



Learnings from a 5-year Partnership with one of the World's Largest Products and Services Providers in the Energy Industry

Value Engineering Yields Tremendous Cost Savings
for a Traditional Engineer-to-Order Company

RESULTS AT A GLANCE

\$195 Million

Improved Annual EBITDA
through increased New
Product Revenue and
reduced costs

25 - 29%

Average cost
reduction

93%

Reduction in SKUs

Sustainment

Institutionalized
organization and culture
change for an on-going
journey to Lean New
Product Development

The Situation:

A \$2B global energy business providing products and services through 7 lines was experiencing the effects of the sharp market downturn. The downturn was squeezing margins driving the need for cost management. In any given year, the company sold over 40k part numbers. Half of the part numbers were ordered only one time, while every part number required extensive product development efforts.

Actions:

In the initial phase of our partnership, Argo introduced its proprietary approach to Value Engineering within a pilot set of products to test the merits of the methodology. In this pilot program, Argo led 20 product re-design initiatives with client teams and facilitated workshops to train and develop client personnel. Due to the success of the pilot, the client created an entirely new organizational structure to carry on this effort and deploy the next phases of the Value Management strategy.

Why Value Engineering (VE):

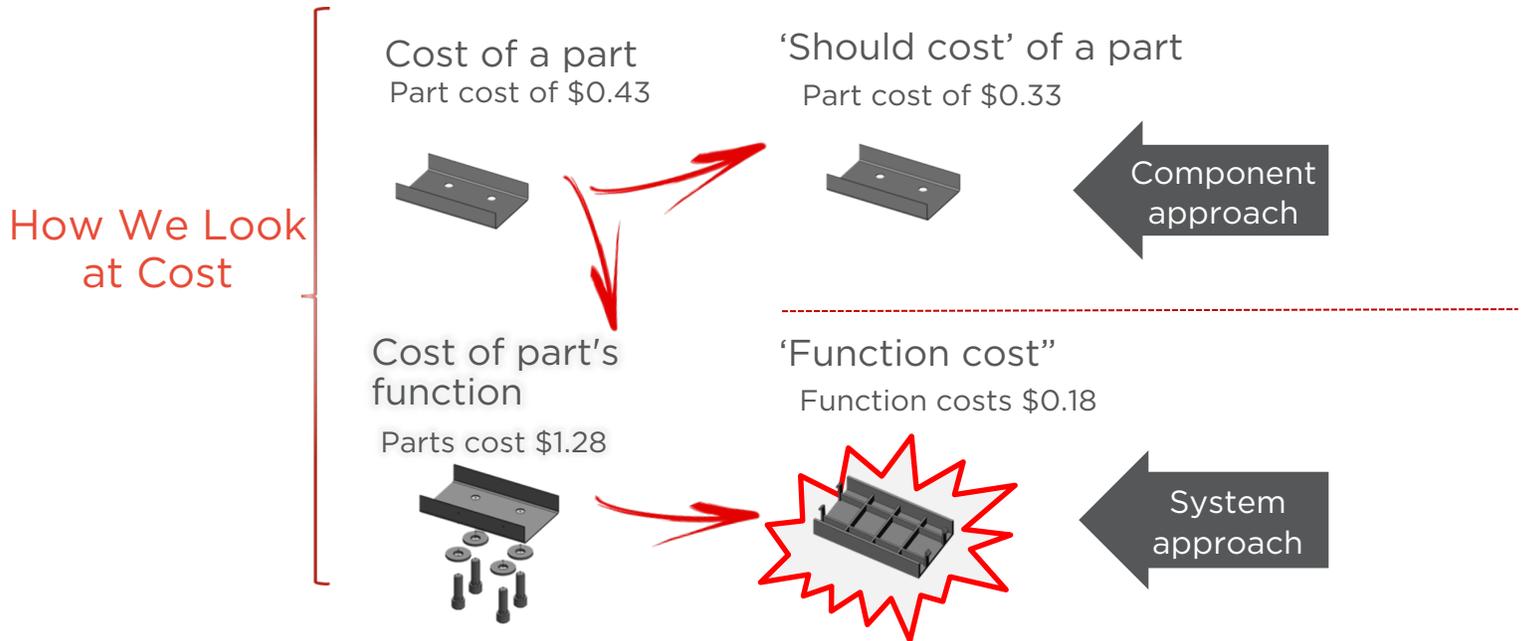
- Direct Material accounted for 70% of COGS (Cost of Goods Sold) for their manufactured products
- VE focuses on the system to maximize the amount and performance of functions at the lowest total cost
- VE is the most effective tool to minimize overall cost of ownership from a customer perspective

