Making Soymilk "The Business"

National Soybean Research Laboratory

INTSOY™ INTERNATIONAL SOYBEAN PROGRAM

University of Illinois at Urbana-Champaign

June 6-10, 2010

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½ Gallon Soymilk
Price = US $ 3.99

½ Gallon Dairy Milk
Price = US $ 1.99

WHY?

SoyMilk is EASY to sell

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$$Enriched$$ with SOY??

FACT !

- Soy is 12X cheaper than Coffee
- Soy doesn't add flavor or aroma
- In the infusion Soy doesn't add nutrition
- Soy is perceived as the best ingredient.

Is it?

SOY has a GOOD image

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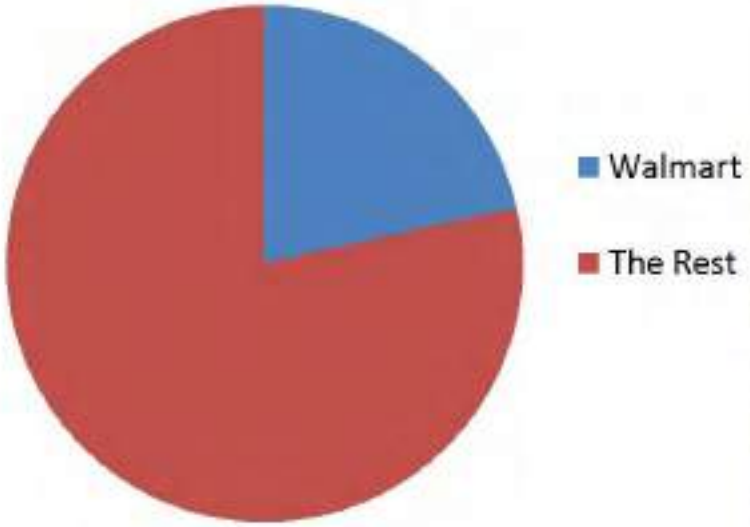
84
million dollars worth of soymilk sold in the U.S. in 1992

892
million dollars worth of soymilk sold in the U.S. in 2006



Grocery Sales in USA 2009
US $ 816 Billion (WM = 21.5%)

Top refrigerated kefir/soymilk brands
(Individual brands)

	DOLLAR SALES	% CHANGE VS. PRIOR YEAR	MARKET SHARE	% CHANGE VS. PRIOR YEAR
Silk	$259,351,600	(1.3)	46.5	(3.9)
Private Label	$91,936,800	44.8	16.5	4.3
Silk Light	$72,356,720	17.5	12.9	1.2
Silk Plus	$29,227,180	(1.3)	5.2	(0.4)
8th Continent	$25,402,370	(41.9)	4.6	(3.8)
Lifeway Kefir	$23,382,110	11.5	4.2	0.2
Meyenberg	$9,239,896	8.8	1.7	0.0
Hood Carb Countdown	$6,960,643	(6.9)	1.3	(0.2)
Organic Valley	$5,293,711	36.2	0.9	0.2
Horizon Organic	$4,408,129	915.1	0.8	0.7
Category Total*	$557,373,100	7.1	100.0	--

*Includes brands not listed.
Source: Information Resources Inc., Chicago, U.S. supermarkets, drug stores and mass merchandise outlets (excluding Wal-Mart) for the 52 weeks ending May 17, 2009.

SoyMilk Sales in 2010 USA
Projected to be over 1.1 Billion

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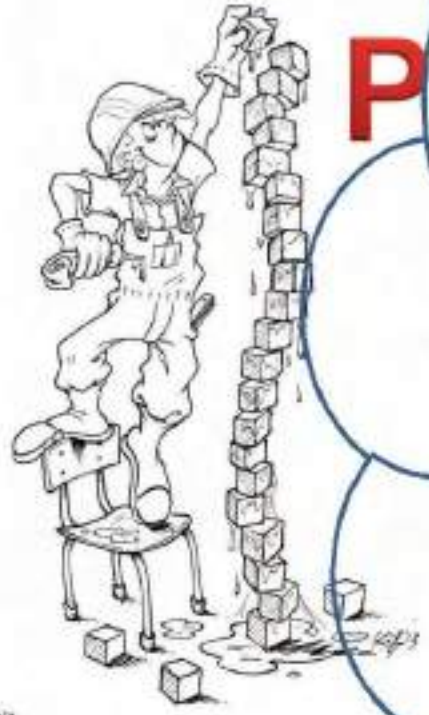
Building blocks in making SoyMilk … a Business

