Bioenergy project finance, experiences and lessons learned

Luca Soppelsa - How2Guide for Bioenergy
Bangkok, Thailand, 23-24 July 2014
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• Everest Energy
• NL Enterprise Agency, Netherlands Program Sustainable Biomass - NPSB
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Everest Energy

Independent global energy project developer and project advisor:

– Headquartered in the Netherlands with offices in Indonesia and USA;
– Specialized in structured and “hands-on” project development where bio-energy (biomass, biogas, biowaste and biofuel) is created and converted into electricity;
– Combines industry, project financing and technical expertise, thus increasing the chances of success and speedy execution.

– By executing both advisory and development assignments we service our clients with “real life” expertise, analytical background and in-depth content;
– Servicing public institutions, private clients and NGOs.
Everest Energy approach

Projects are structured according to the EE “7 Building Blocks” principle:

- Each block is developed simultaneously and with equal weight;
- Allows to identify project key risks and potentials;
- Information is presented in an “investor-friendly” manner;
- Chances of obtaining project finance are dramatically increased.
The Dutch Ministry of Economic Affairs and Ministry of Foreign Affairs have developed 2 programs in line with UN Development Goals:

- Goal 1: eradicate extreme poverty and hunger
- Goal 7: ensure environmental sustainability

RVO is the governmental executive body responsible for the implementation of the 2 programs:

- 1-DBI Program: Export from developing countries
- 2-DBM Program: Production for local markets

Goal: stimulate, support and facilitate sustainable biomass production projects
NPSB Program

• 41 Bio-Energy Projects
  – Focus on Asia (12), Africa (11) and Latin America (11)

• Variety of biomass inputs:
  – Bio-residues, woody biomass and energy crops cultivated for conversion to energy.

• Outputs:
  – Solid Biomass, Liquid Biofuel or Biogas.
In 2012-2013 Everest Energy was asked by RVO to execute a commercial support program for 24 NPSB projects.

The program enhanced the insights of the economic feasibility and scalability of these projects by improving their structure & bankability.
UMA Commercial Support Program

- Heterogeneous input, output and technologies
UMA Commercial Support Program

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UMA Commercial Support Program

- Increasing bankability and structure of projects through:
  - Strategic analysis → qualitative analysis
  - Business case evaluation → quantitative analysis
  - Investment criteria → best strategy to attract investment
  - Structured investment documentation → project data to management data

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Business Case</td>
<td>Qualitative Strategic Analysis</td>
</tr>
<tr>
<td>2- Discounted Cash flow model</td>
<td>Quantitative Economic Analysis</td>
</tr>
<tr>
<td>3- Investor Documentation</td>
<td>Combination and presentation of 1&amp;2</td>
</tr>
<tr>
<td>4- Investor Criteria Analysis</td>
<td>Support Research</td>
</tr>
<tr>
<td>5- Project Results</td>
<td>Management Data</td>
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</tbody>
</table>
Qualitative Strategic Analysis of Project:

- Questionnaire, interview and 1-to-1 session;
- Project description, PFD, SWOT analysis;
- Project Success Factors analysis: 1-5 scale Spider Diagram with 8 key indicators

### SWOT analysis

**Strengths**
1. The feedstock is readily available at different locations.
2. The value of CO₂ emission rights has not been incorporated yet.
3. The government is obliged to buy produced electricity at high fixed prices.

**Weaknesses**
1. Engineering and construction are proving lengthy, diverse and costly.
2. Operational development and execution resources are required for up-scaling.
3. There is a dependency on one party as supplier and buyer.

**Opportunities**
1. Growth of the asset portfolio.

**Threats**
1. Due to competition, speed of development is important.
2. There is a dependency on one party as supplier and initiator.

### Spider diagram

Project X has a well-developed project with large scalability potential, converting a waste product from rice production into a useful output; electricity.

