**COST ANALYSIS** 

Both materials consumption and production processes should be the subjects of cost analysis for solar cell producers. Photos (2): BSW-Solar

Cost analysis has long been an established tool in other industries, but the photovoltaics industry has scarcely begun to tap its potential.

# **Cost analysis in purchasing**

ost analysis – the automotive industry discovered it in the 90s. The renewables market, and especially the photovoltaics sector, can use this tool both to optimize costs and carry out successful price negotiations. Every business economist knows that basic calculation for profit is "sales minus cost". Thus, optimizing purchasing costs can have a positive effect on profitability.

Until now, the photovoltaics industry has been characterized by high demand with high market prices to match. But these days, this budding industry needs instruments like cost analysis more than ever. Investor wariness due to the financial crisis, overcapacities, and tougher competition is forcing companies to make use of this analytical instrument to survive in the market. The more the PV industry matures, the more it is subject to the rules of the "old economy" – the realm of the automotive and electronics industries, for instance. Manufacturers and dealers alike have to ask themselves: How can I make my product better? How can I be more competitive? How can I optimize procurement costs? Cost analysis can often reveal alternatives to existing products. In collaboration with manufacturers, development departments can find improved product alternatives by diagramming processes and questioning existing structures and methods.

Many mid-sized and large old-economy companies have dedicated cost analysis departments that do the legwork for decision-makers. Cost analysis departments work closely with engineering departments, for instance, to analyze competing products, consider technical issues, and calculate an optimal procurement price for the purchasing department. This type of work falls under the responsibility of personnel in cost analysis, engineering, and technology departments with extensive technical knowledge in their fields, as well as an understanding of current production methods, system prices, costs, and purchase prices.

There are a number of different aspects of cost analysis. The examples below are intended to help the reader understand the principle of cost analysis and how it can be put to use. They also offer approaches to implementing cost analysis in the photovoltaics industry.

#### The situation facing industry

Customer and supplier negotiations are characterized by conflicts of interest. Cost analysis is a method that uses facts as a basis for solving these conflicts. Transparent data help to achieve a result that satisfies both partners in the transaction. Together, the partners study product and process costs to identify optimization potential.

Thomas Kipp, head of the cost analysis department at German appliance manufacturer Miele, also pursues the goal of optimization: "Following internal preliminary work with our construction and development departments – and in coordination and cooperation with our suppliers – we were able to optimize costs at both the product and process level." Kipp and his team studied a supplier's product that had been manufactured for a fairly long time using the same materials and process. The analysis showed that an alternative material better served the functions required of the product.

Once Miele's experts had finished this groundwork, they sat down with the supplier to create an implementation plan to optimize the product. The plan took numerous technical and commercial details into account. For instance, the planning team determined which manufacturing tools needed to be changed and how many samples of the new part were needed for quality testing at Miele. They also worked out the cost of the new tools and how the anticipated cost reductions should be divided between the supplier and Miele. The change in materials allowed the supplier to simplify a production step, minimizing the reject rate and increasing the quality of the product. Ultimately, the supplier and Miele were both able to significantly increase competitiveness.

This example shows that cost analysis encourages transparency and openness between customer and supplier, which is a meaningful basis for successful cooperation. For Miele, with its very high quality standards, long-term partnerships with its suppliers create the necessary foundation for continuous improvement.

But Miele is just one cost analysis success story. In the automotive industry, successes also abound. According to Oktay Gürda, cost analyst in the purchasing department at Ford Germany, two key benefits of cost analysis are the ability to identify both cost disparities between supplier and market prices as well as cost drivers in parts prices. "Cost analysis also offers an opportunity to specify optimum manufacturing conditions and identify purchasing and commercial risks associated with suppliers." He also emphasized that building trust between customer and supplier was a significant goal of cost analysis.

## How can a company put cost analysis to use?

Gürda provided the following examples of scenarios in which the analytical instrument could be used:

a. The cost analyst determines that added value is much too high in the supplier's cost structure. Following intensive study and a visit to the supplier's manufacturing plant, it is evident that material consumption has been "rounded up".

b. Cooperation between the cost analyst, design engineer, and supplier results in a previously unrecognized option to switch to a more cost-effective material.

c. In studying the cost structure of the supplier, the cost analyst discovers that the supplier amortizes and insures his equipment at a higher rate than usual.

#### Cost analysis in the PV industry

Cost analysis can be used at both the manufacturer and customer levels all along the value chain in the production process. Wholesalers are the end customers for manufacturers; but if you consider the whole value chain, panel manufacturers are also customers of aluminium profile and solar cell suppliers, for instance.

• Company A procures solar panels as a dealer from manufacturer B. A can evaluate the manufacturing costs of the panel using cost analysis and obtain a lower purchase price in negotiations based on estimated costs.

