



CAAFI 2014 General Meeting & Expo

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Finance Discussion

Moderated by: Don Schenk, ACA Associates, Inc.

Arnaldo Viera de Carvalho,
Inter-American Development Bank

Artur Milanez,
Brazilian Development Bank, Biofuel Manager

Cindy Thyfault,
Westar Trade Resources, CEO

Tom Todaro,
AltAir Fuels, CEO

Produced by



Finance Panel

Moderator - Donald P. Schenk

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ACA Associates, Inc.
545 Fifth Ave, Ste 640
New York, NY 10017
+1 212-808-4420
Mobile: +1 646-248-3461
dpschenk@aca-assoc.com
www.aca-assoc.com

Objective

Improve understanding of what is required to obtain funding for the development of new bio jet technologies and for the subsequent scale up of commercial production.

Panelists

- Artur Milanez, Brazilian development banker's perspective.
- Cindy Thyfault, U.S. perspective.
- Tom Todaro, Bio jet refiner perspective.
- Arnaldo Vieira de Carvalho, regional development banker's perspective.

Funding

- **Developmental Phase** – covers technology R&D, fuel for testing, construction of production facilities from bench scale through first initial commercial scale.
 - Generally costs between \$50 and \$300 million, and takes 5 to 10 years.
 - Risky: probability of commercial success starts under 20%; grows to over 95% by the time the first commercial-scale production facility is built.
- **Commercial Phase** – commences after first commercial-scale facility has been operated profitably for a few years.
 - Build out should occur over a decade or more and cost several billion dollars.

Lack of Funds is Not the Problem

- U.S.-based investment capital
 - Private equity has \$900 billion to invest today
 - U.S. banks have \$1.5 trillion from quantitative easing and very little of this has been lent to anyone.
- Why so little is invested in bio fuels? What makes a good investment?
- Finance 101: funds providers expect returns that match the risk
 - High risk (developmental phase) investments require higher returns than low risk ones (commercial phase).
 - Equity in commercial phase projects has more risk than debt financing in the same project.
- What motivates bankers?
 - Commercial bankers do deals where they can make money at low risk and need to do very little work.
 - Development bankers do deals to promote economic development and are not motivated by profit. They work very hard.

Selling a Dream (Rewards must Match Risk)

- “My technology solves all problems and will make everyone rich.”
- New technologies generally fail, requiring confidence in the dream.
- Early stage investors expect to lose money in 3 of 5 investments, break even on 1, and make a lot of money on 1.
- Bio jet technologies, other than HRJ, are at this stage.
- First commercial scale facility likely to cost 40% to 70% of total developmental phase costs.

Delivering Hard Facts (Low Risk & Low Reward)

- Dreams do not work at this stage.
- Gasoline, diesel, and Jet A generate modest profits.
- Ethanol and bio diesel have resulted in large losses to bankers.
- Bio jet refining proposals must recognize this historical context.
- Business plans must include credible proposals for avoiding the risks associated with bio refineries.
- Bio jet will hopefully achieve this status within a few years.

Commercial Banker's Perspective

- Bio jet is simply another bio fuel that must compete for investable funds.
- Why take a risk when other opportunities have lower risks and higher rewards?
- Will only invest in the commercial phase.

Developmental Banker's Perspective

- All bio fuels provide sizable economic and employment benefits to both rural and urban citizens.
- Bio fuels are critical to a sustainable world.
- Will invest in both developmental and commercial phases.

2009 CAAFI Study Conclusions

- Significant challenges need to be solved to develop bio jet in the U.S. because of
 - High Technology Risk
 - Until 2010 no bio jet technology had been approved by ASTM and none had been tested at commercial scale.
 - High Competitive Risk
 - At current oil prices, petroleum-based jet costs less than bio jet.
 - No mandated bio jet use, no carbon tax, & no RINS
 - Unacceptably Low and Volatile Profit Expectation
 - Limited supply of non-food feed stocks.
 - Feed stock price uncertainty.
- Concluded that industry goals for bio jet availability required a multi-national strategy.

Brazil

- Government policy stable
 - Multi-decade commitment to bio fuel leadership.
 - Jet A is priced FOB New Orleans plus an import tax.
- Feed stock supply available - sugar cane industry mature, vertically integrated and “wastes” 50% of the bio mass.
- Geographic location near the equator makes agriculture highly productive at converting sun energy to carbon.
- BNDES has mandate to support bio fuel development and commercialization. Put > US\$ 20 billion into sugar cane industry over last 10 years.
- IDB also available to support bio fuel development.

- Brazil/U.S. bilateral on bio fuels supports cooperation.
- Complementary needs and objectives
 - Near term bio fuel goals
 - U.S. – unlikely to meet near term bio fuel goals of airlines, Air Force, & Navy
 - Brazil – provided opportunity for U.S. to obtain critical supplies of bio jet
 - Feed stock
 - Brazil has a plentiful supply of cheap feed stock
 - U.S. needs time to develop supplies of cheap non-food feed stock
 - Funding
 - Brazil has a development bank that supports bio fuels
 - U.S. lacks development bank funding
 - Politics
 - U.S. lacked political consensus
 - Brazil enjoyed political consensus on bio fuels

Panel Discussion Outline

Panel Discussion

- Questions designed to stimulate thinking on key challenges to funding bio jet projects
- Each panelist to provide a brief response

Panelist Summary

- Each panelist makes their short “takeaway” statement, saying what they consider is most important to making bio jet a reality.

Audience Participation During Conference

Audience Voting on Key Issues After Lunch

Arnaldo Viera de Carvalho,
Inter-American Development Bank

Artur Milanez,
Brazilian Development Bank, Biofuel Manager

Cindy Thyfault,
Westar Trade Resources, CEO

Tom Todaro,
AltAir Fuels, CEO

1. Are there a substantial number of developmental phase bio fuel projects in your region: which development stage is most difficult to finance (early R&D or the first commercial scale facility)?
2. What are the primary sources of funding for early developmental phase projects using the following categories: sponsor equity, private equity, public equity, government support (grants, loans, loan guarantees), other?

Using Tom Todaro's definition of the characteristics of an attractive and bankable commercial-scale project (great management, absence of technical risk, and assured attractive profits), I have three questions

3. What are the primary qualifications of great management?
4. What techniques are available for reducing or eliminating the technical risk?
5. What approaches are most useful for assuring attractive profits?

6. What are the primary sources of funding for initial commercial-scale facilities?
7. Some believe that RINS or an alternative, such as mandated purchase requirements or carbon tax, are required to ensure profits from a bio fuel refinery in the United States. Even Brazil has mandated usage of ethanol and bio diesel. Do you think that subsidies are required to complement mandated usage to ensure commercial scale development?
8. Once the initial commercial-scale bio jet facility has operated profitably for 3 to 5 years, do you believe that the private markets will provide the funding for the build out of the industry or is there a need for development banks?