

# Financing Bio-Refinery Projects

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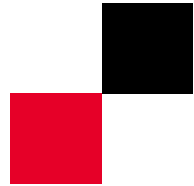
# Where are We Now?

## The Renewable Fuel Industry from a Financial Perspective



# Where are we now?

- **1<sup>st</sup> generation bio-refineries are prolific**
  - ▶ Financing to date - adequate
  - ▶ Potential overcapacity given existing Renewable Fuels Standard mandate
  
- **2<sup>nd</sup> generation bio-refineries are embryonic**
  - ▶ Pilot scale facilities being built and coming into operation
  - ▶ Commercial scale plants planned for development
  
- **Popular awareness of “green” issues higher than ever before and receiving bi-partisan support**
  - ▶ Department of Energy has recently pledged support to renewable fuel technology and commercialization efforts through the Loan Guarantee Program



# 1<sup>st</sup> Generation Bio-Refinery Finance

## Overview of Established Financing



# 1<sup>st</sup> Generation Bio-Refinery Characteristics



- **Feedstock is a commodity**
  - ▶ Quality is homogenous and industry standards exist
  - ▶ Easy price discovery, which fluctuates with supply and demand
  
- **Implied ceiling for industry production**
  - ▶ Food vs. fuel
  - ▶ Finite Land
  - ▶ Approximately 15-18 billion gallons per year
  
- **Mature logistics**
  - ▶ Logistics such as feedstock origination, by-product marketing, and ethanol marketing have been outsourced to established industry participants
  - ▶ Terminaling, transport, handling facilities largely in place
  
- **Requires government support in order to continue development**
  - ▶ Tariff, tax credit, research & development



# Traditional Project Finance



## ■ Financing mechanism – Typically Project Finance

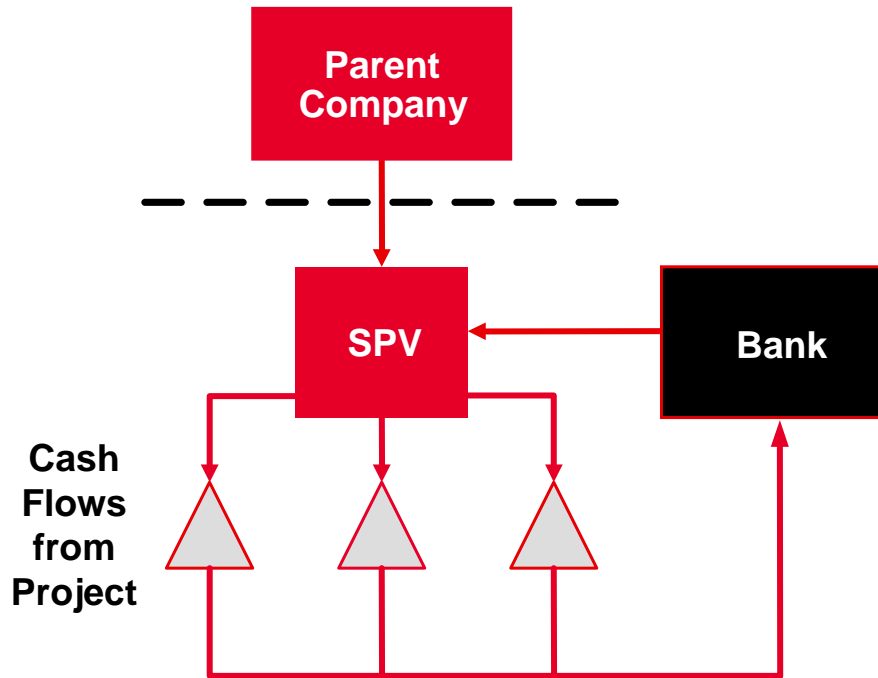
- ▶ 1<sup>st</sup> generation bio-refineries financed according to this model
  - Sponsors with limited resources
  - Numerous minority shareholders
  - Fragmented industry
- ▶ 2<sup>nd</sup> generation bio-refineries expected to fall under this type of financing

## ■ Can be thought of as “project only cash flow lending”

- ▶ Independent of parent company finances
- ▶ Financing based on expected cash flows generated by project
- ▶ Strength of the contracted agreements between sponsor, service providers, and lender is an important part of the economic assessment
- ▶ Success relies on individual project economics



