Corporate Investment in the Bioeconomy

The Latest Derisking Techniques For Commercial Scale Project Financing in Bio
Table of Contents

Typical Project Finance Structure ................................................................. 3
Project Structure Mitigates Project Risk ..................................................... 4
Development Company ................................................................................ 5
Project Essentials ....................................................................................... 6
Technology Risk Insurance – New Energy Risk ....................................... 7
Feedstock Studies – EcoStrat ................................................................. 20
Offtake Essentials ..................................................................................... 27
  RFS – Weaver ......................................................................................... 28
Market Studies – Muse Stancil ............................................................. 31
Typical Project Finance Structure

- **Equity Investors**
- **Sponsor’s Equity**
- **Project Level Equity Investors**
- **Senior Project Debt Providers**

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**Project Company** (Borrower)

- **Feedstock Agreements**
- **Technology License Agreements**
- **EPC Contract (construct)**
- **O&M Agreement**
- **Off-take Agreements**
Project Structure Mitigates Project Risks

**SOUND PROJECT ECONOMICS**

- **Adequate Debt Service Coverage**
- **Acceptable Equity Returns**

**Sponsors**
- Experienced & financially strong investors with demonstrated track record of investing & operating similar projects.
- Ability to provide financial support to Project.

**Construction Risks**
- Fixed price, date certain, turnkey EPC contract with liquidated damages.
- Completion guarantee by Sponsors.

**Market Risk Assessment**
- Competitive positioning.
- Supply / demand forecasts.
- Competing suppliers.
- Government policies – tax and income.

**Feedstock Supply**
- Adequacy of available feedstock.
- Long-term quantity supply agreement.
- Long-term fixed price supply agreement (or at least a price ceiling). Adequate on-site storage.

**Management**
- Strong managerial, financial, operational, & technical capabilities with demonstrated track record of implementing similar projects.
- Continuity of senior management.

**Technology Risk / Feasibility**
- Perpetual technology licenses and performance warranties.
- Technology / project feasibility reviewed by Independent engineer.

**Operations Risks**
- O&M contract with efficiency bonus provisions.
- Adequate Maintenance Reserve Account.

**Off-take**
- Long-term quantity off-take agreement.
- Long-term fixed price off-take agreement (or at least a price floor).
- Adequate storage & transportation infrastructure.
Development Company (DevCo) Structure

- Private Equity Investors
- Strategic Investors
- Parent Company (Investors)
- Development Company / Intermediate Holding Company
  - Project Company (1st Commercialization)
  - Project Company
  - Project Company
- Senior Project Debt Providers
- Loan Guarantee / Insurance
- Project Level Equity Investors
- 100% Infrastructure Fund Capital with Back-End Leverage
Project Essentials

• “Reasonable” Leverage

• EPC Wrap (excluded technology)

• Decreasing Technology Risks with demo facilities and/or insurance
Demonstrated Reliability

• **Anatomy of Reliability**
  – How can we derive a feeling of reliability from an organization that is growing and a product that is evolving?

• **Failure Modes**
  – What can go wrong?
  – How severe are the consequences?
  – How often will it occur?
  – How important is the IE?

• **Data**
  – How much is enough?
  – How relevant are the data?
  – How will the next technology release perform?
  – Policy evolution
Who is New Energy Risk?

- Underwriter of long-term renewable energy performance
- Owned by insurer XL Catlin (S&P “A+”)
- Partner with Munich Re (world’s largest reinsurer)

- No other insurer has deployed more long-term performance insurance for renewable energy

- Wait, what do you mean by long-term performance?
  - We insure the output or availability of systems over a multi-year period
  - Generally, we’re asked to do so in order to help companies raise project debt.
More capital is accessible for early stage technologies, and mature technologies.

