

THE ALMOND CONFERENCE

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THE ALMOND CONFERENCE

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YEARS

Getting More Value from Almond Co-Products

December 7, 2022

Moderators: Josette Lewis (ABC)

Speakers: Maddison Gurrola (Mattson Co)

Jordan Solomon (Ecostrat)

Bill Mattos (California Poultry Federation)

 **california
almonds**
Almond Board of California



Food Applications for Almond Hulls

The Almond Conference

12.07.22



Maddison Gurrola | Maddison@MattsonCo.com

mattsonco.com



Evaluate hull material

(nutritional, hedonic, functional, etc.)

Brainstorm potential applications

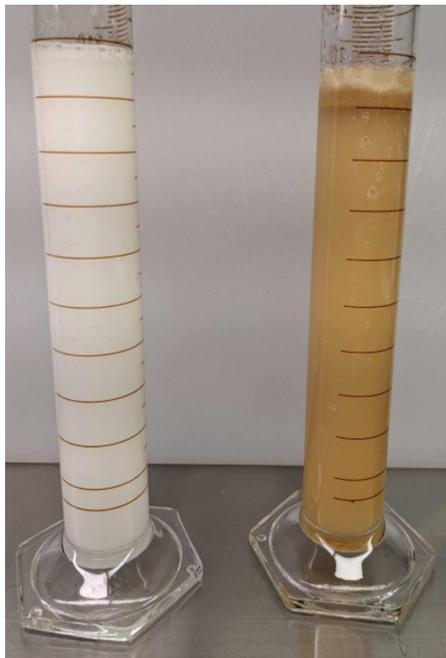
Assess relative volume potential; present 6

Narrow to 3, and create proofs-of-concept

Ingredient Evaluation & Learning

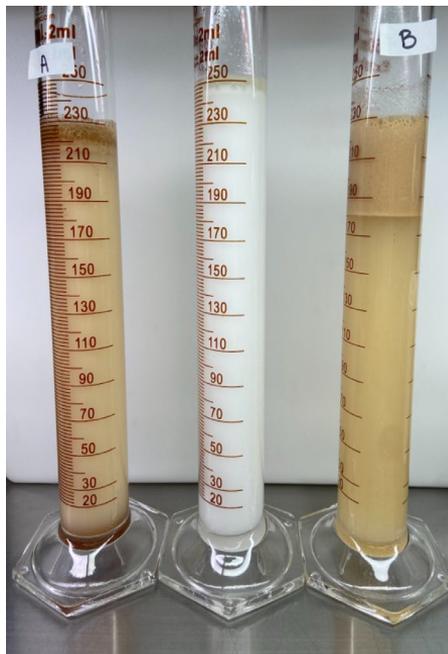
Initial Test	Summary & Learnings
Bulk Density	Powder B was about $\frac{2}{3}$ the density of powder A
pH	Both A & B are almost identical pH recording; in a 10% solution in deionized water they are acidic at ~ 4.85
Water Absorption	Powder B (4.85g H ₂ O/ 1g hull) absorbed 20% more water than A (3.19g H ₂ O/ 1g hull)
Nixtamalization Test	Alkali processing of whole hulls similar to traditional corn nixtamalization was explored with the goal of making the hulls softer by breaking down fibers. This process was ineffective, even with additional mechanical processing.
Emulsion Test	Both powders A&B were tested at 0.5% in a simple oil/water system. While both powders showed some emulsifying capacity, powder B appeared to create a more stable emulsion with minimal sedimentation, however compared to commonly used products like gum acacia, almond hull functionality is limited.
Heated Gel Test	Hot water was added to almond hull powder which produced less of gel texture, and more of a paste/puree.
Fry Test	Initial tests are promising for fried applications. Preliminary learnings show the flavor is improved through frying, mitigated bitterness & astringency notes. It also is visually acceptable at a low level, appearing similar to whole wheat applications.
Coffee Replacement	Replaced coffee ground solids with roasted almond hull powder A. Replacement yielded positive results and a good sensory experience with complex flavor.

Ingredient Evaluation & Learning



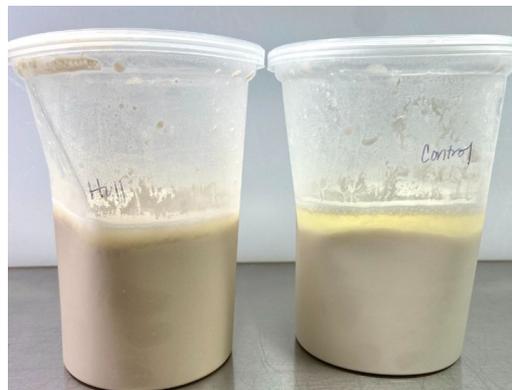
Gum Acacia Comparison

Left: Control | Right: Powder B



Emulsion Comparison

Left: Powder A | Center: Control |
Right: Powder B



Nut Milk Experiment Heated & Homogenized

Left: Hull 0.5% | Right: Control
Hull had lower rate of separation 20.4g liquid
compared to the control with 58.6g liquid