# Traditional Project Finance



- **Parent Company establishes a Special Purpose Vehicle (SPV) which owns the project**
  - ▶ Equity for project is provided by parent
- **Bank evaluates project borrowing capacity according to the economics of the project**
  - ▶ Bank provides loan directly to SPV
- **Cash flows are used to repay loan over time.**
  - ▶ Typically no financial guarantee required from parent



# Sources of Project Capital

## Senior Secured Debt / TLB

- Project Finance Banks
- Agricultural Banks
- U.S. Regional Banks
- Insurance Companies
- Finance Companies
- CLOs
- Hedge Funds

## 2<sup>nd</sup> Lien / Mezzanine

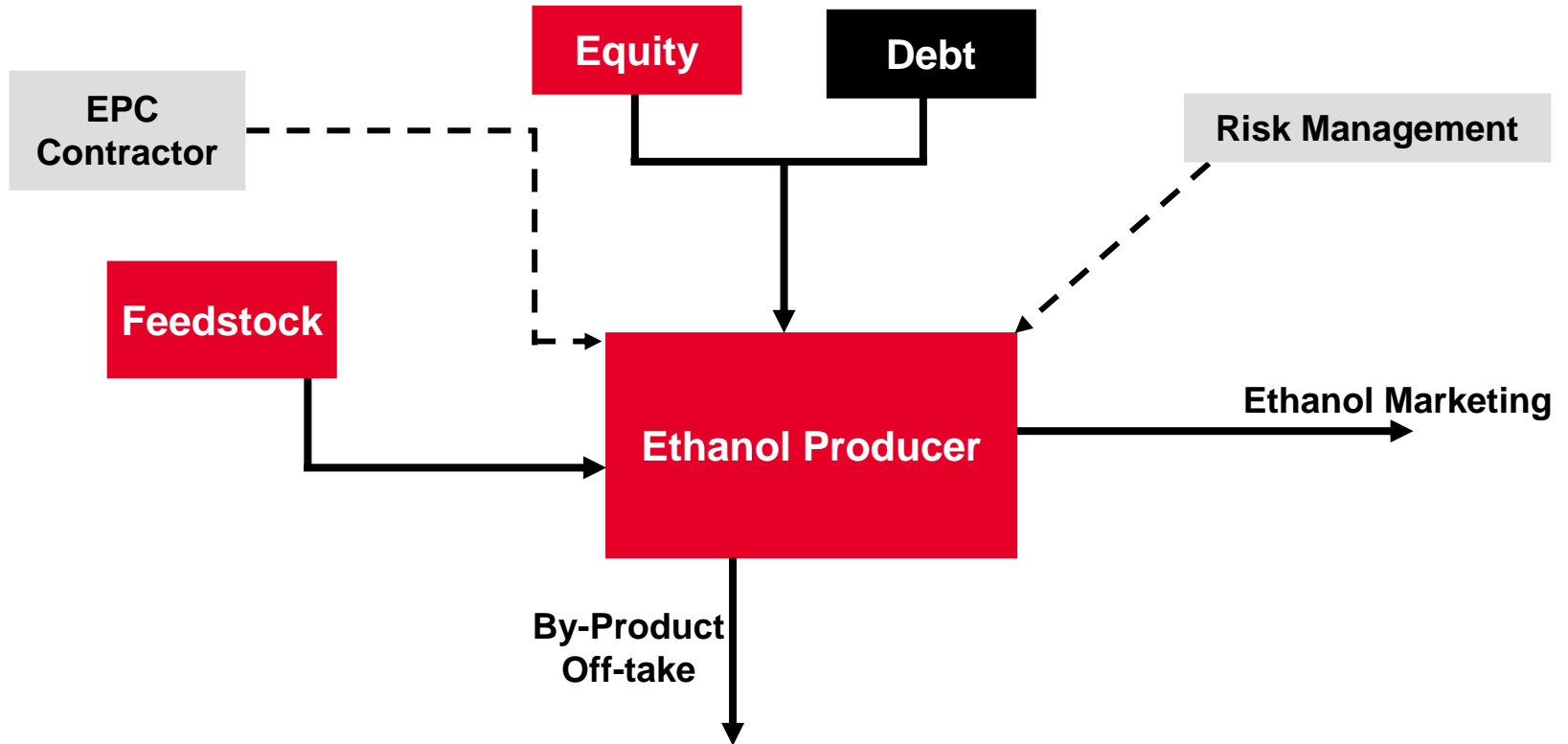
- Finance Companies
- Hedge Funds
- Financial Sponsors
- Family Owned Investment Companies
- Project Suppliers & Offtakers
- Proprietary Desks