Mid-stage technologies (Pilot plant, data, but not yet widely adopted) have a tougher time.
Our approach is to close that gap with insurance.
What We’ve Done

- **Industrial biofuel client base**
  - $150 million capex
  - 50+ test campaigns on like-size demonstration plant in batch and continuous run, using expected feedstocks.
  - Stable design, low heat, low pressures
  - Off-take with investment grade entity

- **Realized Financing**
  - 10 year amortization term
  - 1.33x debt service coverage ratio
  - 70% advance rate
  - Insurance is coterminous with debt, full principal protection
  - L+200 to L+350 debt terms (BBB-rated in one transaction)

- **Wide Expertise**
  - Industrial biofuels (pyrolysis, gasification, anaerobic digestion)
  - Battery Storage
  - Fuel Cells
  - Synthetic lubricants
  - Medical devices

- **We’ve learned lenders are most efficient at evaluating credit**
  - We are structured to evaluate technology and performance.
  - No other insurer can deploy capacity on our scale
Anatomy of Reliability

- We don’t insure technologies; we insure products and projects.

- We do so based on our understanding of the fundamental reasons why they might underperform.
Failure Modes

- Design FMEA and Process FMEA are the cornerstones of our underwriting
  - What can fail?
  - What is the probability of that failure?
  - What are the consequences?

- Frequently rely on IE to corroborate our understanding and the manufacturer’s analysis
  - Is an IE report relevant?
  - Structure, operating conditions, design stability
  - Put the IE in our shoes:
    - IE’s like to use “reasonable, feasible, possible”
    - We want to know “expected, probable, likely”
Performance Data

• How much performance data is enough?
  – I don’t know.
  – Operating conditions and behavior are more relevant than the sample size
    • Is 8,000 cycles of bench data more relevant than 2,000 cycles of field data?
  – The fundamental understanding of the electrochemistry gives the data context
    • With VRB, we anticipate a stable chemistry and negligible electrolyte degradation
    • We are really worried about the membrane failure, and stress on the BOP
    • HALT testing on the system is key

• What are the performance thresholds in the product warranty?
  – Distributions are paramount
    – “The warranty is tied to P90” tells us a lot more than “The warranty is tied to 70% of P50”, even if your customer wants to know the opposite.

• Be reasonable; don’t expect an insurer to take a ten-year risk based on a month of performance data
Pareto Analysis

Availability

100%

Warranty

Data Show

Pumps/Sensors

AC Plant

Membrane

Other

What is being done to fix, test and measure this?

Can we exclude this or improve servicing?

We can prove this
Evolving Technology

- Clients want us to insure a technology vintage for 10+ years
- That vintage has only been in production for a year.
- No field data exist.
- How do we extrapolate performance?
- How do we evaluate manufacturing?

- Are the distributions getting contracting?
- We have bigger data sets for older vintages (more equipment produced and sold).
- As incremental systems are produced, how do they perform as compared to the first systems produced in a vintage?
- Does the team have a track record of success?
- Are the new systems backward-compatible?
Does Insurance Get Cheaper?

- In theory, the more we know the more comfortable we are
  - Client creditworthiness increases as they sell more

- In theory, insurance gets cheaper, or eventually clients don’t need us

- In reality, the hardware design evolves, creditworthiness is slow to develop, and lenders like having insurance.
  - Clients do bigger and bigger deals
  - Prices come down, but more often than not, execution gets cleaner and terms get better.
Contact Info

Jon Cozens
New Energy Risk

3555 Alameda de las Pulgas, Second Floor
Menlo Park, CA 94025

jcozens@newenergyrisk.com
De-Risking Biomass Feedstock Supply Chains: How Advanced Predictive Analytics® Can Lower Debt Cost

Jordan Solomon
Managing Director & CEO
Ecostrat Inc.
Most Bioenergy Projects Carry BB Rating or less ~ Junk