Nixtamalization Test

Top: Ground "jerky"
Bottom: Whole Hull



Water Absorption Test

Left: Powder A | Right: Powder B

Brainstorm Notes

As an emulsifier / oil binder

- Beverage applications like plant-based milks, powdered drink mix
- In salad dressings and/or dips; hummus
- In condiments, e.g., mayonnaise
- **In PB Creamers**
- In ice cream instead of citrus fiber (need to understand freezing behavior)
- **To prevent separation in nut butters and nut butter crackers/cookies**
- Instead of citrus fiber in other PB foods

As a thickening/bulking agent

- In puddings
- In fruit preps for filled bars, yogurts, etc. instead of pectin
- In sauces
- Increase overrun on ice cream/foaming
- **Replace milk solids in DF chocolate**
- Pulp replacer in juices
- **Powdered drink mixes**

For its high fiber content

- In granola/bran cereals
- **Breads and baked goods**
- As a functional beverage like Metamucil
- To reduce net carbs in chocolates, ice cream, other keto applications
- Better for you tortilla chip
- **Nutrition bar**

To reduce oil pick-up/reduce fat in fried foods

- Doughnuts
- Fried chips
- Breading for chicken nuggets, fish sticks, etc.

For the antioxidant/polyphenols

- To prevent rancidity in fried foods (leveraging polyphenols)
- To add antioxidant load to juices/ beverages
- Tannin additive for winemaking

As an egg replacer in baked goods - explore in baked goods application

As a cost reducing additive

- **Replace x% of flour in crackers, breads, cookies, etc.** (ALSO TEST IN ICE CREAM SANDWICH? Could also add fiber, flavor)
 - Especially ones using almond flour like Simple Mills
- **Replace y% of coffee**

As a flow agent

- Shredded cheese
- Dry drink mixes (hot chocolate, protein powders, Nesquik type products)
- Spices
- Instead of cornmeal in pizza ovens

As a binding agent

- Processed meats

For its inherent flavor and color (a bit bitter; fruity; brown)

- Baked goods
- **Hop replacement in beer/hop waters**
- Teas
- **Coffee, like roasted chicory - might be hard to execute**
- PB lattes (liquid emulsification)
- Beer
- NA whiskey
- Fermented vegetables like peppers
- Caramel
- As a tannin additive for wine (oak, chestnut bark used today)

For the sugar content

- Feedstock for yeast in precision fermentation
- To make kombucha
- Sugar extraction (sugar beet substitute)

To prevent sogginess in ice cream sandwiches, waffle cones, etc.

As a replacement for celery powder nitrates
As a base for plating flavors like maltodextrin
As a carrier for infused flavors, e.g., in tea bags
To extend shelf life, leveraging phytochemicals (like Apeel)
As a filtering medium for wine/spirits
As fuel for smoking food (almond hull barbecue?)

Prioritized Opportunities

Application	Example Category	One Share Point Equals*
To enhance the nutritional appeal (added fiber)...or to reduce costs...in baked goods .	Bread/Rolls Frozen Pizza Crackers Cookies	4.9M lbs 341K lbs 374 lbs 382K lbs
To add fiber to nutrition bars , inexpensively	"Intrinsic Health Value" Bars	288K lbs
As a bulking agent in ground coffee , replacing up to 10-20% of beans (OR, as a bean-free coffee alternative)	Ground coffee	270K- 680K lbs
As an additive to batters/doughs to reduce oil pickup/reduce fat in fried foods	Frozen Chicken Nuggets Frozen Fish Sticks Doughnuts	44-55K lbs 14K lbs 363K lbs
As an oil-binder in nut butters/nut butter sandwich crackers	Nut Butter Nut Butter Sandwiches	300K lbs 66K lbs
As a hop replacement/amendment in brewing beer and other beverages	Hops (total industry tonnage)	1.15M lbs

Bread (added Fiber)

