estimate

estimate • analyze • plan • control

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SEER® by GALORATH

"Smart Sourcing" in a Global Environment Using Seer Hardware & Manufacturing Tools

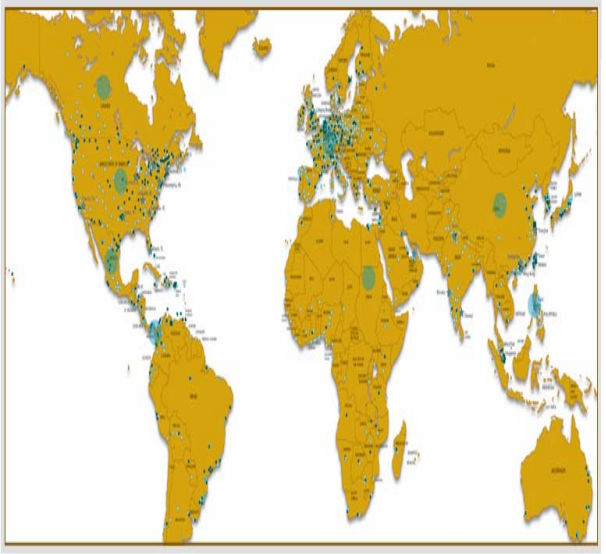
Presentation for

Galorath Incorporated Annual User Conference

“Smart Sourcing” in a Global Environment

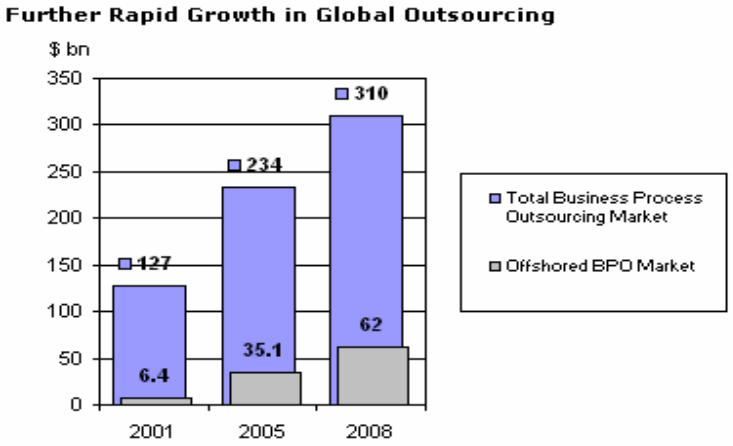
Global sourcing is a procurement strategy aimed at exploiting global efficiencies in production.

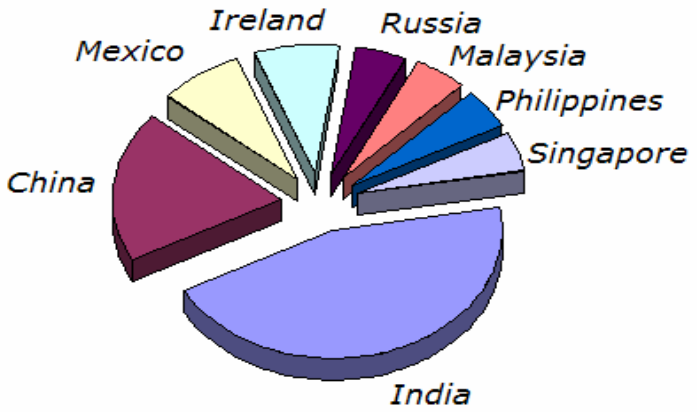
- A mechanism of exploiting cross-geographic arbitrages.
- Identifying cheaper global sources.
- Standard step in the global expansion of firms.
- Global sourcing advantages extend to:
  - Identifying alternate supplier sources
  - Utilizing buffer capacities and taking advantage of specific geographical talent pools
- Done for many reasons the primary one is to reduce and control costs.
  - Free up internal resources
  - Gain access to world class capabilities
  - Increase revenue potential
  - Reduce time to market
  - Increase process efficiencies
  - Follow company philosophy of outsourcing non core activities
  - Compensate for lack of appropriate skills



“Smart Sourcing” in a Global Environment

- With the rapid growth and expansion of global sourcing, organizations are capitalizing on all of the benefits it provides.
- Today India and China dominate the global sourcing directions of most companies particularly for those based in the United States and Europe.
- However, near-shore sourcing destinations such as South America and Eastern Europe form significant second-tier markets.
- It can also be called "near sourcing".