Typical bioenergy project ratings are in the junk region

Rating Marks for Long-Term Bonds

- **AAA**: Most likely that debt obligations will be honored.
- **AA (+-)**: High likelihood that debt obligations will be honored.
- **A (+-)**: Reasonable likelihood that debt obligations will be honored.
- **BBB (+-)**: There is a likelihood that debt obligations will be honored, but compared to the higher rating (A), there is the possibility of a diminished likelihood of debt repayment.
- **BB (+-)**: Repayment does not pose a problem at present but may become problematic in the future.
- **B (+-)**: Probability of repayment is weak, with cause for concern.
- **CCC**: Repayment is uncertain and there is the danger of default on debt obligations as a real possibility.
- **CC**: High likelihood of default on debt obligations.
- **C**: Extremely high probability of default on debt obligations.
- **D**: Defaulting on debt obligations.

Note: Credit ratings range from AAA to D, and are further subdivided into a total of 20 ratings (see chart) by the use of plus and minus signs for ratings AA to B.
Biomass Supply Chain Risk: Complexity

Multiple components with indeterminate risk of occurrence and impact
In the real world, questions about feedstock risk are simple

- What is the likelihood that feedstock price will exceed $x per bone dry ton over the next 10 years?
- How big is too big? What is the ideal plant size?
- What are the real risks to the feedstock supply?
- What is the vulnerability of the supply chain to a disruption risk?
- Which particular variable has the largest impact upon feedstock cost?
- What is the impact of various mitigation strategies on multiple disruption risks?
- What is the ideal supplier mix to minimize risk and cost?

The fact is that 10 experts can give 10 different opinions.

So.... What makes for reliable predictions in biomass feedstock?

And ... When do you know you can trust the information?
20 Yr Supply Chain Risk in **US** (risk pathways with typical stumpage variance)

High cost variance.
Hard to predict not-to-exceed cost of feedstock over time.
The Impact of More Accurate Modeling of Supply Chain Risk

1. Increase the credit rating of bioenergy projects
2. Enable better pricing of risk by commercial lenders and debt providers
3. Decrease financial drag on bioenergy/ lower debt and capital cost

The Bottom Line:
Accelerate the rate of bioenergy project development in Canada
To discuss your project please contact us

Jordan Solomon
Managing Director & CEO
Ecostrat Inc.
www.ecostrat.com
jordan.solomon@ecostrat.com
Tel: 416-968-8884 x 222
Offtake Essentials

• Contracted Cash Flows
  • Trade off of pricing upside vs. floor price
  • Avoid one-sided termination provisions

• Risks related to RFS2/RINs are hard to understand and quantify
Financing an RFS project

Companies endeavoring to build and register a renewable fuel production facility must familiarize themselves, on an un-biased basis, with:

- Part 79 – fuel registration regulations – what a company can and cannot do with their fuel
- Part 80 RFS regulations in depth -
  - Registration – company/facility
  - Reporting – quarterly/annual
  - Recordkeeping – ongoing/extensive!
  - Product Transfer Document requirements
  - Product testing – frequency/extent
  - Common RIN generation mistakes
  - Fuel and RIN buyer expectations
  - Regulatory costs – initial and ongoing compliance, including staffing needs
- Part 80 gasoline and diesel regulations (as applicable)
Strategic Partners

• Every successful renewable fuel production project employs well-qualified strategic partners for financing, design, engineering, construction, etc.

• Often overlooked is the value that a “regulatory consultant” can bring. Such a firm should also be considered an essential partner – one familiar with ALL applicable fuel regulations, compliance requirements and options, and knowledge of the marketplace including potential fuel and RIN buyers
  – The consultant should have a good working relationship with EPA and other applicable regulatory agencies (verify this!)
  – The consultant should have an excellent reputation within the industry, especially with prospective fuel and RIN buyers (verify this too!)