The involvement of the large agricultural company supplying the residues leads to high input availability, a strong local partner and high scaling potential.
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- PSF analysis allows for structuring and conclusions on both a project level as well as a portfolio level, in an easily understood format;
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- Quantitative project analysis: P&L, Balance Sheet & Discounted Cash Flow Model

### Project IRR calculation

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>EBITDA</td>
<td>USD -767,696.26</td>
<td>2,444,045.06</td>
<td>3,529,248.05</td>
<td>3,882,172.86</td>
<td>4,270,390.15</td>
<td>4,697,429.16</td>
<td>5,167,172.08</td>
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<tr>
<td>Depreciation</td>
<td>USD -364,642.00</td>
<td>364,642.00</td>
<td>364,642.00</td>
<td>364,642.00</td>
<td>364,642.00</td>
<td>359,642.00</td>
<td>359,642.00</td>
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<tr>
<td>EBIT</td>
<td>USD -767,696.26</td>
<td>2,079,403.06</td>
<td>3,164,606.05</td>
<td>3,517,530.86</td>
<td>3,905,783.15</td>
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<tr>
<td>Net Taxes</td>
<td>USD -655,328.98</td>
<td>1,003,601.94</td>
<td>1,117,545.88</td>
<td>1,242,783.41</td>
<td>1,382,043.89</td>
<td>1,533,369.62</td>
<td>1,533,369.62</td>
</tr>
<tr>
<td>Capex</td>
<td>USD 3,000,000.00</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Changes in Working Capital</td>
<td>USD -</td>
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### FREE CASH FLOW

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<tbody>
<tr>
<td>Free Cash Flow</td>
<td>USD -3,767,696.26</td>
<td>1,788,716.08</td>
<td>2,525,646.12</td>
<td>2,764,626.98</td>
<td>3,027,606.74</td>
<td>3,315,385.27</td>
<td>3,633,802.45</td>
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<tr>
<td>Cumulative Free Cash Flow</td>
<td>USD -3,767,696.26</td>
<td>-1,978,980.18</td>
<td>546,665.94</td>
<td>3,311,292.92</td>
<td>6,338,899.66</td>
<td>9,654,284.93</td>
<td>13,288,087.38</td>
</tr>
</tbody>
</table>

### Project IRR - overall 7 years

- 60.11% -52.52% 8.98% 36.22% 49.36% 56.25% 60.11%

### Debt Service Coverage Ratio - avg. 7 years

- 33.51 77.59 19.44 21.77 24.37 27.30 30.59

### Discounted Free Cash Flow

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</tr>
<tr>
<td>Debt repayment</td>
<td>USD -150,000.00</td>
<td>150,000.00</td>
<td>150,000.00</td>
<td>150,000.00</td>
<td>150,000.00</td>
<td>150,000.00</td>
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<tr>
<td>Interest on debt</td>
<td>USD 31,500.00</td>
<td>31,500.00</td>
<td>28,350.00</td>
<td>25,200.00</td>
<td>22,050.00</td>
<td>18,900.00</td>
<td>15,750.00</td>
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<td>Net Taxes</td>
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### Equity IRR calculation

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<tbody>
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<td>Capex</td>
<td>USD 3,000,000.00</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Debt</td>
<td>USD 1,500,000.00</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
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### FREE CASH FLOW TO EQUITY

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</thead>
<tbody>
<tr>
<td>Free Cash Flow to Equity</td>
<td>USD -2,299,196.26</td>
<td>1,607,216.08</td>
<td>2,347,296.12</td>
<td>2,589,426.98</td>
<td>2,855,556.74</td>
<td>3,146,485.27</td>
<td>3,468,052.45</td>
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<tr>
<td>Cumulative Free Cash Flow to Equity</td>
<td>USD -2,299,196.26</td>
<td>-691,980.18</td>
<td>1,655,315.94</td>
<td>4,244,742.92</td>
<td>7,100,299.66</td>
<td>10,246,784.93</td>
<td>13,714,837.38</td>
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</tbody>
</table>

### Equity IRR - overall 7 years

- 89.80% -30.10% 41.87% 69.41% 81.31% 86.95% 89.80%

(data is for illustrative purpose only)
UMA Commercial Support Program

- **Sensitivity Analysis:**

<table>
<thead>
<tr>
<th>Project data</th>
<th>Baseline</th>
<th>Sensitivity</th>
<th>New project data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input 1 - price</td>
<td>45.00</td>
<td>100%</td>
<td>45.00</td>
</tr>
<tr>
<td>Output 1 - price</td>
<td>250.00</td>
<td>100%</td>
<td>250.00</td>
</tr>
<tr>
<td>Capex</td>
<td>4,755,200.00</td>
<td>100%</td>
<td>4,755,200.00</td>
</tr>
<tr>
<td>Equity share</td>
<td>50%</td>
<td>100%</td>
<td>50%</td>
</tr>
<tr>
<td>Debt interest rate</td>
<td>7%</td>
<td>100%</td>
<td>7%</td>
</tr>
<tr>
<td>Equity return rate</td>
<td>18%</td>
<td>100%</td>
<td>18%</td>
</tr>
<tr>
<td>WACC</td>
<td>11.38%</td>
<td>-</td>
<td>11.38%</td>
</tr>
</tbody>
</table>