"Smart Sourcing" in a Global Environment

Why do I Need a "Should Be Cost" Model?

- With the global outsourcing migration it is worth a look from a financial perspective to get a feel for the magnitude of the effort as well as the potential value most companies are realizing.
- The problem simply put, what is the right price you should be paying for any given outsourced commodity?
- What is the total cost of that commodity in real terms?
- That's were the parametric cost tools from Galorath Incorporated can help.
- Organizations have now begun to recognize the real costs and inherent risks of outsourcing.
- Instead of simplifying operations, outsourcing often introduces complexity.
  - Increased cost
  - Friction into the value chain, requiring more senior management attention
  - Deeper management skills than anticipated
  - Forced to globalize and meet client demands for closer working relationships
  - OEM's and vendors alike face significant challenges
  - Including the prospect of diminishing profit margins without a clear understanding of the total cost equation.

Why do I Need a "Should Be Cost" Model?

- The typical business applications involved include:
  - Accounts payable
  - Accounts receivable
  - Payroll
  - Expense processing
- The value realized is between 20% and 40%.
- Representing significant increases in bottom line profitability.
- These percentages are achieved in reduction in overhead costs as well as direct headcount reduction.
- In the manufacturing arena the numbers of contracts are increased by 15% to 25%.
- The primary drivers are
  - Reduced labor costs
  - Increased availability of resources throughout the world.

Why do I Need a "Should Be Cost" Model?

Planning is of paramount importance.

- In the manufacturing sector there are multiple views of the global sourcing to consider:
  - A major priority is the "commodity management team".
    - Deals directly with the supply chain.
    - Spends significant time in negotiations to obtain the best product price.
  - This is critical as the impact on profitability can be significant over the life cycle of a program.

The one focus that appears to provide a good value proposition is:

- Utilizing a "should be" costing model during the negotiation phase.
- Empowering the commodity manager by providing
  - Product cost and variable information needed
  - Ability to leverage the data to obtain the best pricing possible.

“Should be Costing” Effort / Strategy

Development of the “Should be Cost” Estimate

- The primary objective of the estimation effort is to provide the commodity managers with “should be” cost model templates.
- Produced in the Galorath Incorporated SEER-HW & DFM models
  - Enhance supplier negotiations
  - Maximize the profitability for (customer)
  - By defining optimization of critical cost driving parameters such as
    - Selection of optimum materials
    - Manufacturing processes / operations Trade offs
    - Set-up and tooling amortization impacts
    - Lot sizing impacts
    - Automation levels utilized
    - Labor rates and efficiencies
    - Etc…
- The SEER models provide the commodity managers with:
  - Access to variables that have not been typically available
  - Utilization of the templates increase the ability to evaluate product pricing from different perspectives
  - Understand the driving pricing criteria and interactively obtain the best price possible.

Development of the "Should be Cost" Estimate

The study example chosen is a Jet Engine.

Defining the Study

Determine product classes that will be candidates for outsourcing.

- These can be broken into families or classes of products.
- Examples such as gears, turbine blades, castings and housings which are machining, castings, forgings, and molded parts could be considered a family unit.
- As well as total commodities like pumps, ducts, starters, and ignition units which are assemblies or complete units that will be inserted into the final end deliverables by the outsourcing company.

Utilization of the SEER solution suite can in effect do two basic but major things.

- For the developer of products and systems, part and assembly affordability are never in doubt.
- Galorath customers have saved a much as 80% from first cut designs to their redefined versions produced using Galorath Incorporated models.
- On the commodity side where you are buying from suppliers savings of as much as 25% can be realized and profit margins have see as much as a 50% increase.