TECHNOLOGY



PRICE

PRODUCTS

COSTS

SIZE

MARKET

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- All variables in making SoyMilk are dependent of each other.
- Making Soymilk a business is partly a science and partly an art.
- Putting all these variables together determines the overall success of the operation.

MARKET

Is the most important driving force in defining a business.
Study your market and analyze your potential customers.
Needs, cultures, policies and consumption trends define a project.

- Supermarket chains
- Independent retailers
- Institutional Buyers
- Milk Programs
- Schools
- Military
- Hospitals
- Geriatric and Child care homes
- Home Delivery Services
- Airlines or Cruise Lines
- Private labeling for third parties
- International Aid Organizations

Packaging Alternatives

CUP

BOTTLE

BOX

BAG

GABLE TOP

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COSTS

Should costs determine your project or should your type of project define your costs? This depends on the available amount of capital. Always under promise and over deliver is a healthy practice when costing and pricing.

For a given size of a Soymilk project, as already determined by your market expectations and where packaging alternatives as well as product line-up have been defined, we may evaluate the spread out of costs as they influence in the overall assembly.

Most important variable costs.

- Beans
- Sweeteners
- Vitamins and Minerals
- Flavor and colors
- Packaging
- Secondary packaging
- Selling costs

Most important Fixed costs *

- Incidence of capital investment, interest for loans. Leases, etc
- Rent or the opportunity cost of owning
- Labor
- Energy (electricity, gas or fuel)
- Water

*some of the fixed costs have a variable component

PRICE

If Customers pay too much, they will not do it for long. If you overprice your products, you will only motivate your competitors.

- Determining price depends on how you evaluate your business.
- Similar products in the distribution chain have different margins, depending on how they are perceived.
  - Dairy products are a commodity with a higher stock turnover and hence have a lower margin. Manufacturers and retailers sacrifice margin for less time on the shelves.
  - If your product doesn't have the same turnover, you should allow for a higher margin in both ends. This increases final price paid by consumer.
  - If your product behaves as a regular grocery you should be making between 20 and 30% of your sales and the distribution channel should be netting between 25 and 40 %.
  - If your product behaves like dairy then margins are more likely to be 7 to 20 % with a corresponding reduction in retail margins, thus reducing final pricing.
- Pricing can be determined according to 2 different methods
  - Mark-up over costs
  - Pricing according to, or as a function of competition

PRODUCTS

Once a market has been determined, products should match preferences. Your product is the connection with the customer and remember "Love at First Sight" (bite)

- Presentation is the eye catching element. It's your magnet.
  - Brand…don't wait… it takes a long time and it will stay forever.
  - Graphics are what brings the bees to the flowers.
  - Labeling. Your label is your ultimate Billboard. "10 gr. of protein" doesn't say as much as "Contains more protein than a glass of milk". Labels should be as clean as possible: A degree in Chemistry should not be required to understand your ingredients.
- Nutrition becomes more important as customers become more educated. Always assume the highest level of customers possible, you can't go wrong.
  - Nutritional Values-The game play between proteins, fibers, fats and sugars will define your targets. Children, adults and the elderly have different necessities.
  - Vitamins and Minerals-From 0 to 60, there's much to be done. Add the basics, calcium, A and D, or go for the works the Mega Man formula.
- Flavors- Are what generates uniqueness and loyalty. If vanilla is the best seller in your market, don't disregard it, but try to have a your own recipe. A new flavor, if accepted, will be yours to stay. Explore the trends, grains, teas, exotic fruits, spices…

