

One Euro Makes the Difference

The SEEGER CONCEPT - the Key to Success



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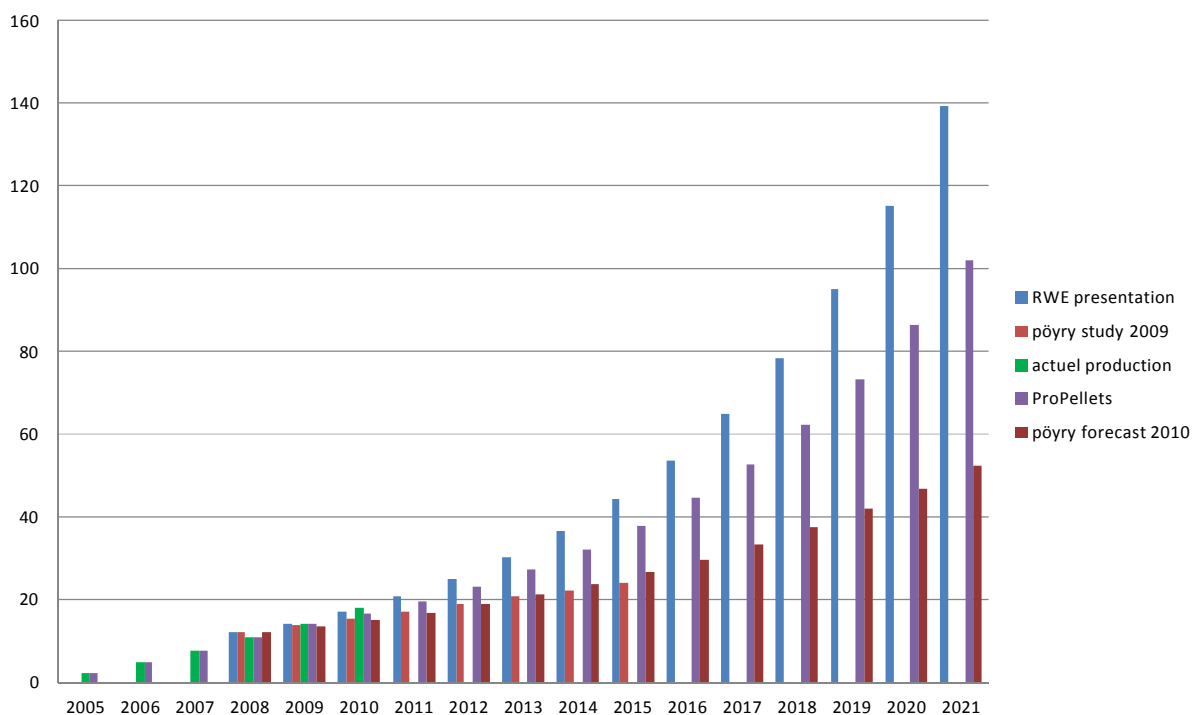


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Introduction

The demand for pellets develops differently. On the one hand, the pellet market for A1 quality pellets in Central Europe is only slightly increasing. Presuming a continuously slow growth rate during the next years the demand for pellets can be surely satisfied due to under-utilized production capacities within Europe. On the other hand the demand for pellets to be used for industrial power generation in large power plants is greatly increasing. According to different forecasts (see following graphic) the production of industrial pellets would have to triple by 2015 to provide the additionally required 12 Mio metric tons of industrial pellets.

FUTURE PELLET DEMAND: Mio. metric t/a



Numerous investors are now making great efforts to install pellet production facilities at different sites all over the world to respond to the forecasted demand.

WE, the company SEEGER ENGINEERING AG and its affiliate SEEGER GREEN ENERGY (USA), have been working for more than 30 years in the bio-energy market as independent engineering office. While pursuing our business we continually saw plants which had not been designed by us. Numerous facilities had difficulties in achieving the output target. As an expert commissioned by plant operators we often detected safety defects and weak points due to planning deficiencies at these facilities. We can look back on many years of experience with pellet productions plants which were all successfully planned by our company. Additionally we achieved great expert knowledge when evaluating facilities which were not designed by our company. We took these two aspects as a reason to ask why so many plants which do not achieve the output targets often lacked professional advance planning.