Value Engineering as a Value Creation Lever

Value Engineering (VE) is an intensive, interdisciplinary problem-solving methodology that analyzes product designs and focuses on improving the value of the desired functions. *Value* is defined as the ratio of function to cost. Typical approaches to cost reduction focus on reducing cost while preserving *minimum* function. ARGO uses a unique systematic set of proven techniques to work with clients in redesign of products and processes to maximize the overall function to cost relationship. The Argo approach concentrates on three areas:

1. Product design
2. Manufacturing process including Design for Manufacturing/Assembly (DFM/A)
3. Procurement & sourcing

Traditional programs focus on components, whereas the VE methodology focuses on the functions performed versus the cost relationship at a system level



Our Value Engineering Approach

This is where the real opportunities lie

Definition: Product Selection and understanding of portfolio, business, and market needs

Preparation: All necessary data are defined, team is selected and invited, competitors' products are selected, Voice Of the Customer is requested and suppliers are identified.

Workshop: The team works together full time. From function identification through design proposal calculations

Deployment: The implementation plan is defined with project manager assigned and Visual Management developed

Consolidate: Sketches and necessary designs are made and RFQ sent out. New Costed BOM is built up. Project Team comes together to freeze concept and create Program Of Demand

Sustainment: Deployment plan updated with consolidation information and plan execution and results tracked and monitored for proper execution

Elements from which the teams generate product design alternatives:

