

Deploying Commercial-Scale
Biorefineries and Bioenergy
Facilities in the Delta...
What's it going to take?

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Introduction

- It seems like a new world order for bioenergy
- Lot's of interest...
 - ✓ Lots of opportunities
 - ✓ Now is the time to pursue commercial enterprises
 - ✓ Now is not the time for mistakes !

Some Basic Considerations

- Deployment will be done by the private sector
- Privately owned enterprises cannot be deployed without financing
- It is unlikely that many commercial facilities will be financed with 100% equity
- Meaning that at least some debt is required
 - ✓ In most instances, equity participants want to minimize equity % and maximize debt %

It's all about Securing Financing

- Which means it's all about risk & returns
- Financial performance must be sufficiently attractive
 - ✓ To equity participants
 - ✓ To debt providers
 - ✓ To other financiers (e.g., federal/state agency grantors)
- Perceived risks must be sufficiently low
 - ✓ To equity participants
 - ✓ To debt providers
 - ✓ To other financiers (e.g., federal/state agency grantors)

Ensuring Attractive Returns & Acceptable Risks...consider:

- Raw material supplies
- Processing technology(s)
- Markets for products
- Enterprise management
- Economic forecasts
- No hidden surprises
 - ✓ Identify all significant risks
 - ✓ Develop mitigation strategies for each risk

Do your homework

- Due Diligence...
 - ✓ Identifying uncertainties
 - ✓ Addressing unknowns
 - ✓ Challenge and verify all assumptions
- There is no substitute for good planning

Raw Material Supplies

- Where will the biomass feedstocks be sourced?
 - ✓ Economic hauling radius?
 - ✓ Collection issues?
 - ✓ Seasonal concerns? (storage?)
 - ✓ Any technological concerns?
 - ✓ Assurance of supplies
 - Fuel Supply Contracts

Processing System

- After choosing the appropriate pathway, consider:
 - ✓ Proven technology(s) available?
 - ✓ Integration risks?
 - ✓ Scale risks?
- EPC Guarantees secured?
(*Engineering & Procurement & Construction*)
 - ✓ Price (firm fixed price?)
 - ✓ Delivery (incentives for on-time?)
 - ✓ Performance (minimum output levels?)
 - ✓ EPC contractor: Experienced? Available? Credit-worthy?

Products & Markets

- Are markets (customers) available?
 - ✓ Really ?? What are bases of confidence levels?
- Assurance of sales
 - ✓ Downstream partners?
 - ✓ Long-term off-take agreements?
 - E.g., 20-year Power Purchase Agreement with utility
 - 5-year biofuels sales contracts with fuel wholesaler
- The ideal scenario...
 - ✓ Take-or-pay off-take agreements in place with credit-worthy buyers for at least duration of debt

Management Team

- Appropriate skills & experience?
- Adequate incentives?
- Consider O&M contracts with experienced firms
 - ✓ With appropriate performance incentives
- Remember:
 - ✓ Credibility = reduced uncertainty (risk)
 - ✓ Technology / Project developers and/or entrepreneurs are often not good biz/ops managers
 - ✓ Enthusiasm / technical expertise does not ensure effective business management & administration
 - ✓ Entrepreneurs...focus on developing more projects!

Other Considerations (no surprises!)

➤ Siting

- ✓ Can be a major challenge (read: *delay*; read: *risk*)
- ✓ Any hidden problems? (Unwise to try to keep hidden)

➤ Environmental considerations

- ✓ Yes, your project will have so many benefits...
but your opinion/enthusiasm may not be shared by all
- ✓ Don't under-estimate the permitting process
 - It almost always takes longer than planned
 - Agency staff don't operate with the same level of incentives
 - Use 3rd party firms who specialize in obtaining permits

Financing

- Reliance on public sector support = RISK !
 - ✓ Congress can giveth, and Congress can taketh away
 - ✓ If financial performance of the enterprise is subject to forthcoming [or continuation of existing] support, then this represents significant uncertainty (risk) to financiers

Financing

➤ Equity

- ✓ The % equity required will be affected by lenders' perceived risk*
 - Could vary from 15% to 50% or more
- ✓ Additional equity can be “purchased”
 - More expensive than debt (can be very expensive)

* *(assuming no other collateral is involved)*

Financing

➤ Debt

- ✓ You want the % as high as possible (compared to equity)
 - Leverage your equity ! (OPM)
- ✓ Interest rate and other fees directly reflect project risk
 - As perceived by the lender
- ✓ Take-home message: “button-up the project”
 - Minimize the risk...maximize the debt

Opportunities in the Delta

- A biomass-rich region
- Huge potential for dedicated energy crops
 - ✓ Herbaceous
 - ✓ Woody
- Biofuels are hot topics
 - ✓ Ethanol from corn
 - ✓ Biodiesel from oilseed crops (soybeans)
 - ✓ Cellulosic options are just around the corner...
- Biopower is ready to go
 - ✓ But subject to regional demand, regulations, etc

Opportunities in the Delta

- Economies of scale are important
 - ✓ Large bioenergy facilities & biorefineries more competitive
- A few examples
 - ✓ 18,000,000 gallon/year oil-seed to biodiesel facility
 - Soybeans: 50~60 gallons/acre/year, depending on bean yield
 - Alternate crops can achieve 2~6 times more oil per acre
 - But feasibility subject to continuing Federal support payments
 - ✓ 30,000,000 gallon/year ethanol
 - 300~400 gallon/acre/year
 - Process yields have been optimized
 - A near-term money maker
 - But who knows when the Federal subsidies will go away?

Opportunities in the Delta

➤ Cellulosic Biofuels

✓ residues

- 10~20 million tons/yr of agri & forestry residues
- Woody debris from storm damage?

✓ Energy crops

- 12 million acres of good farmland...
 - 120 million tons/year of dedicated crops (@10 tons/ac/yr)
- 500 gallons/acre/year (@ 50 gal/ton, 10 t/a/y)
- 1,000 gallons/acre/year (@ 100 gal/ton, 10 t/a/y)
- 3,000 gallons/acre/year (@ 100 gal/ton, 30 t/a/y)
 - Compare to 50~60 from soybeans
 - Compare to 300~400 from corn

In Summary

- Lots of opportunities
- Pursuit strategies:
 - ✓ Large operations (by bioenergy standards)
 - ✓ Reduce risks
 - ✓ Ensure attractive financial performance
- How?
 - ✓ Identify and mitigate risks
 - Feedstocks
 - Processing
 - Product sales (markets)
 - ✓ Homework, homework, homework

We have been supporting bioenergy
for so long...

Now it's time
for bioenergy to support us !

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