The answers mostly showed that people had been unaware of the complexity of a pellet production plant and that they wanted to save the costs for professional and independent planning services. That these services only increase the production costs per metric ton by one Euro, but ensure the technical and economic success of the overall project – this aspect was often neglected. This article intends to explain that it is justifiable to spend this Euro.

The SEEGER CONCEPT

The SEEGER CONCEPT is always based on an intensive examination of all prerequisites before planning in detail and deciding on an investment. Customer's requirements regarding the pellets and the production output set by the investor influence the concept which is developed step by step. During the planning phase the facility is dimensioned according to the available raw materials and adapted to the future plant site. Besides planning the logistics concept for raw material delivery, the raw material preparation system and the required intermediate storage the decision on the appropriate heat source is of major importance. If there is already a heat source on the intended plant site, it can be used for raw material drying. The temperature of the heat source determines the drying technology. Should a power plant provide energy in the form of low temperature steam, then drying can be carried out by means of a belt dryer. If the temperature level exceeds 160 °C, the use of a tubular bundle dryer is possible. This type of dryer can offer advantages since it is a more energy-efficient heat source compared to low temperature drying. If there is not a heat source, residues from wood preparation (e.g. bark, wood chips) can be used for heat generation in a directly or indirectly fired drum dryer.

It is impossible to give a general answer to the question whether to set up a power plant for heat generation at a site or not since costs for fuel and power purchase must be considered. Also CO₂ savings in own power generation can improve the energy balance and must not be neglected. Intensive concept development during the early planning phases helps to determine the necessary production steps. The required plant technology results from this concept and this helps to keep service and

maintenance costs low. This procedure is an important step to guarantee high plant availability and is thus decisive for a successful investment. Modifications during later planning phases mostly entail additional costs. The following graphic shows this interrelationship.