## Private Equity

- Financial Sponsors
- Hedge Funds
- Strategic Buyers
- Family Owned Investment Companies
- Project Suppliers & Offtakers



# How a Bio-Refinery Project is Evaluated



**Contracted agreements are critical to project finance**



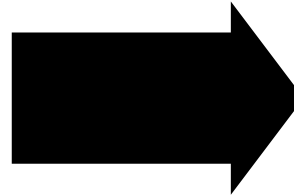
# How a Project is Evaluated: Metrics

## Industry

- Commodity Exposure
- Competitive Market Exposure
- Feedstock Availability
- Federal and State Support

## Project

- Construction Cost
- Feedstock Cost
- Production Cost
- Off-take and Marketing Agreements
- Industry Risk Mitigants



**Industry and Project metrics serve as the basis for a financial model that can be evaluated for economic viability**

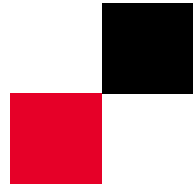
## Financial Model

- Debt service, coverage capability
- First-lien debt
- Percent of first-lien paid off
- Debt (\$/gal.)
- Debt to total capitalization, equity



# Typical Financing for 1<sup>st</sup> Generation Projects

- **Debt: 50-65%, Equity: 35-50%**
  - ▶ This mix of debt and equity allows the project to accommodate production margin volatility
  - ▶ Will vary accordingly with market conditions and investor appetite
  
- **Debt financed at floating interest rate**
  - ▶ Historically priced at LIBOR + 300 to 400bps
  
- **Successful projects have secured feedstock supply and product and by-product off-take agreements**
  - ▶ Feedstock procurement is removed as a variable from the financing model
  - ▶ Ethanol and by-product off-loading is typically pre-arranged
  
- **Primary residual risk: operating margin**



# 2<sup>nd</sup> Generation Bio-Refinery Finance

## Lender Perspective



# 2<sup>nd</sup> Generation Bio-Refinery Characteristics



- **Feedstock is not a traded commodity**
  - ▶ Input quality and value change significantly with respect to location
    - Non homogenous feedstock
  - ▶ Refinery location may be determined by feedstock location
  
- **Detachment from agricultural commodity markets**
  - ▶ 1<sup>st</sup> generation industry ceiling not applicable
  
- **Potential for sustainable low production cost**
  - ▶ Optimism that 2<sup>nd</sup> generation technologies will be better able to maximize production yields and exploit lower-cost feedstock
  
- **Production process refinement**
  - ▶ Technology is being refined and adapted through the pilot plant operation process
  