Opportunity - Fiber addition, Baked Goods



Fiber Bread

5g fiber



KETO Craze

10g fiber



Gluten Free

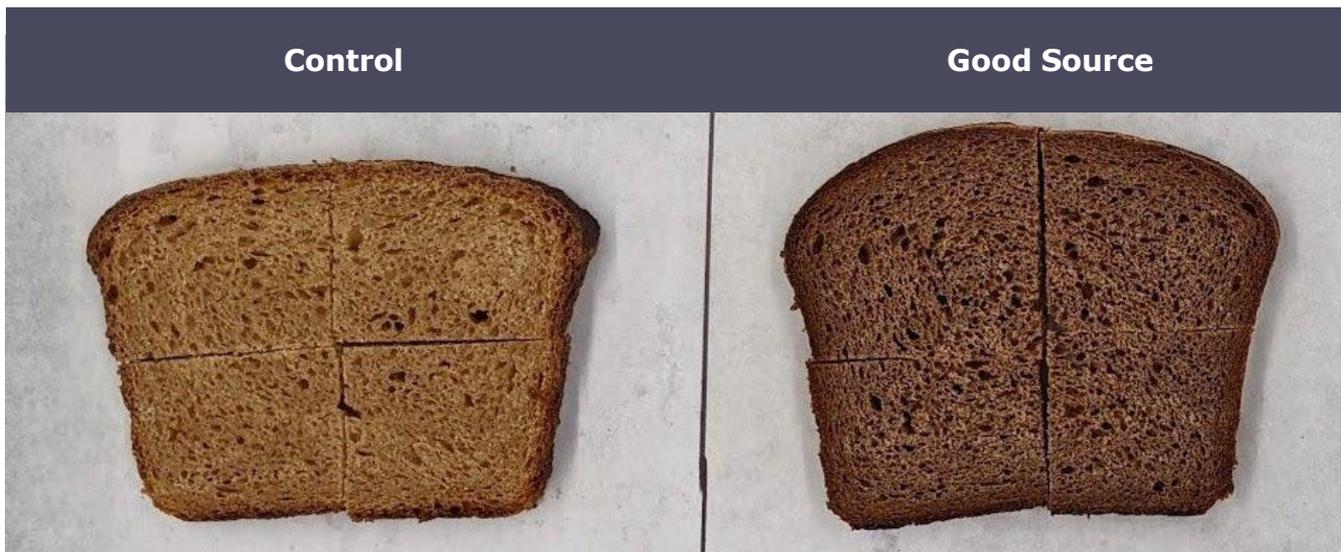
16g fiber

Baked Goods (Bread)

Approach

- Bread is the largest segment in baked goods
- Made a control with 4g fiber per 48g serving, used inulin (chicory root powder) for fiber content
- Incorporated almond hull powder:
 - Flour replacement hedonics: **5, 10, 20, and 30% almond hull replacement of total flour**
 - Nutritional claims: **Good Source** of Fiber = at least **2.8g/Serving** & **Excellent Source** of Fiber = at least **5.6g/Serving**

Baked Goods (Bread)



Flour Replacement Almond Hull %	Formula Percent Almond Hull %	Total Fiber (per 48g serving)	Fiber from Hulls	Sensory Notes	Key Points
NA (Control)	-	4.00g	-	Good sweetness, not too dry without being gummy, crumb has good chewiness	<ul style="list-style-type: none"> Developed to match fiber of an industrial whole wheat bread
10%	5.2%	3.10g	1.33g	Decreased fruit flavor compared to 090822A, improved crumb structure significantly, still grit present in the finish	<ul style="list-style-type: none"> Good Source of Fiber Only almond hulls, <i>no inulin required</i>

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Result

- **Darker color** more similar to pumpernickel/rye
- **fruity and acidic flavor**
- Almond hull powder **inhibit gluten development**, which is common in high fiber ingredients.
 - texture is less chewy and more gummy, may be positive for a **softer crumb**
- Some noted **gritty sandy texture** in the mouth; this can be optimized through processing refinement
- Hulls **may be better for things without a strong gluten network**; cookies, crackers, muffins, pancake mix

Nutrition Bars (added Fiber)

Opportunity: Nutrition Bar



Fiber Focus

8g fiber



Protein Focus

14g fiber



Keto Focus

9g fiber

- Coconut chocolate flavor complements the **fruity notes in the hulls**
- Used Clif Bar as inspiration → **high fiber** Clif Bar
- Matched Clif's fat and protein target ranges but added **5g of fiber from Almond Hulls**
 - Almond hulls were 15.25% of the total formula

Nutrition Bar

Nutrition Facts

servings per container
Serving size (68g)

Amount per serving
Calories 220

% Daily Value*

Total Fat 7g 9%

Saturated Fat 6g 30%

Trans Fat 0g

Cholesterol 0mg 0%

Sodium 55mg 2%

Total Carbohydrate 22g 8%

Dietary Fiber 11g 39%

Total Sugars 14g

Includes 9g Added Sugars 18%

Protein 11g

Increased fiber
by 5g

Almond Hull



Clif Bar

Chocolate Brownie



Nutrition Facts

Serv. size 1 bar (68g)

Calories 250
per serving

Amount/serving % DV

Total Fat 6g 7%

Sat. Fat 1.5g 8%

Trans Fat 0g

Polyunsat. Fat 1.5g

Monounsat. Fat 2g

Cholesterol 0mg 0%

Sodium 180mg 8%

Total Carb. 43g 16%

Dietary Fiber 5g 19%

Total Sugars 17g

Incl. 16g Added Sugars 31%

Protein 10g 19%

Approach

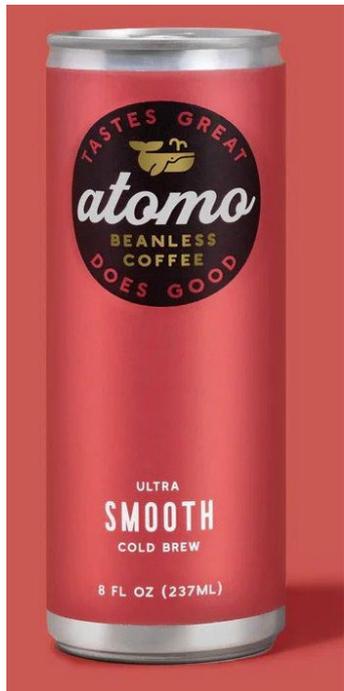
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Result

- Delivers meaningful fiber content
- **Brown color of the almond hulls is** similar to other grain ingredients commonly used in bars
- While the hulls currently have some **gritty texture**, the end result is still acceptable. This can also be optimized.
- Almond hulls **flavor profile provides a pleasant, fruity quality**

Coffee Extender & Alternative

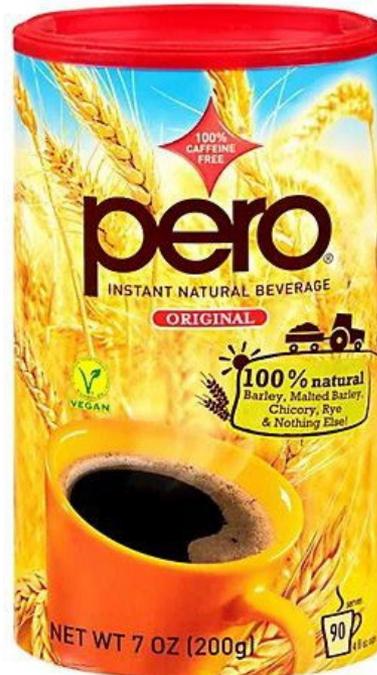
Opportunity Coffee, Extender & Replacement



Atomo is a beanless coffee that does great things for the planet.