- How many flavors? Start with few flavors, trial and error will always be there, unless a magic wand is available. A small line-up of products will help your position on the shelves. Grow to have best sellers and try to stay away from thinking "Small demand items are compensated by other products".
  - Not all flavors must be made in all sizes.
- Functionality is becoming a trend to stay. Consider your niche.
  - Energy drinks
  - Antioxidants
  - Neural enhancers
  - Sex drivers
  - Soul feed
  - Relaxing drinks
- Packaging is not an easy decision. Choices depend on capital investment and size. Tendency goes in the direction of eliminating the cold chain. Shelf stable products should be the goal.
  - Cold distribution or Aseptic packaging can be in bags or bottles.
  - Secondary packaging must be considered. Affects cost, storage and distribution.
  - Evaluate bulk packaging for consumers 6-pack, 12-pack. It's Handy & promotes Savings.
  - High initial investment lowers individual packaging costs.
  - Very small production units require buying Bottles or Cups for filling and sealing

Labeling & Formulating

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Ingredients… How Many?

Nutrition Facts

Serving Size 8 fl. oz (240 mL)
Servings Per Container about 4

Amount Per Serving	
Calories 120	Calories from Fat 50
	% Daily Value*
Total Fat 6g	9%
Saturated Fat 1g	4%
Trans Fat 0g	
Polyunsaturated Fat 3.5g	
Omega 3 505mg	†
Omega 6 3260mg	†
Monounsaturated Fat 1g	
Omega 9 1320mg	†
Cholesterol 0mg	0%
Sodium 5mg	0%
Potassium 460mg	13%
Total Carbohydrate 5g	2%
Dietary Fiber <1g	3%
Sugars 2g	
Protein 12g	24%

Calcium 4% • Iron 10% • Thiamin (B1) 6%
Riboflavin (B2) 6% • Niacin (B3) 4%
Pyridoxine (B6) 8% • Folate (B9) 15%
Biotin (Vit. H) 2% • Pantothenic Acid (B5) 4%
Phosphorus 15% • Iodine 15%
Magnesium 15% • Zinc 8% • Copper 10%

Not a significant source of vitamin A & C.
*Percent Daily Values are based on a 2,000 calorie diet.
†Daily Value not established.

INGREDIENTS:
Reverse Osmosis Purified Water and Organic Soybeans

2?

Or 63?

INGREDIENTS: Water, **Orgain Organic Protein Blend** (Organic Whey Protein Concentrate, Organic Milk Protein Concentrate), **Orgain Organic Complex Carbohydrate Blend** (Organic Brown Rice Dextrins, Organic Evaporated Cane Juice, Organic Brown Rice Syrup), Organic High Oleic Sunflower Oil, Organic Natural Flavors, Cellulose, Carrageenan Gum, Xanthan Gum, Soy Lecithin, Tricalcium Phosphate, Sea Salt, Sodium Phosphate, Inulin (from chicory root)

Orgain Vitamin Blend Tocopherol Acetate, Sodium Ascorbate, Zinc Sulfate, Niacinamide, Calcium Pantothenate, Manganese Gluconate, Copper Gluconate, Vitamin A Palmitate, Thiamine Hydrochloride, Pyridoxine Hydrochloride, Riboflavin, Folic Acid, Chromium Citrate, Biotin, Sodium Molybdate, Sodium Selenate, Potassium Iodide, Cholecalciferol, Cyanocobalamin.

Orgain Organic Veggie Blend (Organic Kale, Organic Beet, Organic Spinach, Organic Carrot, Organic Tomato) 50mg

Orgain Organic Fruit Blend (Organic Blueberry, Organic Banana, Organic Acai, Organic Apple, Organic Raspberry) 50mg

Orgain Organic Antioxidant Blend (Organic Pomegranate Extract - 50% polyphenols and Organic Green Tea Extract - decaffeinated, 90% polyphenols, 45% ECEG) 30mg

ALLERGEN STATEMENT:
Contains milk and soy

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Right Message? Right Graphics?