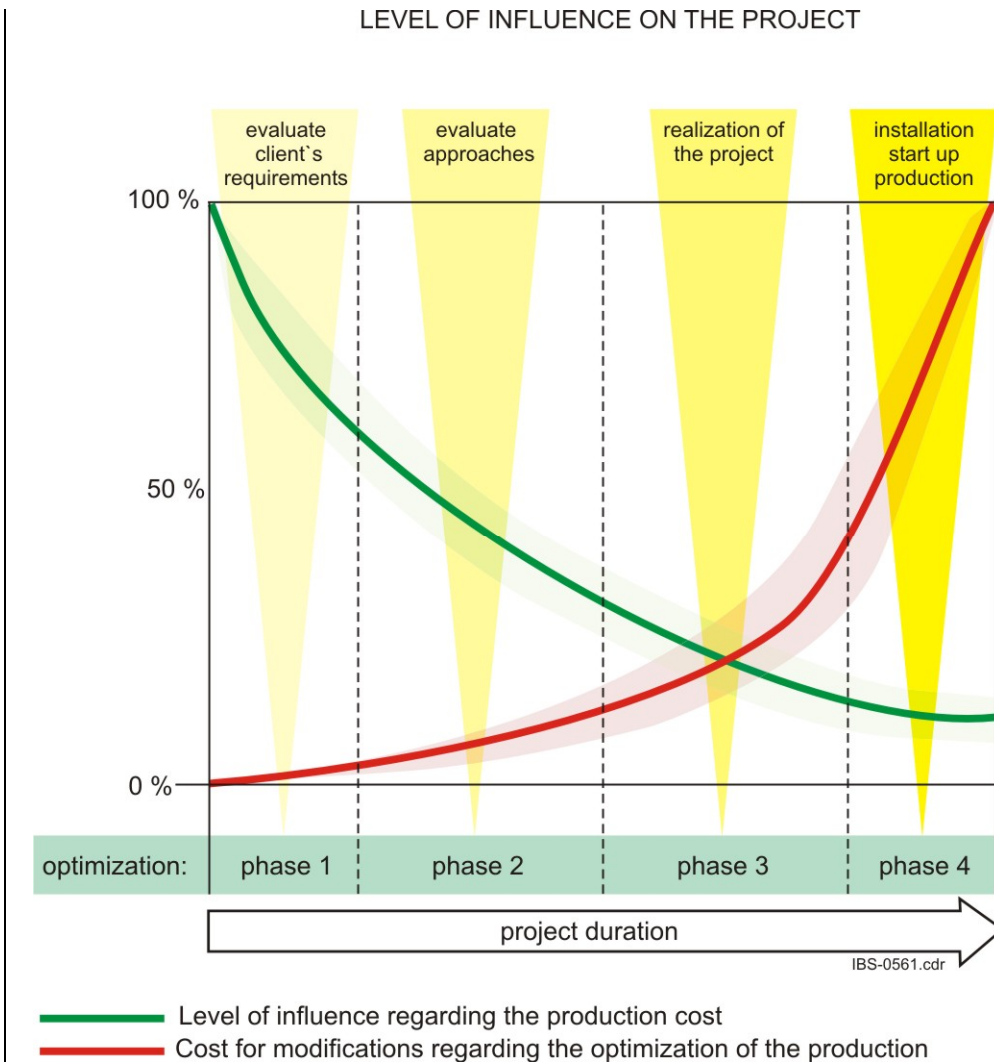


Figure: Level of influence on the project

The green curve shows how the influence on the development of costs declines during the course of the project. The influence on the overall project diminishes during project planning since most decisions have been made after contract placing (see figure above - end of phase 2). The red curve shows that the project costs and costs for possible modifications increase in case the concept must be changed during later project phases. Modifications after starting up production are very expensive, they often require plant shut-down and thus entail loss of production.

Advantages of Independent Planning:

After developing the basic concept detailed planning is coordinated with the Client and a market survey is made to find the appropriate technology. SEEGER

ENGINEERING AG is mainly responsible for the integration of the individual plant parts. The offered plant technology is integrated in such a way that the overall plant concept meets all requirements of an industrial facility. This procedure helps to keep plant availability at a very high level and to minimize operating and wear costs.

These plants are state of the art in terms of energy efficiency and achieve a long operating life. The pellet production plants meet highest requirements due to intensive process planning.

Cost Advantages for the Client

The planning steps require professional know-how and intensive work. This produces costs during the investment phase which are to be borne by the overall project. This money is well invested which is shown by so many successful projects realized by SEEGER ENGINEERING AG. It is realistic to calculate planning costs at approx. 1 Euro/metric ton of pellets for international projects. This is the price our customers pay for a professional planning concept which guarantees a safe, cost-efficient, sustainable and successful pellet production facility. The following figure shows the different cost proportions per metric ton of pellets.