(Customer) Families of Products Top Level View

General Description	Number of supporting Files
Disk, Turbine Engine	18
Shaft Output – Assembly	7
Scroll Assembly, Turbine	41
Wheel Turbine, Axial Flow	18
Pump, Main Fuel	5
Main Control Unit, Digital Electronic	32
Auxiliary Control Unit	12
Inlet Compressor	3
Turbine Assembly	10
Bearing Carrier	5
Torus Assembly, Turbine	12
Housing Assembly	18
Gear Shaft, Helical Output	13
Drive Quill	4
Blade, Turbine Rotor	17
Sub-Total	215 Files
Inter-related files	45 Files
Total	260 files

Development of the "Should be Cost" Estimate

Data broken down into Family of Products

- –Consisting of several files with some level of inter-related / dependent components
  - • "Make from", multiple configurations from tabulated data, and assembly / sub-assemblies.
  - •Conditions increase the number of files involved in the estimation effort to a few hundred in our example.
  - •Other strategies can be employed
  - •Such as setting families tied to key supplier's core competence, strategic alliances and long tern contracting or regional supplier classes etc.

All Parts & Assemblies are examined in detail and weighting factors applied to establish a baseline cost & price range.

- –Factors include geometric complexity, processes involved
- –Programmatic sizing's and quantity adjustments
- –Calibration using historical pricing data helps improve the accuracy of the estimates

These results afford the commodity manager the ability to formulate the best economies of scale from a cost view point and leverage a "Best Price".

"Should Be" Model Creation Effort	
Product Families 1 through 15	3 hours each / TBD
Number of individual component and associated Files	260 / TBD
Total Effort (Estimation)	780 Hours / TBD
Charge Per Hour	$150
Total Estimate	$117,000

Development of the "Should be Cost" Estimate

Family of Products Current Cost Estimate Results

To provide an example of the potential profitability the following value proposition will give a parametric range of benefits (Customer) can expect to receive.

- –To determine a cost baseline a few assumptions have been made to create the costs for the different families.
  - •Total number of products has been sub-divided, an estimate for each section has been applied, and a quantity per year is also estimated.
  - •If desired these numbers can be projected over the life cycle of the products.
- –The numbers are estimates only and not actual historical data.

•Forecasting a cost improvement using the models to establish a new cost baseline

- – Using 10% and 30% improvement levels

Family of Products / Current Cost Estimates				
Partition Breakdown	File / Components	Estimated / Per Unit Cost	Quantity Per Year	Estimated Costs Per year
Part Family I	65 Units	$1,750	350	$612,500
Part Family II	65 Units	$2,500	450	$1,125,000
Part Family III	65 Units	$3,500	575	$2,012,500
Part Family IV	65 Units	$4,500	1,200	$5,400,000
Estimated Total	260 Units	$12,250	2,575	$9,150,000

Family of Products / Current Cost Model Estimates @ 10% Improvement				
Partition Breakdown	File / Components	Estimated / Per Unit Cost	Partition Quantity Per Year	Estimated Costs
Part Family I	65 Units	$1,575	350	$551,250
Part Family II	65 Units	$2,250	450	$1,012,500
Part Family IIII	65 Units	$3,150	575	$1,811,250
Part Family IV	65 Units	$4,050	1200	$4,860,000
Estimated Total	260 Units	$11,025	2,575	$8,235,000

Family of Products / Current Cost Model Estimates @ 30% Improvement				
Partitioning Breakdown	File / Components	Estimated / Per Unit Cost	Partition Quantity Per Year	Estimated Costs
Part Family I	65 Units	$1,225	350	$428,750
Part Family II	65 Units	$1,750	450	$787,500
Part Family III	65 Units	$2,450	575	$1,408,750
Part Family IV	65 Units	$3,150	1200	$3,780,000
Estimated Total	260 Units	$8,575	2,575	$6,405,000

Development of the "Should be Cost" Estimate

Note that these numbers are conservative and higher savings should be realized leveraging the model information.

- –Based on the low savings using the 10% savings estimate.
- –To account for any differences between the estimated improvements and the historical cost data
  - •A 50% probability factor was applied

The resulting savings that can be expected is $457,500 and $1,372,500 respectively.

- –This does not include other ancillary factors like negotiation standardization, variable optimization, lot size allocations, actual material pricing, supplier capabilities and other considerations included in the model that will enhance the returns.

This provides a positive view of the effort proposed effort.

Worth taking a quick look at a cost / benefit analysis to get the ratio between the projected benefits and expenses using cash inflows versus costs.