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Design & Graphics

Or…

TECHNOLOGY

There are many variants in the SoyMilk making Know How. We are not evaluating different process philosophies. For this study we will only concentrate in batch and continuous. (and will concentrate in soymilk from beans)

PROCESS

- Basic Operations. Include bean treatment, extraction, enzyme deactivation, deodorization, filtration, formulation, heat treatment and packaging.
- Yield in the selected process should render more or less milk per Kg of beans and the efficiency will lower when higher protein contents are aimed in the final milk concentration
- Flavor preferences are cultural and the best milk is different in different locations. Nevertheless even if a beany flavor is preferred this basic milk is harder to formulate. As a neutral basis results in less concentration of flavorings and or aromas, final results are easier to obtain.
- Heat and air are enemies of a good product. Enzymatic reactions that impair flavor are catalyzed in their presence.
- Continuous processing in stable conditions helps maintain a specified quality of milk in a consistent manner.
- Under 200 L/hr, Batch operation in a semi continuous pattern can achieve similar results sacrificing yield and efficiency of bigger systems, with smaller investment levels.

PACKAGING

Packaging technology goes attached to heat treatment of the formulated products. Alternatives must be evaluated as function of capital investment, product requirements, market preferences and expected time and type of shelf life.

Whenever Product is Low Acid pH > 4.6

- Pasteurization and refrigeration
- High Temperature Short Time treatment and filling in very Hygienic conditions for extended Shelf Life. Requires all the refrigeration but behaves almost as sterilized + aseptic product.
- Pasteurization and filling with retorting in autoclaves for 30 min at least 120C. Requires no refrigeration. This process is commonly used in Many countries. Affects slightly appearance and flavor, but yields an economic, safe treatment requiring no refrigeration and extending shelf life.
- This is the most flexible process as capacities and sizes can be changed at any time and there's no compromise with product labeling or design as it comes afterwards.
- Form, fill seal equipment handling multilaminate material after UHT and filling in aseptic conditions is the most common aseptic package alternative. This is the typical Brick shape container. No refrig.
- UHT treatment followed by bagging or bottling in aseptic conditions is becoming every time more common. Emerging technologies are occupying more and more space trying to satisfy the market either looking for a very cheap container (bag) or fort the traditional bottle in aseptic presentation. Some companies have gone as far as starting from the blow molding of the bottle either from Pre-Forms or from plastic raw materials.

Heat Treatment		Package				Shelf Life	Cost		
End Product Requires Refrigeration									
Pasteurization	Cups	Gable Top	Bags or Pouches	Bottles	Bricks		Process Line	Package Line	Package
	OK					5 to 10	Low	Low	Low
		OK				5 to 10	Low	Med	Med
			OK			5 to 10	Low	Med	Low
				Ok		5 to 10	Low	Low	Med
					Na				
HTST Extended Shelf Life ESL	Ok					30 to 60	Med	Med	Low
		OK				30 to 60	Med	Med	Med
			OK			30 to 60	Med	Med	Low
				OK		30 to 60	Med	Low	Med
					NA				

Heat Treatment		Package				Shelf Life	Cost		
Non Refrigerated Shelf Stable Products									
Retorting Pasteurization with autoclave HTHT	Cups	Gable Top	Bags or Pouches	Bottles	Bricks		Process Line	Package Line	Package
				Ok		90 to 180	Low	Low	Med
UHT Cold filling in aseptic packaging & environment	Ok					90 to 360	High	High	Med
		na							
			OK			90 to 360	High	Med	Low
				OK		90 to 360	High	High	High
					OK	90 to 360	High	High	Med

SIZE

One size doesn't fit all. Specifying the size of a soymilk plant in liters/hr only solves half of the SIZE problem. When we fill in 0.25 L or in 1.8 L we almost have the same filling capacity in containers per hour but given one size of plant it could translate to:

Case A You use all the filling capacity in small formats
Only using 40 % of the Production capacity.

Case B You fill in only big format containers
End up needing 2 or 3 plants the size installed.

