (moderate-high), or C (high).

In assessing the biomass supply chain risk for the Bioeconomy Development

Opportunity (BDO) Zone in Bon Wier, Texas, 51 Risk Indicators from the U.S. Standards for Biomass Supply Chain Risk (BSCR) were applied. These BDO Zone Risk Indicators are the subset of BSCR Risk Indicators applicable to gauging feedstock risk within a BDO Zone.

Feedstock quantity is expressed

green tons per year (gt/yr). Feedstock cost is expressed in US dollars, at the site of generation. Maximum transport distance is based on a 75-mile drive distance supply zone.

The BDO Zone rating is based on an aggregation of the scores assigned to each BDO Zone Risk Indicator (RI) assessed in this report. First, each BDO

Zone Risk Indicator is given a Raw Risk score based on the research and analysis conducted on the feedstock supply chain in the region. Raw Risk

Scores are scaled between 1 (low risk) and 10 (high risk).

Next, each Risk Indicator is discounted or "notched", based on the degree to which the uncertainty drivers are

whether there is a reasonable expectation that mitigation measures could be put into place within the price

Notched Sallience score correspond to the likelihood of each Risk Indicator's described risk materializing

given the implementation of reasonable mitigation measures. To arrive at the Notched Saliency score, Raw RI scores are reduced based on

the efficacy of the likely mitigation measures. If applicable, notching occurs at one of 3 levels: 25%, 50%, or 75%.

Finally, the potential impact of each Risk Indicator on the supply chain is assessed and scored on a 10-point Impact Level scale, as either low,

(3.33), moderate (5.66), or high (9.99). Impact level scores are based on the assumption that key measures were implemented to mitigate uncertain-

The **Loaded RI** score for each Risk

Indicator is then calculated as the
product of Notched Saliency and

Raw RI Score is 7.0

¹⁸ EIA's Monthly Retail Gas Price Report
<http://www.eia.gov/dn>

Bon Wier, TX 'AA' BDO Zone Rating supports capital raise

Date of issue: October 2022



*Bon Wier, TX Rated AA for 2Mgt/y of
woody biomass*

The 'AA' BDO Zone Rating for Bon Wier, TX supports the siting decision and \$1B capital raise for USA BioEnergy's development of an advanced biorefinery.



"Citi and USA BioEnergy have worked closely together for more than two years to develop an efficient, achievable plan and we look forward to delivering on this vision."

David Livingstone, Managing Director, Citigroup, BDO Zone Press Release Oct 19 2022



"USA BioEnergy is committed to delivering over 100M gallons of sustainable aviation fuel into LAX annually. Airlines using our sustainable aviation fuel will eliminate over 50M metric tons of greenhouse gas emissions over a 20-year period."

Nick Andrews, CEO, USA BioEnergy, BDO Zone Press Release Oct 19 2022

BDO Ratings supercharge bio-based economic development:

BDO ZoneCONNECT connects BDO Zones with >1000 project developers and investors worldwide

'Bio-Business Development' Webinars

Viewed by >1000 bio-project developers and investors worldwide

Access to TheDigest's >5 million unique online bioeconomy sector readers, 140,000 streaming viewers bio-industry stakeholders and 45,000 daily newsletter subscriptions.

'Rapid Accelerator' Meetings

Private, hosted discussion groups

Private zoom meetings with 50-100 pre-qualified bio-project developers, investors and strategic partner companies actively looking to build new bio-based plants in BDO Zones.

[Click here to view BDO ZoneCONNECT for Barnwell County, SC](#)

DIGESTCONNECT

Tuesday April 5, 12-1PM ET

BDOZONECONNECT **SILOAM SPRINGS, ARKANSAS** **MELVILLE, SASKATCHEWAN**

- SUSTAINABLE SURPLUSES OF BIOMASS FEEDSTOCK, SUPPORTIVE OF BIOBASED DEVELOPMENT, INFRASTRUCTURE TO SUPPORT NEW MANUFACTURING
- PART OF OUR SERIES EXPLORING BIOECONOMY DEVELOPMENT OPPORTUNITY ZONES
- NETWORKING THROUGHOUT THE HOUR
- POST-PRESENTATION DISCUSSION