A unique and beautiful blend of instant coffee beans and chicory.



This coffee substitute is blended from malted barley, barley, chicory and rye.



Orzo Pupo gives you the best selected Italian barley varieties, roasted and then solubilized

- Used **Peet's pre-ground coffee as a control** for the experiment ([light](#), [medium](#), and [dark](#) roasts)
- **Roasted almond hulls to the 3 different intensities**
- Incorporated roasted hulls at **10% replacement and 20% replacement** (plus control)
- Coordinated **internal blind tasting of three variables** (control, 10%, 20%) asked preference

Coffee Extender



Approach

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- **Roasted almond hulls to the 3 different intensities**
- Incorporated roasted hulls at **10% replacement and 20% replacement** (plus control)
- Coordinated **internal blind tasting of three variables** (control, 10%, 20%) asked preference

Result

- Roasting the hulls is an **easy process and provides a kill step** for the hulls
- Most evaluators noted a **more complex and increased overall flavor** → more enjoyable experience and improved perception of quality
- **Hulls reduced bitterness**
- 20% level of almond hull **increased astringency** - preference of this was divided

Coffee Alternative

- Used whole hulls in this application → **no interim milling step required**
- Hulls had the **same preparation as roasting green coffee beans**
- Modified roasting to avoid smoking; lower roast temperature for longer time
- Roasted hulls were then ground with no issues
 - Burr grinder was not able to process the whole hulls (they got stuck); a partially ground hull may allow this process to work with burr grinder

Approach

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Result

- Resulting almond hull beverage was **surprisingly pleasant**, hybrid between coffee and tea
- Visually similar to coffee (dark brown liquid)
- Pleasant aroma, however different from coffee; more of a roasted & fruity (some noted raisin, dried fruit) profile
- Flavor was more fruity, acidic up front and finished bitter.
- We believe the roast profile/body can be modified with different roasting times & temp., similar to coffee
- Pending analysis, **may provide significant antioxidant benefit**

Thank you.



 **MATTSON**
WE MAKE FOOD HAPPEN



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BDO Zone Ratings

**Accelerating almond biomass-based manufacturing
and clean energy economic development in CA**

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



- “A” and “AA” BDO Zone Ratings identify optimal zones in each state 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



Bioeconomy Development Opportunity Zone Risk Rating Report | BDO ZONE Designation: Barnwell County, SC
Date of Issue: 08-26-2021

BDO ZONE Rating: A

Figure 1 - Risk Indicators (sorted by risk level)



Bioeconomy Development Opportunity Zone Risk Rating Report | BDO ZONE Designation: Barnwell County, SC
Date of Issue: 08-26-2021

BDO ZONE Rating: A



With the lone exception of Clear Chip Chips, prices for all residual types increased their first quarter of 2020 through the end of the available data (Q3 2021 or Q2 2022). Four to 2017. Fire Clean Chip prices dropped in price by roughly 2%, from \$51 to \$52 per ton in generation site. During the same time period, hardwood Sawmill Chip prices rose 3% increase in price, from \$49 to \$50.50 per ton FOB Generation site. Fire Clean Chip Hardwood Chip prices were fairly consistent through the available data.

Average Sawmill prices have increased by 60%, from \$2,85,250,000 to \$51,200,000 generation site in the first quarter of 2021. While, Fire Clean experienced a 20% low average price during that time span, from \$19.38 to \$24.20/ton FOB generation site. The 20% overall increase observed in Sawmill is an interesting finding. While we have experienced a fairly small price increase, from \$32.28 to \$34.50/ton FOB generation site. Shavings prices were the most stable of the available data. Particularly from 2011 to Shavings average prices peaked and fell regularly. They have been increasing fairly consistent since then.

Historical data from previous studies conducted in the region previously confirm that Clear prices have increased in the short term. Vendors in the region previously cited that prices in 2010/ton FOB generation site in August 2010, representing an 17% increase in price to markets to today's price of \$30/ton FOB generation site.

Bioeconomy Development Opportunity Zone Risk Rating Report | BDO ZONE Designation: Barnwell County, SC
Date of Issue: 08-26-2021

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

BDO ZONE Rating: A

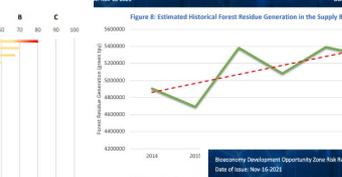
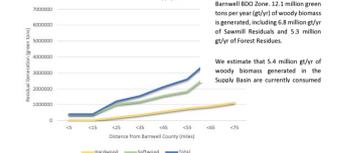


Figure 6. Estimated Historical Forest Residuals Generation in the Supply Base

scored at 2.25 and Impact Level is deemed Low (i.e., 3.33). The final Loaded BDO score for this risk indicator is 2.25 x 3.33 = 7.49 (out of 100).
Loaded BDO scores of 39.39 or less are deemed low risk; scores greater than 39.39 and less than 66.66 are deemed moderate risk; and those that score 66.66 to 100 are deemed high risk.