Example

Plant size	3,000 L/h
Filling Machine	6,000 Containers/h +/- 15 % for bigger or smaller than 1 L
In 200ml	Max Fill 6,900 C/h = 1,380 L = 46 % production capacity
In 1,800 ml	Max Fill 5,100 C/h = 9,180 L = 306 % production capacity

Proportioning sizes should satisfy your market not your filling machines

Costing For Soymilk

Production of Soymilk

		BEANS	
Total Protein in Bean	PT	%Protein	39
Percentage of Humidity in Beans	H	%Humidity	13
Price of Beans per Bushell (1 Bu - 60Lbs)	PB	Price / Bu	11
Freight Cost of Beans to Factory in % xtra	F	Transport From Source	10
Yield in kg of Beans per L. of Soymilk	BL	Yields L Soy/BAse/Kg Bean	5.00

		Milk	
Final Protein % in Soymilk (formulated end product)	FP	Final % Protein	3.3
Max Protein Content in this process (Soymilk Base)	MP	Max Obtainable Protein	5.5
Process Yield as extractable Protein From Bean in %	Y	Process Yield	81.05
Liters of Soymilk per hour (Base at max prot content)	L	Required	1000

		Process	
Hours of Operation per Day	H	Hours/ Day	20
Days of Operation per Month	D	Days / Month	22

Process extraction yield

	Milk At	
% Protein	5.5	3.3

Milk Required		
1000	1,667	Formula End Product

Beans Required

Kg	0.200	0.12	Per Liter
Liters per	5	8.33	Kg

Cost of Milk	
0.0887	0.053 Per Liter

Note: Prices are only comprehensive of beans as raw material

Beans Required (Kg) &($)				
	Hour	Day	Month	Year
KG	200	4,000	88,000	1,056,000 Kg
Cost of Beans				
US$	89	1,775	39,083	425,920 US$

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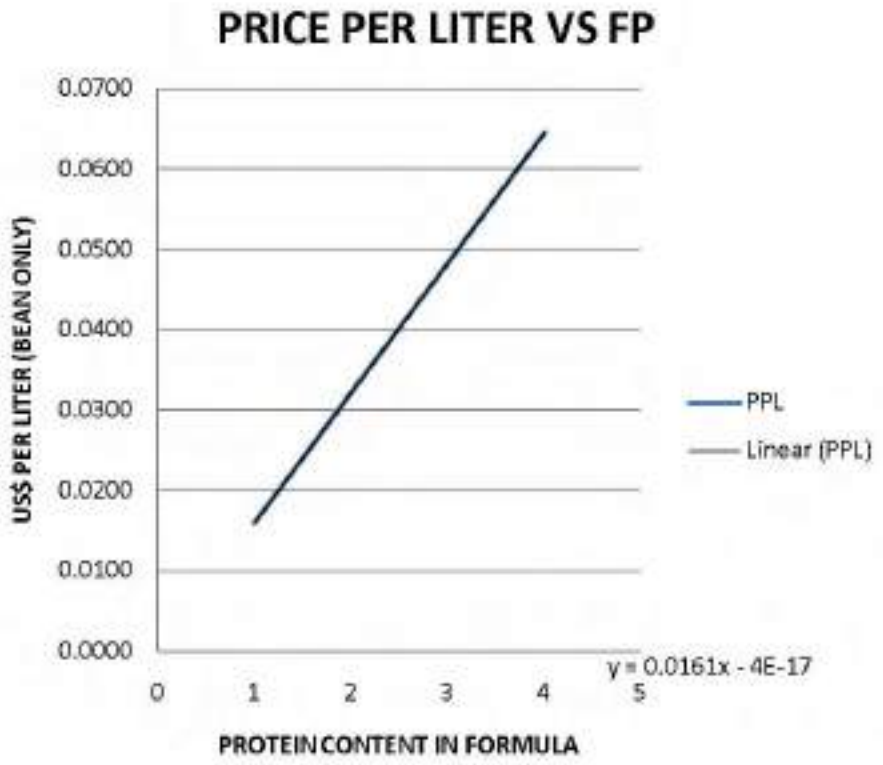
PT	PB	F	Y	FP	PPL
39	11	10	81	1	0.0161
39	11	10	81	1.5	0.0242
39	11	10	81	2	0.0323
39	11	10	81	2.5	0.0403
39	11	10	81	3	0.0484
39	11	10	81	3.5	0.0565
39	11	10	81	4	0.0645