### Project Key financial indicators

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>Equity IRR</th>
<th>Project IRR</th>
<th>Cumulative profit</th>
<th>Cumulative FCF</th>
<th>Avg. EBITDA</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>54.1%</td>
<td>35.6%</td>
<td>$12,546,617</td>
<td>$10,480,395</td>
<td>$3,089,169</td>
<td>$5,162,146</td>
</tr>
<tr>
<td>New Scenario</td>
<td>54.1%</td>
<td>35.6%</td>
<td>$12,546,617</td>
<td>$10,480,395</td>
<td>$3,089,169</td>
<td>$5,162,146</td>
</tr>
</tbody>
</table>

| % Change       | 0.0%       | 0.0%        | 0.0%               | 0.0%           | 0.0%        | 0.0%   |

### Project success indicators

- **Project Input: Length of Market**
- **Sales: Length of market**
- **Team: project development**
- **Sales of Output: Contracted**
- **Availability O&M**
- **Availability PC (as part of EPC)**
- **Scalability of the project**
- **Team: day to day execution**

### Changes in Key financial indicators

- **NPV:** 0.0%
- **Avg. EBITDA:** 0.0%
- **Cumulative FCF:** 0.0%
- **Cumulative profit:** 0.0%
- **Project IRR:** 0.0%
- **Equity IRR:** 0.0%

(data is for illustrative purpose only)
UMA Commercial Support Program

- **Sensitivity Analysis ➔ real time updates**

<table>
<thead>
<tr>
<th>Project data</th>
<th>Baseline</th>
<th>Sensitivity</th>
<th>New project data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input 1 - price</td>
<td>45.00</td>
<td>125%</td>
<td>56.25</td>
</tr>
<tr>
<td>Output 1 - price</td>
<td>250.00</td>
<td>115%</td>
<td>287.50</td>
</tr>
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<td>Capex</td>
<td>4,755,200.00</td>
<td>75%</td>
<td>3,566,400.00</td>
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<tr>
<td>Equity share</td>
<td>50%</td>
<td>50%</td>
<td>25%</td>
</tr>
<tr>
<td>Debt interest rate</td>
<td>7%</td>
<td>100%</td>
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<td>100%</td>
<td>18%</td>
</tr>
<tr>
<td>WACC</td>
<td>11.38%</td>
<td>-</td>
<td>8.07%</td>
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### Project Key Financial Indicators

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>Equity IRR</th>
<th>Project IRR</th>
<th>Cumulative profit</th>
<th>Cumulative EBITDA</th>
<th>NPV</th>
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<td>35.6%</td>
<td>$12,546,617</td>
<td>$3,089,169</td>
<td>$5,162,146</td>
</tr>
<tr>
<td>New Scenario</td>
<td>103.4%</td>
<td>52.2%</td>
<td>$14,280,959</td>
<td>$3,385,737</td>
<td>$8,598,660</td>
</tr>
</tbody>
</table>

| % Change          | 91.1%      | 46.7%       | 13.8%             | 23.8%             | 9.6%    | 66.6%  |

### Project success indicators

- **Prof & Loss**
- **Profit & Loss**
- **Profit & Loss**
- **Profit & Loss**

### Changes in Key financial indicators

(data is for illustrative purpose only)
Based on qualitative & quantitative data, strategic analysis of the project is executed

48 indicators to be able to better assess projects likelihood of success and sustained financial, social and environmental gain

Result in Management data to analyze current and future proposals

<table>
<thead>
<tr>
<th>Category</th>
<th>Explanation</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Development Building Blocks</strong></td>
<td>Key-variables which need to be in place for successful project development</td>
<td>Risk free presence of feedstock, guaranteed output market, logistics, licensing, etc.</td>
</tr>
<tr>
<td><strong>Financial Parameters</strong></td>
<td>Standard economic measures used and understood by the global financial world</td>
<td>CapEx, OpEx, DSCR, IRR etc.</td>
</tr>
<tr>
<td><strong>Macro Data</strong></td>
<td>Geo-Political and Technological data</td>
<td>Sustainability, policy support etc.</td>
</tr>
</tbody>
</table>
Lessons Learned: Input

- Markets are looking for sourcing the most competitive option in feedstock resources.