The forestry industry in the Barnwell BDO Zone is strong and has a long history of production and performance. In fact, forestry is the largest industry in South Carolina from the employment perspective. Therefore, the forestry labor market is healthy, and we do not anticipate labor or skill shortages.
The woody biomass supply chain is characterized by a large number of potential suppliers. There are 24 sawmills, and 40 loggers/harvesters operating in the Supply Base. This is a relatively large number of individual generators of woody biomass compared to other regions, providing for supply chain robustness.

Of the 24 sawmills, one indicated current availability of Sawmill Residuals (though did not provide quantities available) and one currently cannot all Residuals. Our survey findings suggest that approximately 50% of the 48 million gV of Sawmill Residuals could be currently accessible to new buyers, assuming satisfactory pricing is



Impact Level: B Impact Level is deemed High.

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

BDO ZONE Rating: A

Map 4: Competitors within 150-mile Drive Distance



The average current (Q3 2021) pricing of Sawmill Residuals in the Supply Base is \$20/gv FOB generation site. Average Bark pricing is \$19.22/gv; Sawmill - \$21.02/gv; Shavings - \$56.44/gv; and Chip - \$15.25/gv. The average pricing of Forest Residuals is \$24.21/gv FOB generation site.

Historical pricing trends vary depending on biomass type. Chip and Shavings pricing remained relatively consistent over the past decade despite year-to-year variations. Bark prices increased slightly over the same year-to-year variation of \$15.56/gv in 2021 to \$18.56/gv in 2020. Sawmill average pricing increased significantly, from \$12.61/gv in 2020 to \$20.02/gv in 2021. Fire Clean Chip prices in 2021 to \$18.56/gv in 2020. Sawmill average pricing has been increasing steadily over the last decade, from \$16.40/gv in 2011 to \$23.56/gv in 2021. Pricing increases of bark, Sawmill and Forest Residuals all have value fluctuations, but are partially explained by higher demand from the pellet industry, which experienced significant growth in the last decade.

Year-to-year variations in Sawmill Residuals generation is significant. To estimate Sawmill Residuals generation, we used rounded production as proxy. Between 2011 and 2021, rounded production increased by 33%, while over the following two years, it increased by 6%. However, it is important to note that the variation in rounded production is mainly due to changes in hardwood rounded production. Softwood rounded production tends to be stable, with the exception of the 2019/2020 period. The majority of competitor consumption is in the form of pellets, from 0.75 to 1.80 million gV per site. Excess generation in the first 70 miles is estimated at 2,187,402 gV, with total excess across the competition zone at an estimated 2,184,021 gV. By sourcing from within 70 miles of a facility located in Barnwell County, a potential facility could mitigate much of the risk associated with its location, as the risk is reduced by 25% (matched baseline is 4.5).

High Risk Indicators
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Impact Level: B Impact Level is deemed High.

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

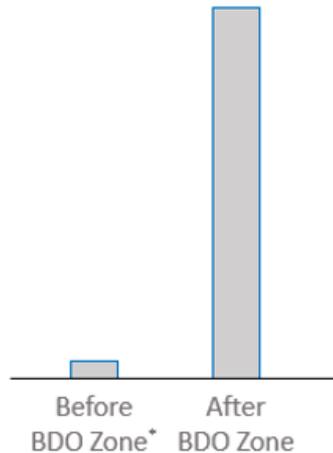


"USA BioEnergy is committed to delivering over 100M gallons of sustainable aviation fuel into LAX annually. Airlines using our sustainable aviation fuel will eliminate over 50M metric tons of greenhouse gas emissions over a 20-year period."

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

Impact of BDO Zone Rating: 10X increase in bioproject dealflow for City of Melville

Potential Bio-development
Opportunities in Melville



In the **11-month** period after issue of the BDO Zone designation, the City of Melville generated a **1000% increase in inquiries and discussions related to wheat straw utilization (versus the past 12 months)** by bio-based project developers, investors, other EDAs, research colleges and municipalities.

Melville's View

- Increased ability to reject investments that don't match up with their sustainability pillars – in part due to **increased deal flow**
- Looking at **growth and potential partnerships** in a way they couldn't previously; business economic development conversations were very limited prior to designation

Goals of Potential Projects

- 1 or more biobased manufacturing plant
- \$250M investment target
- 110 direct jobs
- 150 to 200 indirect jobs
- Long-term tax incentives partnerships possible

"I haven't seen this kind of activity in the seven years I've been here."