Voice of the customer

Engineering effort & processes

Supplier ideas, supply chain, sourcing

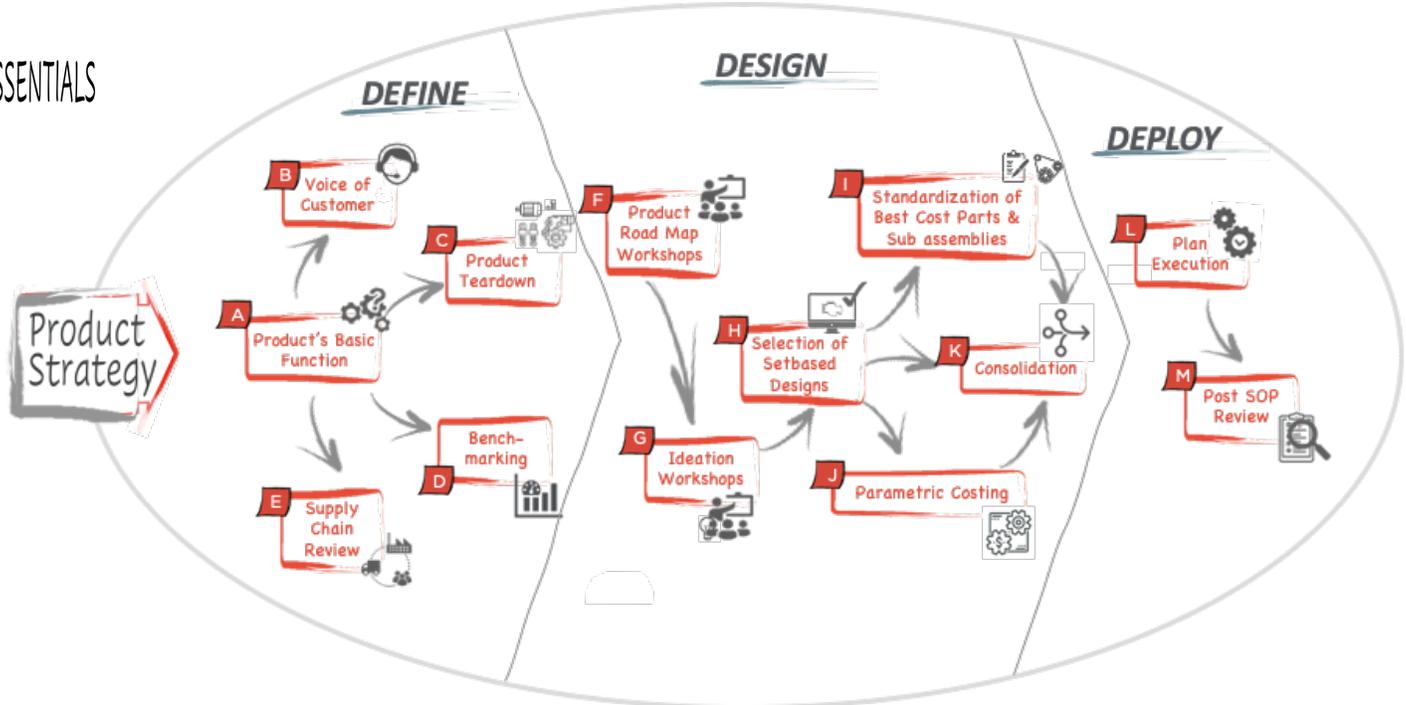
Benchmark

Function analysis, design challenges

Performance teardown

Together with the client, we decided to embark on a “VE-light” approach: a rigorously structured but shortened approach to help the client redesign their products and processes through intense concurrent engineering and multifunctional teamwork. Our holistic methodology drives success from a 3-step approach: **Define, Design, Deploy**.

3 ESSENTIALS



Product Strategy Product / Solution total lifecycle strategy is defined, incl. components
Define



A. Product's Basic Functions
Product's / Solution's Basic Functions are used to generate Concept Designs for now and the future (incl. long term vision). Also analyzed are product variants, options and take rates in order to understand opportunities for modular designs or platforms.



B. Voice of Customer, Market and Competitive Environment
Product / Solution Value Proposition will be defined based on a thorough market and competitive environment analysis. Purchase drivers will be defined correlated to actual and past sales (heat maps), market share evolution, competition offering, trends and regulations.



C. Products under study Teardown
Products under study / reference projects are physically or virtually torn down using parts or sub-assemblies, typically provided by the assembly plants, drawings or warehouses. Functions performed are identified and qualified (e.g. one time, safety, appearance, basic,...). Function costs are established.



D. Benchmarking
Products under study / reference projects are benchmarked against comparable competitors' products / solutions per market and/or region: Direct Competitor, High and Low End. Product's system basic functions design are benchmarked internally and against parallel industries. Additional competitors are also virtually benchmarked using data available online.



E. Supply Chain Review
Global Supply Chain footprint, internal and external, is mapped including sales network and density. Make versus Buy strategies are integrated, as well as LTA, MSA, etc. contracts with key or strategic suppliers.



Design
F. Product Roadmap Workshops
Design concepts are generated based on previously identified Product's / Solution's Basic Functions, on Megatrends, on upcoming regulations and after sales data (spare & wear parts, repairs,...). Offering and other variations are integrated in the financial roadmap.



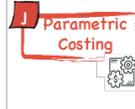
G. Ideation Workshops for design concepts', sub-systems', modules', platforms' Functions
Multiple Design Concepts and Design Change Proposals are created to fulfill "wanted" functions ie. 'What the customer is willing to pay for'. Functions brainstormed are based on either existing comparable products or detailed concepts. Crowd Based Innovation may be used.



H. Evaluation of Design Concept and Design Change Proposals (DCP). Selection of set based designs
The use of multiple sources generates hundreds of ideas that after a feasibility check can either be grouped in a set or need to be kept separate since they are mutually exclusive from others. All sets or DCPs are technically and financially evaluated according to a formal process.



I. Standardization – Platforms – modules – interchangeable sets of parts
It is crucial to understand the product portfolio, the market segmentation and 'go-to-market' strategy to establish platforms, common interfaces, and common, backwards compatible parts.



J. Parametric Costing
Software is used to identify optimal cost for functions from a design perspective, piece cost is studied to determine cost drivers, then "should-cost" is determined against cost libraries.



K. Consolidation
Estimated cost for proposed Design Sets are replaced with solid offers based on supplier quotations Engineering or from Operations. Carry-over or carry-back are validated. Costed BOMs / reference costs are rebuilt with new information and expected benefits are formalized.