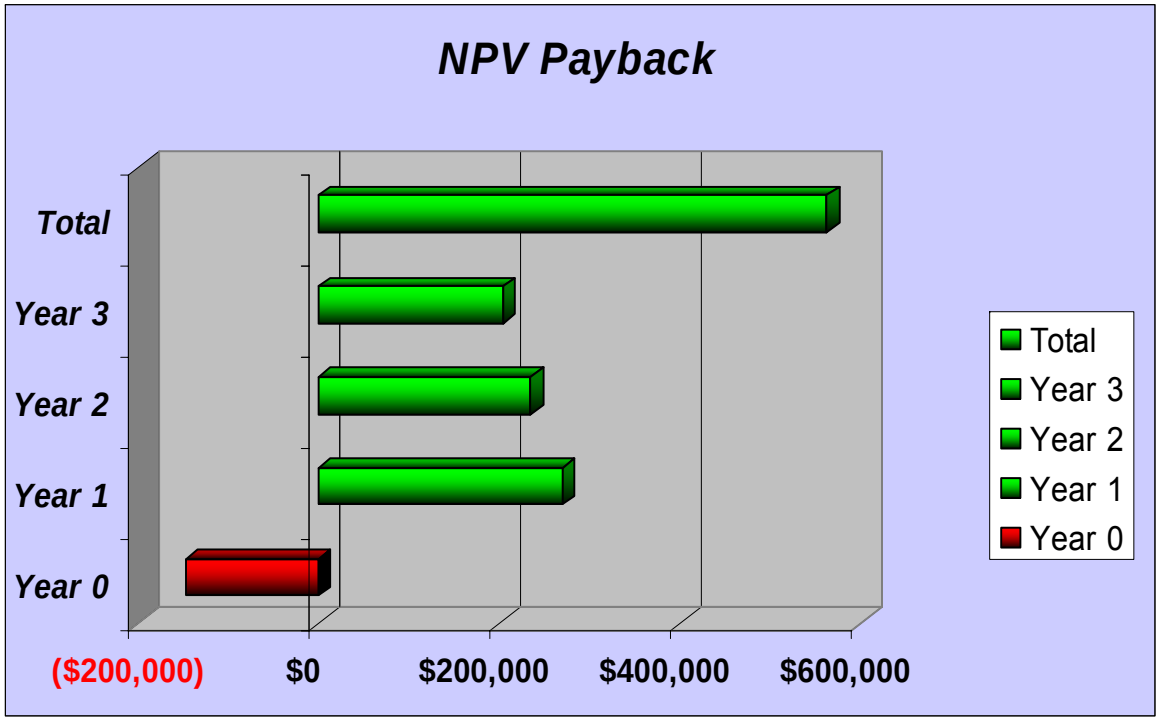
Cost / Benefit Model				
Year (t)	Estimate Development Expense	Model Procurement	Benefit	Net Benefit
Year 0	($117,000)	($30,000)	$0	($147,000)
Year 1	($117,000)	($30,000)	$457,500	$310,500
Year 2	($117,000)	($30,000)	$457,500	$310,500
Year 3	($117,000)	($30,000)	$457,500	$310,500
Total	($468,000)	($120,000)	$1,372,500	$784,500

Cost / Benefit Model NPV				
Year (time)	Estimate Development Expense	Model	Benefit	NPV Benefit
Year 0	($117,000)	($30,000)	$0	($147,000)
Year 1	($117,000)	($30,000)	$457,500	$269,925
Year 2	($117,000)	($30,000)	$457,500	$235,226
Year 3	($117,000)	($30,000)	$457,500	$204,276
Total	($468,000)	($120,000)	$1,372,500	$562,427

"The Payback Is"

The return percentage is approximately

"300%".



- This should be taken as a basis of possibility only!
- It covers a small four-year window
  - Based on the low estimate for returns
  - Does not include any benefits in the first year
    - Documented cases organizations have hit the ground running using the Galorath Incorporated models in negotiations.

“Should Cost “ Study Conclusions

- The models will help reduce outsourcing costs within the first two to three months.
- Using the four year example you can see the benefits.
- But if one were to extend this for a product or program life cycle for Twenty (20) years which is the norm in the case of our engine premise.
- Using a twenty (20) year case and if we hold all the other parameters constant the cash inflows are significant and the profitability to (Customer) is very high.
- A conservative view is in the range of several millions of dollars.
- As I have stated some of these numbers are estimates, as I am prohibited to use the actual data to incorporate.
- NPV Payback. What this illustrates is there is no risk associated with the estimation effort and the profitability picture is increased significantly starting at year 1.
- Again, this assumes no benefits will be received the first year and this in not expected to be the case.