Chris Bruce, Director of Community Services, City of Melville

* In year prior to BDO Zone designation

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- August 17, 2021

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/>

BDO Ratings supercharge bio-based economic development: BDO ZoneCONNECT connects BDO Zones with hundreds of 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 Barnwell County, SC BDO ZoneCONNECT <<

Tuesday June 21, 12-1PM ET

BDOZONECONNECT BARNWELL COUNTY, SC

- 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



Kay Maxwell
VP, Marketing
Southern Carolina
Alliance



John Fleming
Director of
Development
Southern Carolina
Alliance



Jordan Solomon,
CEO, Ecostrat,
Co-Founder,
BDO Zones

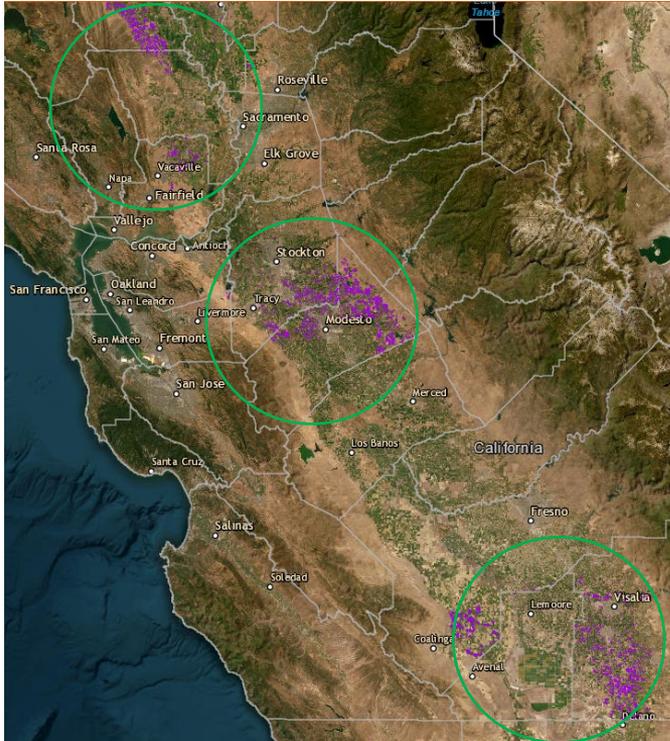
In a nutshell, BDO Zone Ratings are powerful economic development tools that...



- ✓ **Pre-vet, quantify and signal** 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 regions that are able to support it-- and create new markets for biomass producers.**

BDO Zones can help drive new almond biomass-based market development in CA

2-3 potential BDO Zones in CA for almond shells, tree prunings and husk



- **Markets for almond shells and tree prunings have decreased** in CA: biomass-to-electricity plants closed due to competition from lower cost solar and wind generated power. Burning increased since 2012.
- **Almond biomass presents ideal technical specs** for many biofuel, renewable chemical and RNG applications: low MC, LCFS qualifying.
- **Feedstock cost is currently lower** than in US Southeast (dry basis).
- **30,000 direct and indirect jobs** in the Central Valley from cellulosic ethanol production alone would -- *not including SAF and renewable chemical opportunities.*
- **Significant revenue capture benefits for almond growers:** biofuel and renewable chemical producers are able to pay more for biomass feedstock than former wood-to-electricity producers.



Want to know more?

Contact:

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



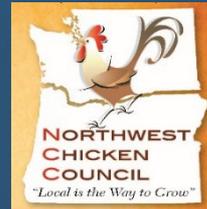
DOING MORE BUSINESS TOGETHER

POULTRY & ALMONDS

50TH ALMOND CONFERENCE

SACRAMENTO, CALIFORNIA

WEDNESDAY, DECEMBER 7, 2022



BILL MATTOS, PRESIDENT

GROWER MEMBERS



FOSTER FARMS



GEMPERLE FAMILY FARMS



GRIMAUD FARMS



J.S. WEST AND COMPANIES



PITMAN FAMILY FARMS



PETALUMA POULTRY



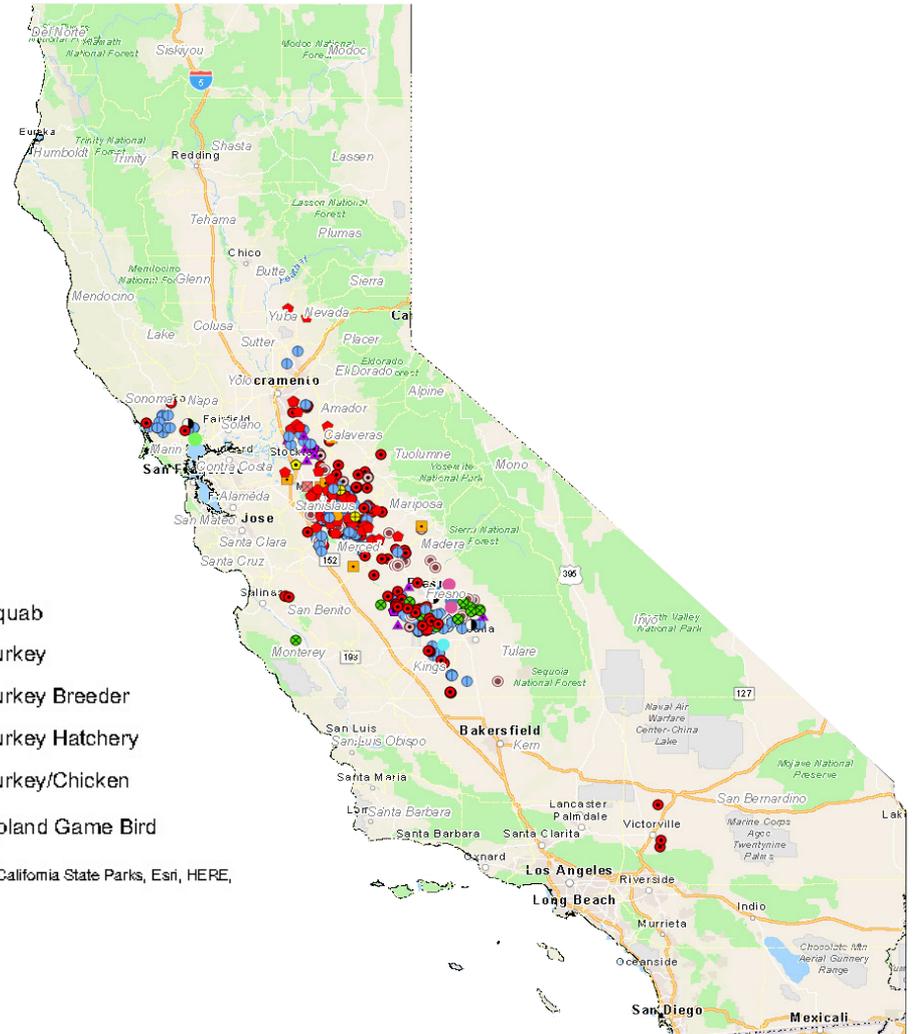
SQUAB PRODUCERS OF CALIFORNIA



CALIFORNIA RANCH FACILITIES

- | | | | |
|--------------------|--------------------------|-----------|--------------------|
| CPF Facilities | ▲ Duck | ⊕ Layer | ★ Squab |
| ⊗ Breeder | ⬢ Duck Hatchery, Breeder | ⦿ Mill | ● Turkey |
| ⦿ Broiler | ⬢ Duck Processing | ● Pasture | ⦿ Turkey Breeder |
| ⦿ Broiler, Breeder | ● Feed Mill | ● Plant | ▲ Turkey Hatchery |
| ● Brood | ⊗ Guinea Fowl | ■ Pullet | ▲ Turkey/Chicken |
| ● Brown | ○ Hatchery | ⬢ Shop | ◆ Upland Game Bird |

Esri, USGS | California State Parks, Esri, HERE,



THE CHICKEN INDUSTRY CREATES JOBS IN CALIFORNIA

ECONOMIC IMPACT OF THE CHICKEN INDUSTRY IN CALIFORNIA

	Direct	Supplier	Induced	Total
Jobs (FTE)	17,910	56,719	30,048	104,677
Wages	\$1,078,918,000	\$4,300,884,300	\$2,170,096,000	\$7,549,898,300
Economic Impact	\$7,865,130,700	\$13,707,708,200	\$7,099,396,400	\$28,672,235,300



THE CHICKEN INDUSTRY IS AN INTEGRAL PART OF THE ECONOMY IN CALIFORNIA

- ❖ Companies that produce and process chicken in California employ as many as 17,910 people across the state and generate an additional 86,767 jobs in supplier and ancillary industries. These include jobs in companies supplying goods and services to the industry.
- ❖ These are good jobs paying an average of \$72,100 in wages and benefits. And in today's economy, every job is important. In fact, in California the unemployment rate has reached 4.1 percent. This means that there are 790,900 people trying to find jobs across the state.

EGG PRODUCERS CREATE JOBS IN CALIFORNIA

ECONOMIC IMPACT OF THE EGG INDUSTRY IN CALIFORNIA

	Direct	Supplier	Induced	Total
Jobs (FTE)	1,251	5,301	2,592	9,144
Wages	\$81,689,500	\$419,602,400	\$218,354,900	\$719,646,800
Economic Impact	\$776,098,100	\$1,444,676,500	\$622,951,800	\$2,843,726,400

THE EGG INDUSTRY IS AN INTEGRAL PART OF THE ECONOMY IN CALIFORNIA

- ❖ Egg producers in California employ as many as 1,251 people across the state and generate an additional 7,893 jobs in supplier and ancillary industries. These include jobs in companies supplying goods and services to the industry.
- ❖ These are good jobs paying an average of \$78,700 in wages and benefits. And in today's economy, every job is important. In fact, in California the unemployment rate has reached 4.1 percent. This means that there are 790,900 people trying to find jobs across the state.



POULTRY IMPACT INFORMATION

OREGON



RELATIVE TO GROWER VOLUME IN THE PNW FOR FOSTER FARMS & DRAPER VALLEY FARMS, THE FOLLOWING STATISTICS APPLY:

- ❑ Number of Growers – 26
- ❑ Number of Chicken Houses – 151
- ❑ Total Square feet – 3,172,814
- ❑ Annualized Birds Placed – 25,260,800

COUNTIES IN WHICH WE GROW BIRDS IN OREGON:

Yamhill | Clackamas | Polk | Marion | Lane | Linn



NUMBER OF EMPLOYEES IN OREGON THEY ARE AS FOLLOWS:

Hatchery – 15 employees | Feedmill – 20 employees
Growout – 11 employees Live haul – 23 employees | Corvallis – 50 employees



WASHINGTON STATE

- ❑ Number of Growers – 46
- ❑ Number of Chicken Houses – 251
- ❑ Total Square feet – 4,322,193
- ❑ Annualized Birds Placed – 31,003,235