RON MCCULLOUGH
CITY ADMINISTRATOR
MELVILLE,
SASKATCHEWAN



PHILLIP PATTERSON
CITY ADMINISTRATOR
SILOAM SPRINGS,
ARKANSAS



JORDAN SOLOMON
CEO, ECOSTRAT,
CO-FOUNDER,
BDO ZONES

BDO Zone Investment Coalition

April 22, 2021: **\$1 Billion announced** for deployment into bio-based investment in BDO Zones



The BDO Zone Investment Coalition is a group of leading capital markets¹ with a collective **goal of investing \$1 billion in BDO Zones** to build new biofuel, renewable chemical, biogas manufacturing plants.

BSCR Risk Ratings Review Committee Members



See all BDO Zone Investment Coalition members: www.bdozone.org/us/support

See all 65 BSCR RC members: ecostrat.com/standards/participants

¹ Made up 16 members of the BSCR Review Committee

The BDO Zone Summit

BD | THE BIOECONOMY DEVELOPMENT
OZ | OPPORTUNITY ZONE INITIATIVE

PROGRAM AGENDA

1:00 OPENING REMARKS

How BDO Zones help communities leverage biomass assets to create jobs. Why BDO Zone Designations drive and unlock bio-investment and get new plants built faster.



Jordan Solomon
President & CEO
Ecostrat
Chairman of the BDO Zone Initiative



Mark Riedy
General Counsel & Co-Founder
Alternative Fuels & Chemicals
Coalition (AFCC)



Wes Jurey
CEO & Founder
Agricultural Technology Innovation
Partnership (ATIP) Foundation

1:10 COMMUNITY PANEL

Real communities speak about opportunities and barriers to attracting biobased investment and deal-flow. Grassroots support for BDO Zone Designations from local communities and EDAs. Moderated by Wes Jurey, ATIP Foundation.



Donna Gambrell
President & CEO
Appalachian Community
Capital



Sumesh Arora
Director of Energy &
Natural Resources Division
Mississippi Development Authority



Greg Norton
President
Golden State National
Resources Corporation



Mike McArthur
Executive Director
Community Renewable
Energy Association



John Lester
General Manager
Clarksville Connected
Utilities

1:40 CAPITAL MARKETS PANEL

Barriers to investing in rural and distressed communities. Why are BDO Zone designations meaningful for capital markets? How much capital is "investment ready" to stand up biobased plants across the country? Moderated by Jordan Solomon, Ecostrat.



Justin Goldstein
Vice President, Investment
Banking Division
Goldman Sachs



David Livingstone
Managing Director
Citigroup



Max Vernier
Head of Bioenergy
Live Oak Bank



Scott Chabina
CEO & Founder
Chabina Energy Partners

2:00 PROJECT PANEL

Why BDO Zone Designations help create efficiencies for project developers. Why they help projects succeed. How they make developers develop more biobased projects faster. Moderated by Mark Riedy, AFCC.



Nick Andrews
CEO & Founder
USA Bioenergy



Chris Whitworth
Project General Manager
Northwest Advanced Biofuels



Seth Ginther
Executive Director
US Industrial Pellet
Association



Patrick Serfass
Executive Director
American Biogas Council

2:20 USDA REMARKS



Dr. Karama Neal
Administrator, Rural Business-
Cooperative Service
USDA Rural Development

View the BDO Zone Summit here:

<https://bdozone.org/the-bdo-zone-summit-2021/>

In a nutshell, BDO Zone Ratings...

- ✓ **Pre-vet, and quantify** key regional biomass feedstock and infrastructure “success” characteristics.
- ✓ **Connect BDO Zones** with bio-based project developers and investors around the world
- ✓ **Link BDO Zones with \$1B** of private capital to get new plants built.
- ✓ **Drive new biobased manufacturing to rural communities– and create jobs!**





www.bdozone.org
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Want to know more?

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Jordan Solomon, Chairman BDO Zone Initiative, jordan.solomon@ecostrat.com