

**BIN2BEAN training series -
Attracting private investment
for biowaste-to-soil improver
innovations
Webinar**

*Unit 3: How do you prepare
for an investment decision?*

by Henning Friege



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Necessary steps: from market analysis to creating an estimated business case.

- 1. Demand and Market Analysis** (Strategic Considerations, Make-or-Buy Decision)
- 2. Plant Sizing** (Process Parameters, Plant Components)
- 3. Investment Analysis for Plant Design**
- 4. Cost Calculation for Plant Operation** (Fixed Costs, Variable Costs)
- 5. Revenue Forecasts**
- 6. Income Statement** (Return on Investment Calculation (PVM), Sensitivity Analysis)

Strategical considerations

Are there any existing facilities? What about the regional WMP? What are the competitors doing? What type of soil improvers/fertilisers do farmers need?

Is there a gap in the market that we can fill? How can we be faster, better, and more cost-effective? What about the soil type, carbon content, nutrients etc. in the area (-> EUSO)

What should the company do itself, and what should be outsourced?

Plant construction, operation: maintenance, bookkeeping, cleaning...

Extend the company's value chain?

Own collection fleet? Own marketing activities? Tap into additional (geographically or otherwise distinct) markets?

Cost estimation based on known facilities, using depreciation exponents and price indexation

Y₁: Capital requirements for the existing plant

Y₂: Capital requirements for the new plant

X₁: Capacity of the existing plant

X₂: Capacity of the new plant

m: Depreciation exponent

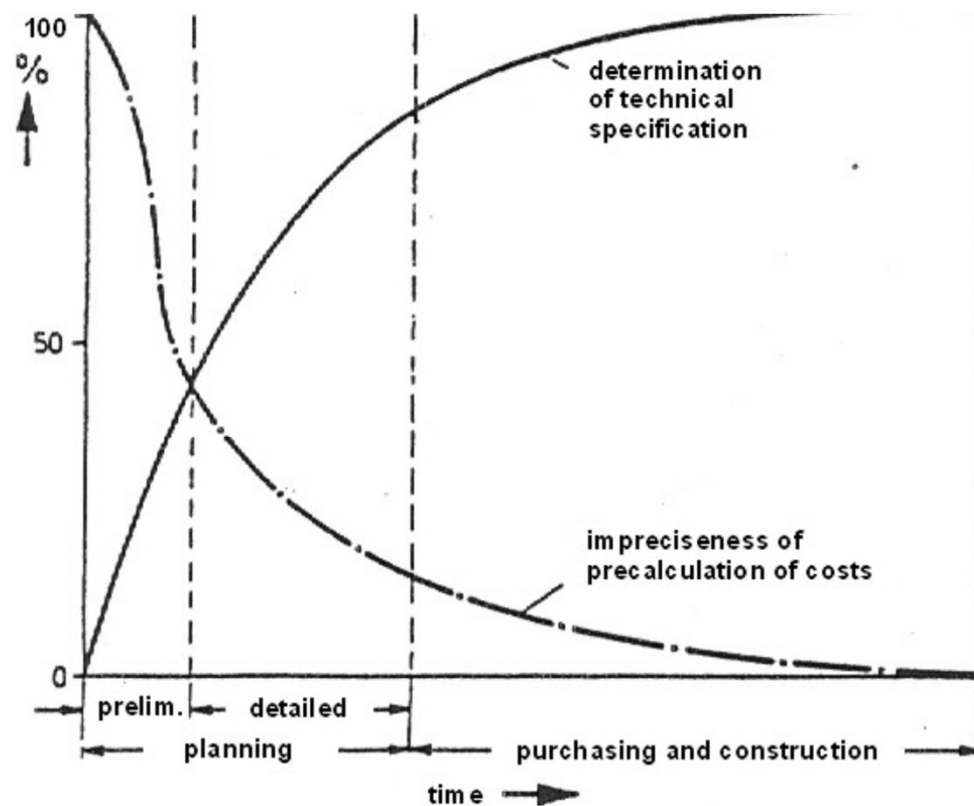
f(t): Price increase factor

$$Y_2 / Y_1 = (X_2 / X_1)^m$$

$$Y_2(t) = Y_2(t=0) \times f(t)$$

From cost estimates to the business plan

The relationship between the status of technical planning and the certainty of the overall cost level.



Cost estimate of the plant (Investment)

- Land (purchase, lease)
- Initial costs / project development
- Engineering services for the client: planning, construction, building services
- Building construction (operational buildings) / civil engineering / infrastructure, including utilities
- Machinery / mechanical equipment
 - e.g. fermenters
 - e.g. gas engine / combined heat and power plant
 - e.g. gas storage tanks, gas flare
 - e.g. output storage (digestate)
 - e.g. vehicles (wheel loaders, forklift trucks)
 - e.g. inclined conveyors, tunnel conveyors, drives
 - e.g. composting
 - e.g. sieves, grinders



Beware of cost drivers!

Technical cost drivers:

- Highly reductive or oxidative conditions: special steels
- Abrasive waste and stones
- Additional separation and pre-sorting steps

Conceptual cost drivers:

- Wide variety of units
- Different suppliers
- Custom-made solutions
- High degree of automation

Beware of cost drivers!

Cost drivers related to construction time

- Construction delays
- Higher component prices, losses due to delayed commissioning, and increased costs for construction supervision

Financial cost drivers

- Unusual ratio of equity to debt
- Additional collateral and/or higher interest rates
- General interest rate levels
- “Taxonomy problem”

Business plan

Investment costs

- Depreciation
- Interests

Staffing costs

Cost of materials

Outside services

Revenues from waste and products

Operating income

Taxes

EBIDTA

EBIT

EBT

Return on invest?

“**Net present value** (NPV), also known as net present worth (NPW) is a method for assessing whether future amounts of money are worth more or less than the cost of an investment made today. It is widely used in finance, economics, and project evaluation to judge whether a planned activity is expected to create value. NPV works by converting future cash flows into their “present value,” recognising that money available now is more valuable than the same amount received later. This adjustment reflects factors such as interest rates, inflation, and the opportunity to use money for other purposes.” (https://en.wikipedia.org/wiki/Net_present_value)

$$C_0 = Z \cdot \frac{(1+i)^n - 1}{i \cdot (1+i)^n}$$

→ Difference between the discounted benefits and costs over time.



Thank you

Dr. Henning Friege

N³ Thinking Ahead

Friege@N-hoch-drei.de