COUNTIES IN WHICH WE GROW BIRDS IN WASHINGTON:

Clark | Cowlitz | Lewis | Skagit | Snohomish | Thurston | Whatcom

TOTAL OF 1,149 POULTRY INDUSTRY DIRECT EMPLOYEES





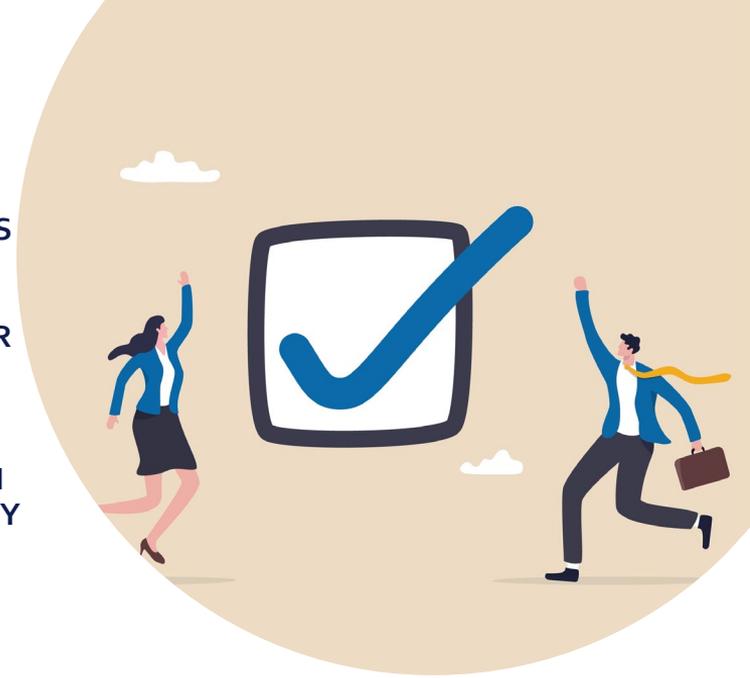
ACCOMPLISHMENTS

- SUPPORTED NEW STATE AND FEDERAL “FRESH” POULTRY STANDARDS.
- ABOLISHED STATE SALES TAXES ON POULTRY LITTER, MEDICATIONS IN WATER, FARM EQUIPMENT, AND POULTRY HOUSES.
- DEVELOPED ANNUAL WESTERN U.S. CHICKEN COOKING CONTEST. COORDINATED WITH “BUY CALIFORNIA” PROGRAM
- SPONSOR RESEARCH ON POULTRY BLOOD AND CARCASS COMPOSTING
- SPONSOR RESEARCH ON POULTRY EMISSIONS.
- DEVELOP BIOSECURITY PROGRAM WITH ASSISTANCE FROM USDA RURAL DEVELOPMENT GRANT.
- VARIOUS PUBLIC RELATIONS ACTIVITIES FOR CALIFORNIA POULTRY PRODUCTS.
- PUBLIC RELATIONS/PROMOTION RESULTS SOME OF THE BEST IN INDUSTRY
- FOUNDED AND MANAGE STATE WIDE POULTRY TASK FORCE TO MONITOR HEALTH OF INDUSTRY THROUGHOUT CALIFORNIA
- QUALITY ASSURANCE PROGRAM OFFERS CERTIFICATION BY THE CALIFORNIA POULTRY FEDERATION AND THE CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE



ACCOMPLISHMENTS

- ANIMAL WELFARE COMMITTEE TO ENFORCE AND MONITOR STANDARDS IN CALIFORNIA
- PRODUCED AND PUBLISHED A POULTRY AND EGG CURRICULUM KIT FOR HIGH SCHOOL AGRICULTURE EDUCATORS, DISTRIBUTING MORE THAN 500 KITS THROUGHOUT THE STATE IN THE FIRST MONTH.
- DEVELOPED NPIP SURVEILLANCE PROGRAM WITH 100% PARTICIPATION BY CHICKENS, TURKEYS, DUCK AND SQUAB; AND 90% PARTICIPATION BY LAYER INDUSTRY.
- PROMOTED A CALIFORNIA WIDE PROGRAM TO “EAT CALIFORNIA, BUY CALIFORNIA GROWN” ON SUNDAYS...WHICH COULD GENERATE MORE THAN \$15 BILLION A YEAR FOR CALIFORNIA AGRICULTURE IF EVERY CALIFORNIAN JUST ATE CALIFORNIA GROWN PRODUCTS ON SUNDAYS. THIS EFFORT RECEIVED MAJOR MEDIA COVERAGE IN BOTH NORTHERN AND SOUTHERN CALIFORNIA.
- SPONSORED AND PASSED LEGISLATION IN SENATE TO OUTLAW ANY USE OF “CALIFORNIA GROWN” LABEL ON POULTRY PRODUCTS THAT ARE GROWN AND/OR RAISED OUTSIDE STATE.





THANK YOU!



BILL@CPIF.ORG



[HTTP://WWW.CPIF.ORG](http://WWW.CPIF.ORG)

A sunset scene with a bright sun low on the horizon, casting a warm glow over a dense line of trees. The foreground is filled with tall, dry grasses, and the right side of the image is decorated with falling yellow confetti. The entire scene is framed by a thin yellow border.

THANK YOU

THE ALMOND CONFERENCE

50
YEARS