The Commodity Manager – "Should be Costing Strategy"

The major benefits associated with the "Should be" modeling and supplier negotiation process are:

- Access to the many variables not normally available such as:
  - Process optimization
  - Example for machine parts
    - The cost variance between castings and forgings, bar stock machining and castings
    - Adjustments in tight tolerances
    - Materials selection
    - Vendor capabilities
    - Automation levels, condition and types,
    - Skills of staff, and experience with the specific type of work in question
    - Make trade studies for programmatic data like set up amortization, lot size modifications etc.

- The Goal is to make sure the commodity management team knows how to adjust parameters and evaluate the different prices.
  - A technology transfer session has to occur so there is a clear understanding of the SEER models
  - What is required to make parameter adjustments
  - Perform trade studies that will provide an immediate view of the pricing changes

The Commodity Manager – "Should be Costing Strategy"

The approach to the modeling is to utilize the SEER-models

- Team create the models as this compresses the overall cycle time to complete the models and ensured accuracy in the final product.
- Many organizations have and will engage their own individual manufacturing experts to complete these tasks.
- Training in the use of the SEER models will have to be utilized on two different levels.
  - First in-depth training for the developers of the commodity family or class templates
  - Developed by manufacturing experts an in-depth training curriculum in required.
  - The commodity managers need an overview and familiarization course which is offered in the SEER-model environment.
  - This is followed with a technology transfer sessions where we leverage the product models
  - Illustrate the process of optimizing the pricing with the adjustments of the different parameters in the model
- The main point is this approach is designed to bring commodity managers up to speed using an existing model in the negotiation process in a compressed time frame.

The Two Approaches to Estimating

SEER-HW
Hardware
Life-Cycle Cost Analysis

Parametric approach:

- Employs cost estimating relationships or equations
- Allows estimation based on measurement of key *parameters* that drive time and effort
  - Technical or physical characteristics of the product, personnel, and development environment
- Once relationships are known, parameter values can be changed and the effects evaluated

SEER-MFG
Cost designer for parts, process and assembly

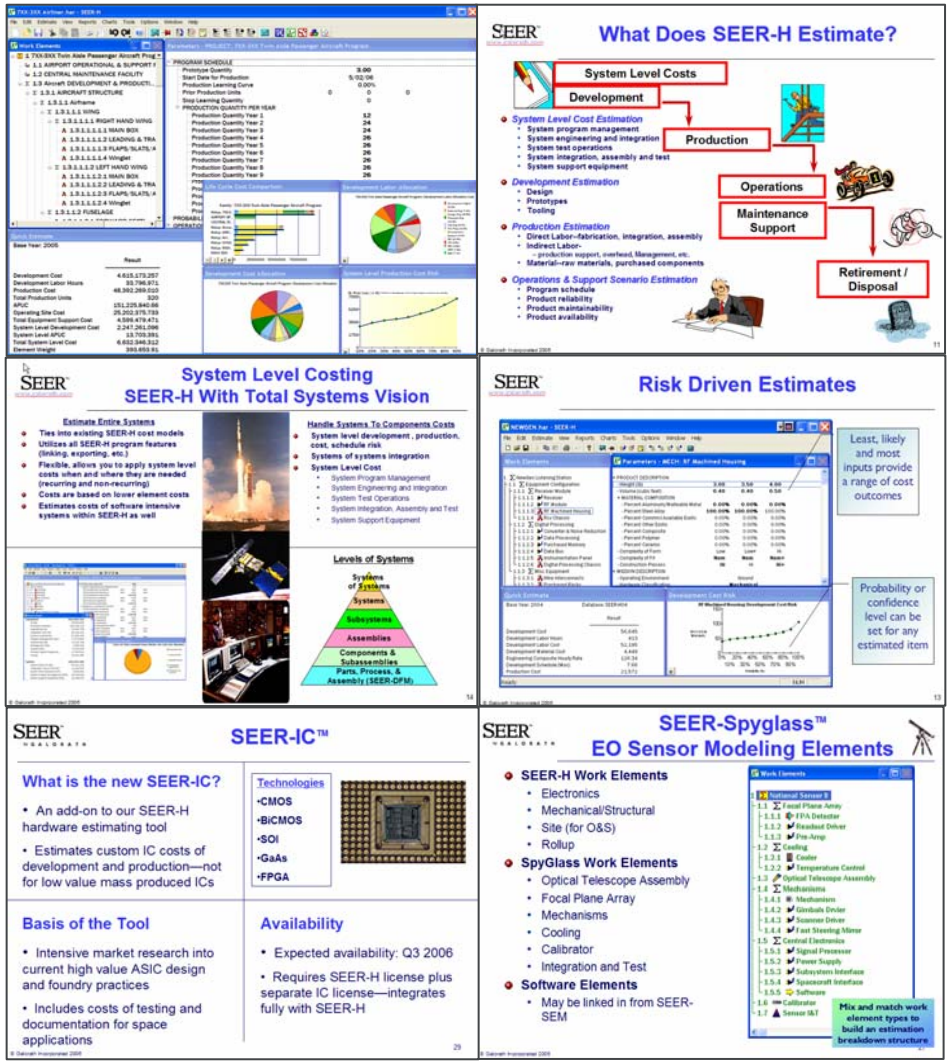
"Bottoms-up" Parametric approach:

- Measure everything directly and exactly
- Basis of estimate is Time & Motion Studies
- Each project/process task is unique
- Process steps analysis of alternatives
- Forecast Values Parametrically

SEER-HW™ *Life Cycle Cost Evaluation* Providing You With *Total System Vision*

SEER-HW™ Hardware Model Develops Schedule, Effort, Schedule, Risk, Cost and Staffing Estimates.

- Built in Mapping Data Base
- Analyzes complex and interdependent tradeoffs Evaluates quality and reliability
- Development & Production labor hours and material costs
- Enables CAIV Team's Understand & Manage cost drivers and project risks for all Project Life Cycle Stages
- Gauges Maintenance, Operations and support labor hours and material costs
- MTTR, MTBF, Spares Pipeline, Upgrades and lifecycle costs
- Covers System Level and System of Systems Costs
- Hosts Details Estimates from Other Program, SEM & DFM



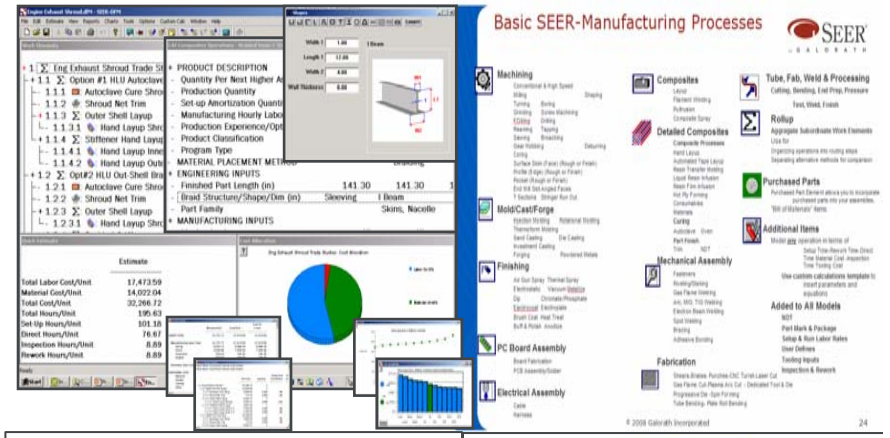
•**Product description - What is Being Built**
•**Mission description - How it Must Perform**
•**Program description - How it Will Be Built**

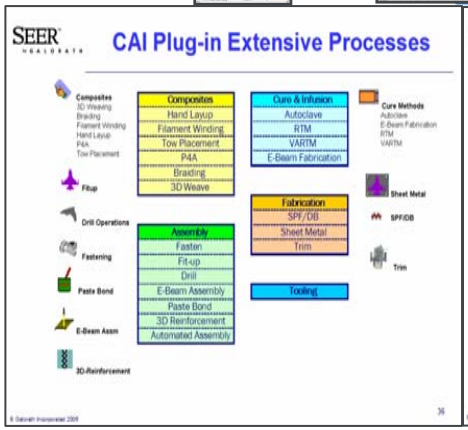
SEER-MFG™

SEER-MFG™ Bottoms –Up Parametric Cost Model Develops Estimates Average Unit and Total Production costs for Labor, Material, Tooling.