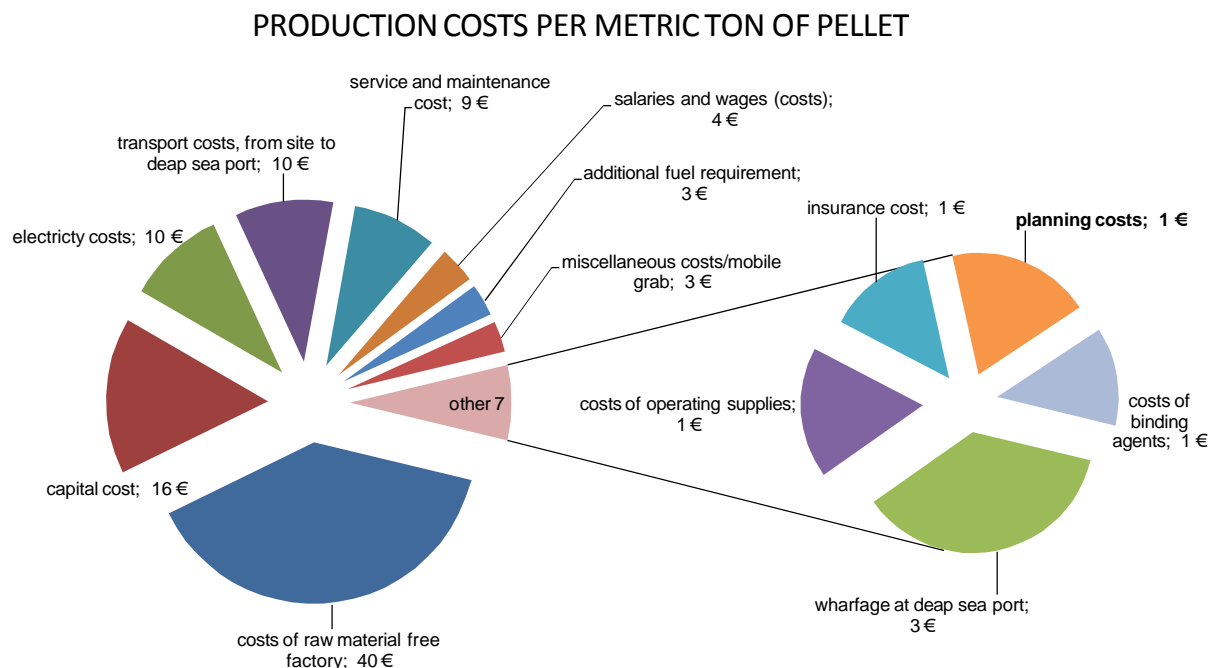


Figure: Cost proportion per metric ton of pellets

Often a first comparison of plants is only based on the investment. This one-sided view leads to the assumption that a lower investment entails more economic success. However, practical examples show that a professionally chosen and adapted plant technology at reasonable costs leads to success. It is unreasonable to

save on necessary investments and even dangerous to neglect safety concepts and in doing so endanger human lives.

The following graphic shows the specific investment for realized pellet plants with and without log preparation system. The investment costs for a plant with log preparation are approx. 25% higher. The graphic does not consider the use of different raw materials, drying systems etc.

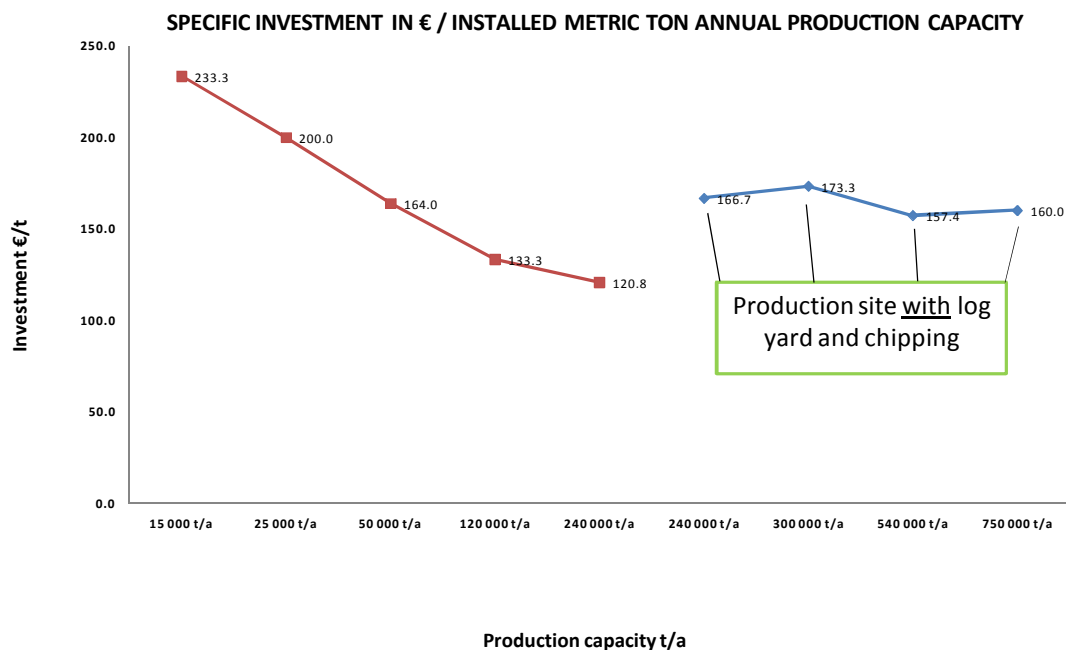


Figure: Specific investment costs

The investment for a pellet production plant with comparable technology is almost the same all over the world. Regarding profitability, however, the determining factor is if a plant constantly achieves its nominal capacity during the planned running time from the date of commissioning.

In summary, we can conclude that the investment costs are not decisive for efficient plant operation but the achieved annual production output which depends on numerous aspects. Thus professional planning should accompany a project from the initial idea through to project realization.

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