- **Significant capital expenditure vis-à-vis 1<sup>st</sup> generation**



## 2<sup>nd</sup> Generation Project Finance Issues and Potential Mitigants

### ■ **Technology Risk**

- ▶ EPC Contractor, Liquidated damages

### ■ **Independent Engineer**

- ▶ Reviews, assesses, confirms

### ■ **Capital & Operating Costs**

- ▶ Must fit market metrics: need to lower CapEx, operating expenditures

### ■ **Feedstock Supply**

- ▶ Procurement contracts with respected operators

### ■ **Operations Management**

- ▶ Management assessments

### ■ **Ethanol Off-take**

- ▶ Marketing contracts

### ■ **DOE Loan Guarantee Program**

- ▶ Availability and structure

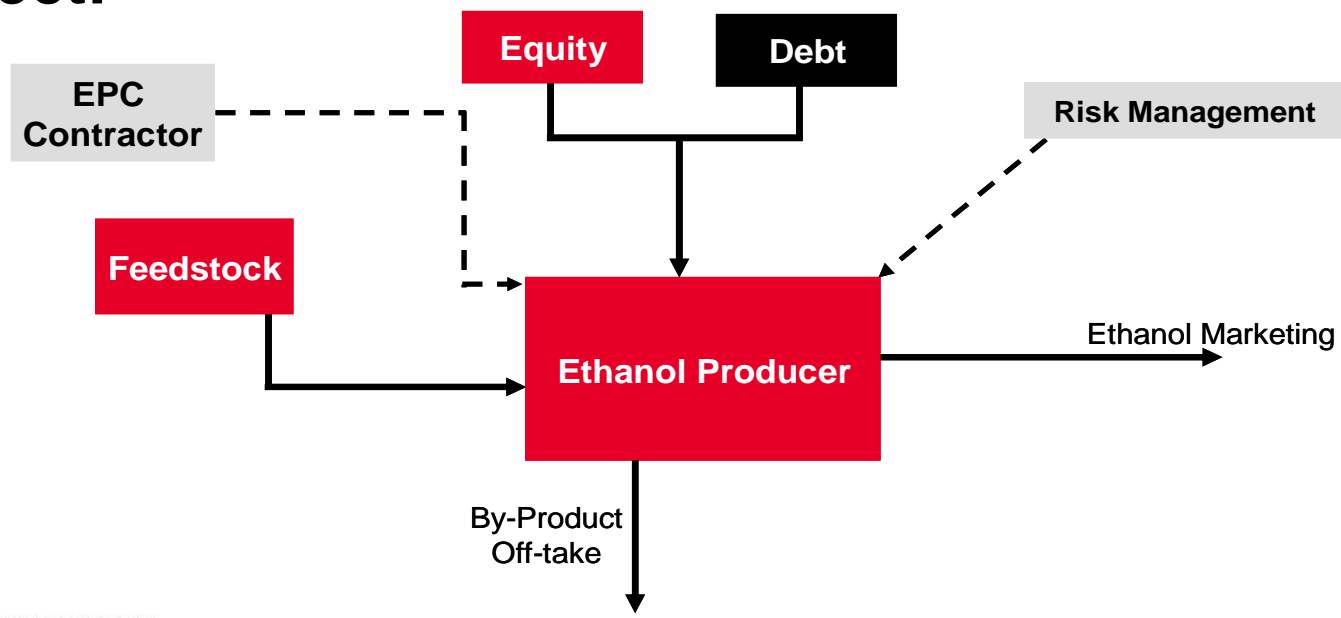


# 2<sup>nd</sup> Generation Refineries: Cellulosic Ethanol

## From Process:



## To Project:

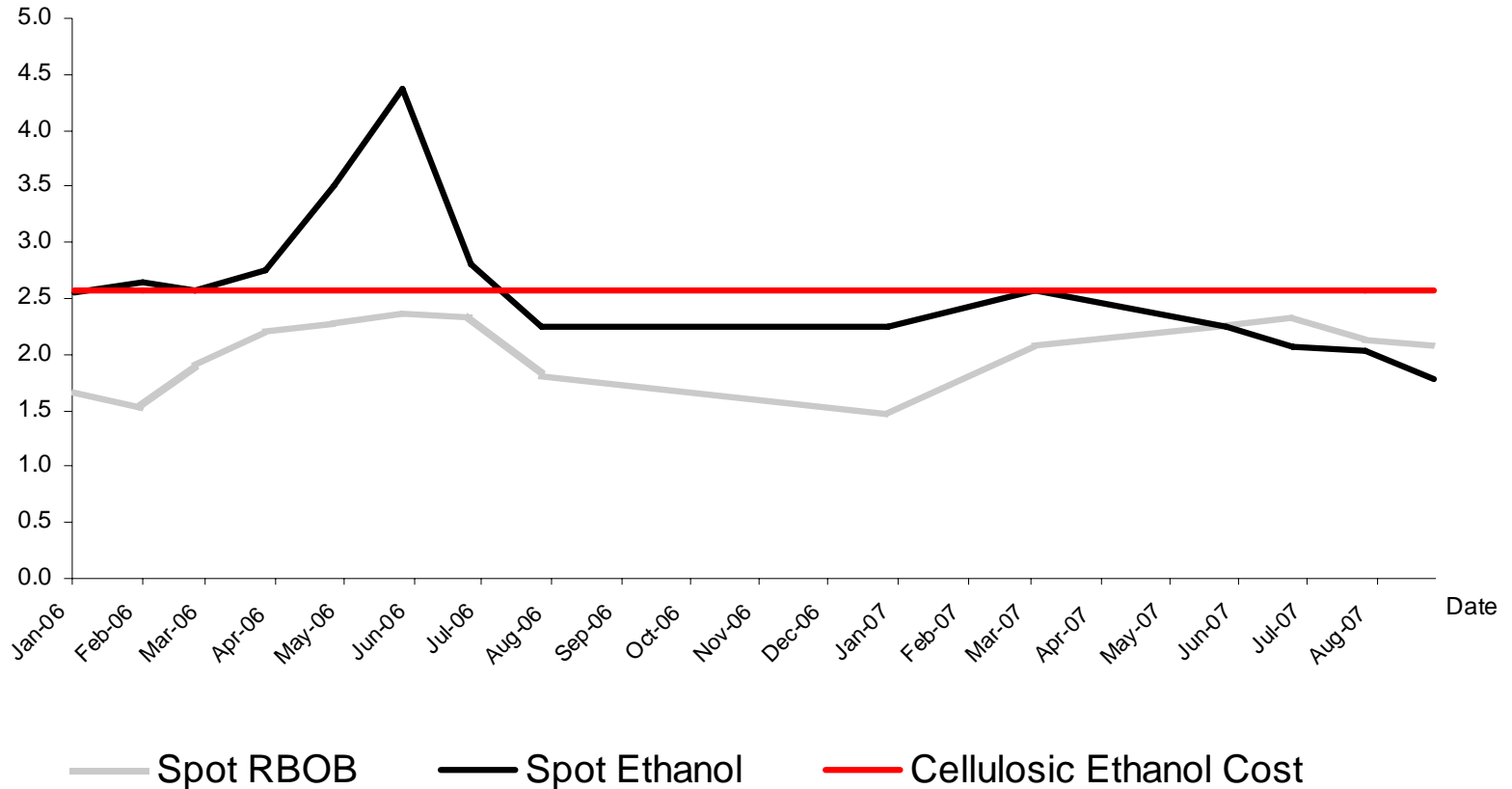




# 2<sup>nd</sup> Generation Refineries: Cellulosic Ethanol



Price (in dollars)



■ Cellulosic ethanol cost includes \$0.15 round-trip transport and \$0.165 debt amortization and interest per gallon



# Comparison Between 1<sup>st</sup> and 2<sup>nd</sup> Generation



## 1<sup>st</sup> Generation Refineries

- **Feedstock is agricultural commodity,**
  - ▶ logistically mature
- **Cross-commodity risk**
  - ▶ Tolling agreements
- **Lower potential industry volumes due to nature of feedstock.**
  - ▶ Producers compete with food product market
- **Ongoing production less commercially viable without government support**
- **Low technology risk**
  - ▶ Attracts all types of capital

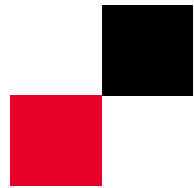
## 2<sup>nd</sup> Generation Refineries

- **Feedstock is not a commodity,**
  - ▶ does not yet benefit from established standards, infrastructure or logistics
- **Limited cross-commodity risk**
- **High potential industry volumes**