- Based on Standards "Time & Motion Studies"
- Parametric Forecasting-Estimates At the "Process" Level
- Bases Estimates on Process Parameters
- Part Size, Process Types and Steps, Lot Size, Etc.
- Provides Design Team with the ability to make Smart Decisions Early from the "Back of the Napkin" to the CAD Program Phases
- Performs Design & Manufacturing Trade Studies
- Provides the Design Team with Real Time Cost Feedback and a Systematic Repeatable Estimating Process
- Provides and Reports Production Cost Estimates in a variety of formats

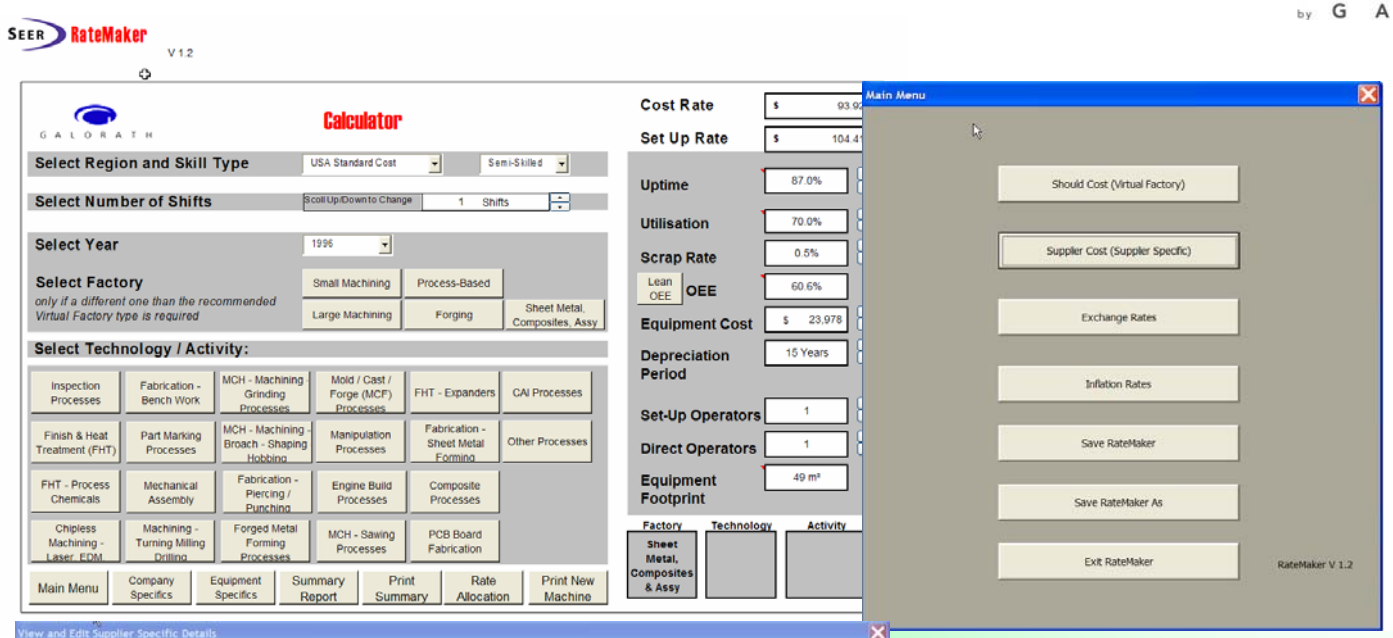
- Project & Part Roll Up Levels
  - Total & Average Project and Unit Production Costs for
    - Part Labor Costs , Tooling Costs, Material Costs
- The Manufacturing Process Level
  - Key Process drivers, Part Raw & Finished Weights, Key Process Variables and there Impacts on total Cost
  - Set Up Cost, Run Cost, Rework Cost, Inspection Cost, Material Cost, Tooling Cost





Answers the Design Build Team's Question "Which Way do we Go"

SEER-RateMaker



World-Wide Rate Templates

- Built in Templates
- Or Build Your Own Library
  - Company Specifics
  - Factory Specifics
  - Machinery Specifics
  - Set Exchange Rates
  - Set Inflation Rates

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