- Feedstock with multiple end-use markets are likely be sold to the market offering the most attractive prices.

- Sensitivity analysis is essential given the changes in availability and market price fluctuations.

- Securing input is of key importance:
  - Engaging with local stakeholders greatly increases stability of the input.
  - Engaging with local and national policy makers for land-use planning and management, permits and licenses.
Lessons Learned: Output

• A stable output market is of vital importance for a project to generate cash flow and to attract project finance.

• It is essential to have vision in the market opportunities on both the short and long term.

• Long-term uptake of the biomass, and a reasonable price, are needed to justify the investment.

• The regulatory framework and an enabling environment are key for the bioenergy market.
Lessons Learned: local Stakeholders

- Strong local experience and network improves access to local partners, communities, and government support:
  - Combination of local and international partners
  - Combination of capabilities in the team
  - Experience with institutional environment, S&D and technical expertise

- Involving local stakeholders increases the chances of successfully gaining access to financial resources.

- Cross-cutting nature of bioenergy means coordination and understanding among policy makers, industry and finance is required.
# Lessons Learned: Do’s & Don’ts

<table>
<thead>
<tr>
<th>Do’s</th>
<th>Attention points</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Structured Project Development is paramount for all projects.</td>
<td>• Don’t deviate from standards, use common denominators (M3, MT, etc).</td>
</tr>
<tr>
<td>• Be clear and precise with your information, opinions and project strengths &amp; weaknesses.</td>
<td>• Develop scalable projects.</td>
</tr>
<tr>
<td>• Calculate a conservative case and present sensitivities.</td>
<td>• Key investment criteria of financiers mirror EE Project Success Factors.</td>
</tr>
<tr>
<td>• Keep the core project team small and lines short.</td>
<td>• Financiers prefer projects with larger size: bundle small projects.</td>
</tr>
</tbody>
</table>
FUMA Funding Facility

• On behalf of RVO, Everest Energy is now tasked with the development of:
  – Open ended funding facility, starting with the DBM/DBI project-base
  – Investigating barriers-to-launch and recommend solutions to launch

• Goals of the fund:
  – Provide funding for growth of renewable energy projects which help improve both sustainable as well as economic development.

• Fund Development phases:
  – **Phase 1**: clustering of project in Portfolios based on KFI, project funding requirements and preconditions of an investment portfolio.
  – **Phase 2**: match Portfolios with Investors: analyse criteria for investor selection; catalogue operational requirements of every project portfolio and investigate the potential match
FUMA - Lessons Learned

Via the FUMA investigation, EE has examined the best ways to finance a portfolio of bioenergy projects:

• Structure the project before approaching funders.

• The most eligible sort of investors prove to be Development Banks and Funds, Private Equity and Credit Enhancement Agencies.

• Commercial (High Street Banks) have difficulty servicing the demand of bio-energy projects.

• Investors recommend to use an existing infrastructure for a new facility and to work together with partners who have similar interests and goals.
  – Bundle small projects;
  – Make optimal use of synergies between projects;
  – Structuring project finance to a portfolio of projects with similar risk/return profiles and cash flow patterns increases financing potential.
Conclusions

- Experience indicates that project development requires a specific skillset and the presence of this skillset greatly improves chances of success.

- Analyzing projects on the basis of key performance indicators gives a quick and thorough view of project’s barriers and opportunities in a comprehensive and ready to use manner for project partners, policy makers and investors alike.

- Financiers key investment criteria mirror EE Project Success Factors:
  - Risk-free presence of feedstock; presence of buyer for log-term cash flow; strong management team; etc.

- Financiers prefer projects with larger size, for small projects bundling should be considered.

- Involving national and local stakeholders will lead to increased stability of the input and output markets of the bioenergy system.
The Way Forward

• Project Structuring is of key importance to:
  – Attract project finance;
  – Manage project risks;
  – Provide long-term project stability.

• Combine qualitative & quantitative tools: PSFs + DCF + Sensitivity.

• The best way of structuring small to mid-size projects is a balanced approach where all the project building blocks are well developed.

• The most eligible sort of investors for bioenergy projects prove to be Development Banks and Funds, Private Equity and Credit Enhancement agencies.

• Also public entities and NGOs will need to work with project development tools to best evaluate and present their projects.
  – PANGEA and Everest Energy in Africa
Contact details

We invite you for an open discussion and look forward to your reply.

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Zeist, The Netherlands