• Company C is a solar panel manufacturer able to analyze its products and processes, using the resulting data to generate competitiveness analyses or develop new products.

• Another company is unsatisfied with its existing cost situation; the company studies its own products with a view to finding and taking advantage of cost reduction potential (target outcome). In the latter case,

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Each step in panel production should also be subject to cost analysis.

cost analysis serves as an instrument for studying individual components of a company's own products. Cost optimization can be achieved either by using alternative materials or by eliminating unnecessary process steps, thus saving time.

As a purchaser's tool, cost analysis makes it possible to represent product prices completely independently of the market price. This approach arises from the requirement to purchase based on manufacturing costs. Also, the "style" of buyer negotiations changes, since talk is not just about price in general; rather, buyers for solar companies are on an equal footing with their suppliers. Cost analysis experts can break production cost estimates down to the individual component level. With databases based on constant research and experience, they can estimate wage costs for different qualification levels and regions, for instance.

#### Criteria for implementing successful cost analysis

As a value analysis manager in the electronic components department, Hassan El-Bouloumi is responsible for cost analysis at Johnson Controls. The multinational company is one of the world's leading suppliers of automotive interiors, electronics, and batteries.

El-Bouloumi's experience has taught him that two criteria are critical to successful cost reduction projects: "First, management has to be committed – all the way up to the board of directors – to giving value analysis and production cost control the same priority as higher corporate goals." The second criterion he cites is to take a holistic approach: "Every department that influences the value chain of the product has to be involved in the project implementation." Once these criteria are fulfilled, one of the most important components of value analysis can be employed: function and cost analysis.

Dealers and manufacturers along the entire PV value chain – from silicon manufacturers and wafer producers, to final panel producers – are all asking themselves the same question: How can I offset cost pressures?

Cost structures have to be analyzed on procurement markets regularly – the price of silicon, for instance. The plausibility of supplier prices can then be assessed. Cost structures should also be analyzed in times of temporary supply-side shortages, even if the results cannot be used in any concrete way. Having a broad range of experience and comprehensive data is the only way to make serious, long-term judgements about realistic cost structures.

In the following example, we will discuss a cost analysis for a complete panel that a manufacturer might perform in order to take advantage of its own cost optimization potential. Cost analysis can be used in every phase of the value creation process.

First, the manufacturer has to make an itemized list of each part and process necessary to manufacture a PV panel. The product is broken down into its individual components; each type of material is recorded and then technically and commercially evaluated. Apart from the pure cost of materials, the following production considerations are important:

- How is the product manufactured?
- What machines are used to manufacture the product?
- How much does the machine cost?
- How many people does it take to run the machine?
  What kind of qualifications does the employee have to have?
- What is the throughput rate of the machine?





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#### Phases of the Miele cost analysis process



## Breaking down the cost analysis steps

Within the framework of the cost analysis process, both the product to be analyzed and the process used to manufacture it are specified and shown on a flowchart. Once comprehensive data is compiled, each process step is analyzed to determine whether production is set up optimally and whether each production step has been analyzed and evaluated with respect to cost. It is important to perform the analysis in project groups with the participation of personnel from every functional area. This gives the members of the project group a general understanding of how the object of the study is created. Teamwork also helps to define all of the functions of the product and to classify all of the costs associated with each function. Each individual process step must be evaluated in order to obtain the actual final production costs. This is the only way to determine the cost-effectiveness of various manufactured products and make the resulting strategic decisions.

Answering these questions lets the manufacturer discover and take advantage of its own cost optimization potential; either by making adjustments to the product, using other materials of equal quality, or by altering processes. Companies do not get this kind of insight over night, but putting in the effort pays off. A good cost analysis department, just like a good purchasing department, reduces costs over the mid and long-term and optimizes processes. Thus, it can be worthwhile to enlist the help of an external service provider. If an external consultant performs the cost analysis, it is important to make sure that all affected company personnel are involved from the very beginning because cost analysis always goes hand-in-hand with change management - especially in engineering and purchasing departments. Employees have to be shown the methodology and have a distinct and definable outcome explained to them. Relevant technical issues are shown on a process map.

#### Conclusion

In view of the anticipated size of the leading solar companies, as well as changing market structures, cost analysis activities in the photovoltaics industry are inevitable. Apart from the solar industry, other renewables industries, such as wind, bioenergy, and geothermal, will get on the bandwagon as well in the mid-term.

Consistent use of cost analysis can improve the long-term commercial and strategic position of a company. This analytical instrument helps to exploit significant potential. It can be used both to analyze internal processes and make suppliers' manufacturing processes clearer.

The structures of tomorrow's photovoltaics market will resemble those of today's "old economy" industries. Competition and cost pressure are key terms that will be increasingly associated with the PV industry. The sooner companies start paying attention to things like long-term planning, supply security, and competitiveness, the better their chances of survival will be on this dynamic market.

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