  - ▶ not limited by availability of agricultural commodity
- **Potential to be viable on a stand-alone (government subsidy free) basis**
- **High technology risk**
  - ▶ Attracts only government capital and venture capital



# Department of Energy Loan Guarantee Program

- **Intended to encourage early commercial use of new or significantly improved technologies in energy projects**
  
- **Problem: Structure**
  - ▶ Government will guarantee up to 80% of “Project Costs”
  - ▶ Government holds first lien priority in liquidation, lenders are subordinated
  - ▶ Debt can be resold by lender, but guaranteed portion of debt cannot be stripped from non-guaranteed portion



# Next Steps

## Toward Financing the 2<sup>nd</sup> Generation of Bio-Refineries



# Challenges to 2<sup>nd</sup> Generation Bio-Refineries

## ■ Technology

- ▶ Plant specific metrics are not yet available

## ■ Feedstock availability

- ▶ Lack of historical supply chains and established pricing mechanisms

## ■ Logistics

- ▶ No reliable precedent for feedstock procurement
- ▶ Established transport lines do not necessarily service ideal plant locations

## ■ DOE loan guarantee structure

- ▶ Current structure deters lender involvement

**Never Forget: Ethanol is a Commodity!**



# What Can Be Done?

## ■ Technology

- ▶ Publicize technological achievements and pilot scale operation results
- ▶ Continued research directed towards lowering the cost of production

## ■ Feedstock Availability & Logistics

- ▶ Vertically integrate supply chain
- ▶ Create a situation where suppliers and service providers have a vested interest in 2<sup>nd</sup> generation industry

## ■ DOE Loan Guarantee Structure

- ▶ Unify lobbying efforts in order to modify loan guarantee program structure to one more favorable to financing

**Stay the course!**