• Of the available regulatory consultants, Weaver meets all of the above requirements.
  – Their well-qualified staff includes a former head of EPA Fuels Enforcement, attorneys, engineers, chemists and CPAs
  – Weaver’s reputation for integrity (incl. confidentiality), and knowledge of fuels regulations is unsurpassed
Sandra Dunphy
Weaver
Director
Energy Compliance Services
aka “RINderella”
D: 832.320.3218   M: 281.610.4750
sandra.dunphy@weaver.com
ICE IM:  sdunphy
24 Greenway Plaza, Suite 1800
Houston, TX  77046
P: 713.850.8787     F: 713.850.1673
View Bio and VCard

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MUSE AT A GLANCE

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• Biofuels
• Logistics

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RENEWABLE AND ALTERNATIVE FUELS

• RENEWABLE FUEL MARKET STUDY
  • Provided a market study for an advanced biofuel project seeking a federal grant to supplement project funding. Assessed the RIN market and provided opinion regarding future RIN values under a substantially diminished RFS2. Reviewed competing feedstocks for bio-diesel and non-differentiated advanced biofuel.

• RIN MARKET ANALYSIS
  • Conducted a detailed RIN market analysis on behalf of a bio-diesel producer relying mainly on lower cost fats, oil, and greases as feedstock. Reviewed other technologies and forecast incremental production volumes of competing biodiesel, renewable diesel and non-differentiated advanced biofuel.

• CELLULOSIC ETHANOL MARKETING ASSISTANCE
  • Provided market intelligence, contract review and development assistance, price forecasting, and RIN relationships to an international firm looking to market future cellulosic ethanol in the U.S. Screened and helped select off-take partners.

• ETHANOL CONSTRUCTION PROJECT DUE DILIGENCE
  • On behalf of an equity investor, carried out a complete due diligence evaluation and North American ethanol market study for a proposed ethanol construction project in the upper Midwest. Conducted management interviews, performed a technology assessment, and assessed competitive positioning of proposed facility. Provided client with various updates and follow-up market analysis during financing and construction phases. Plant is currently operating.

• ETHANOL MARKET STUDY
  • Performed an ethanol market study and competitive analysis of a proposed multi-plant ethanol construction project on behalf of a financial institution mandated to arrange the senior debt for the project. Estimated local and export market supply/demand balances, assessed competitive positioning for each facility, and evaluated project risks/mitigates. Provided long-term ethanol and related gasoline price forecast in various markets of interest to the project. Fielded questions and comments from potential investors on behalf of client.
RENEWABLE AND ALTERNATIVE FUELS

• ETHANOL COMPANY DUE DILIGENCE
  • Provided commercial and technical due diligence for a Section 144A securities offering on behalf of various investors. Conducted on-site inspections of the company’s facilities and interviewed management.

• ETHANOL MARKET STUDY
  • Conducted an ethanol market study and competitive analysis of a proposed ethanol plant on behalf of a financial institution mandated to arrange the senior debt for the project. Provided client with an in-depth site analysis as proposed location for facility was well outside the traditional center of ethanol production in the U.S. Midwest. Also provided client with in-depth grain report that included long-term supply/demand balances in local area and price forecasts for corn, sorghum, and distillers grains.

• BIODIESEL PRICING
  • Provided expert testimony in Texas court regarding biodiesel pricing and contracting practices in dispute between biodiesel producer and trader

• RFS2 RIN VALUES
  • Provided analytical service for the development of RFS2 valuation projections

• BIODIESEL LOGISTICS
  • Advised mid-western U.S. petroleum refiner concerning biodiesel logistics, blending, and marketing

• BIODIESEL MARKET ANALYSIS
  • Developed market analysis and project of future biodiesel usage patterns for U.S. Gulf Coast terminal operator
Tod D. McGreevy | Vice President
Muse, Stancil & Co.
5080 Spectrum Drive Suite 600E Addison, TX 75001
Phone: (214) 954-4455 Cell: (214) 551-6052 Fax: (214) 954-1521
tmgreevy@musestancil.com www.musestancil.com

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