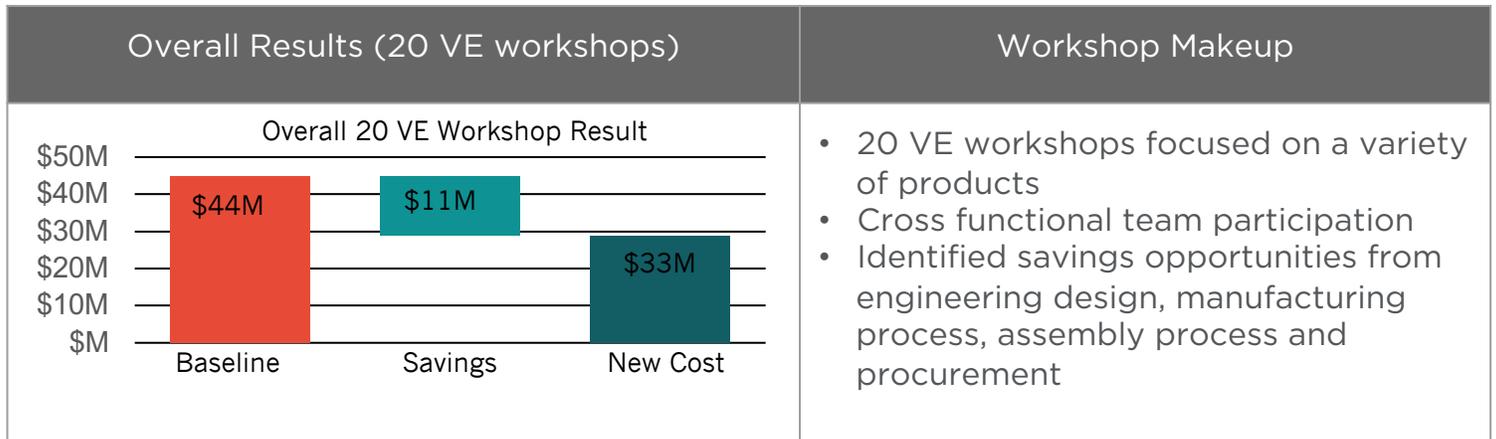
Deploy
L. Execution
Start with an implementation Master Plan based on validated assumptions. An execution rhythm and cadence is established, based on best-practice physical or virtual Visual Management Boards, incl. a risk mitigation structure



M. Post SOP
Hand over is made after ramp up to stable production, at defined O.E.E. and with minimum WIP. Skills matrices are up to date. Engineering references are updated, and project quotations re-evaluated

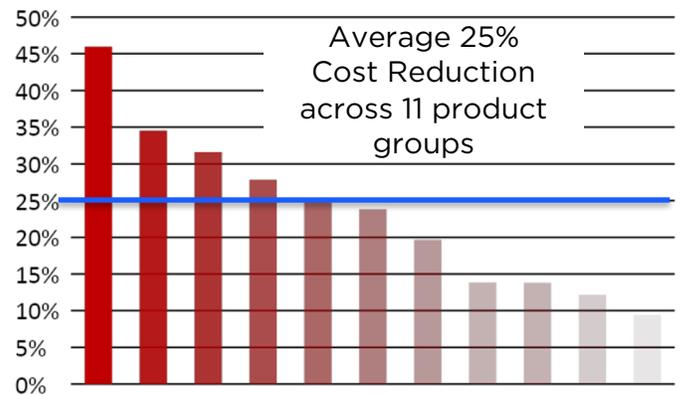
Value Engineering Workshops as part of the VE Project

The organization's top leadership was intimately involved by setting the business context for the effort. Then each workshop involved training every team member on the VE methodology including the history and purpose for the process.



Design Analysis

- Functions for every component were identified and costs estimated.
- Material choices, shapes, finish, tolerances, production routings, interfaces, etc. were challenged.
- High-cost functions were brainstormed for alternate design ideas, classified and ranked by opportunity to reduce cost.

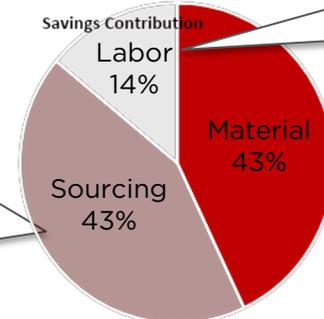


Workshop Report Out

Each team prepared and presented their findings to the organization's top management, including:

- Workshop Savings table
- Costed BOM
- Cost/Function Worksheet
- Cumulative Savings table

- Global supplier selection
- Minimum Order Quantities
- Kit components
- BUY vs. Make



- Design for Manufacture
- Reduced Machine Time
- Combine operations

- base material selection
- Combine parts
- Standardize components
- Eliminate redundancy

Sustainment - Training and Personnel Development for Client

Detailed training was provided for 3 Managers, 8 customer sales Engineers and several VE leads - to serve as ongoing facilitators of the process. The training was repeated as new members joined the team, until the client facilitators were able to provide all training and take ownership for the entire program.

A Manufacturing Process Review Example

The manufacturing process required an internal diameter of 4.5 inch on a lathe then be moved to a burnishing machine to hone a 32 finish. The team was able to find new tooling manufacturers that could achieve the 32 finish on the lathe, saving \$114 per unit.

About the Authors

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