PT	PROTEIN IN SOYBEAN
PB	PRICE PER BUSHELL
F	FREIGHT IN %
Y	PROCESS EXTRACION YIELD
FP	PROTEIN CONTENT IN FINAL FORMULA
PPL	PRICE PER LITER FINAL FORMULA (ONLY BEAN)



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PT	PB	F	Y	FP	PPL
39	9	10	81	3	0.040
39	10	10	81	3	0.044
39	11	10	81	3	0.048
39	12	10	81	3	0.053
39	13	10	81	3	0.057
39	14	10	81	3	0.062
39	15	10	81	3	0.066

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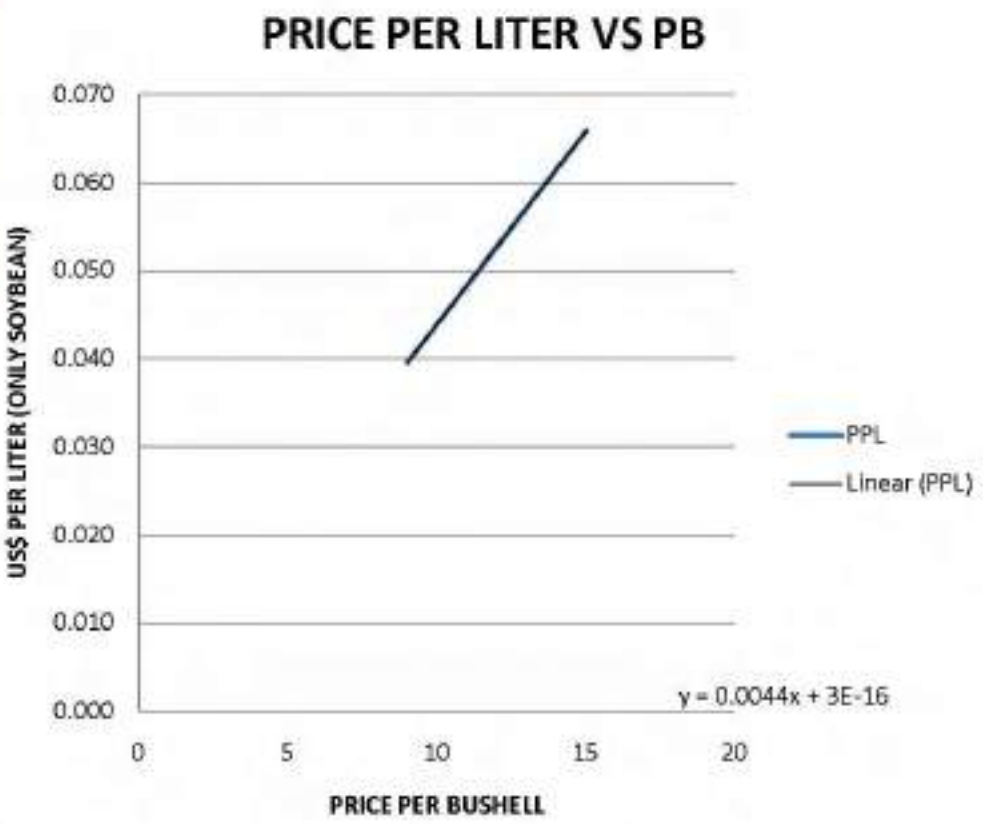

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PT	PB	F	Y	FP	PPL
36	11	10	81	3	0.0524
37	11	10	81	3	0.0510
38	11	10	81	3	0.0497
39	11	10	81	3	0.0484
40	11	10	81	3	0.0472
41	11	10	81	3	0.0460
42	11	10	81	3	0.0449

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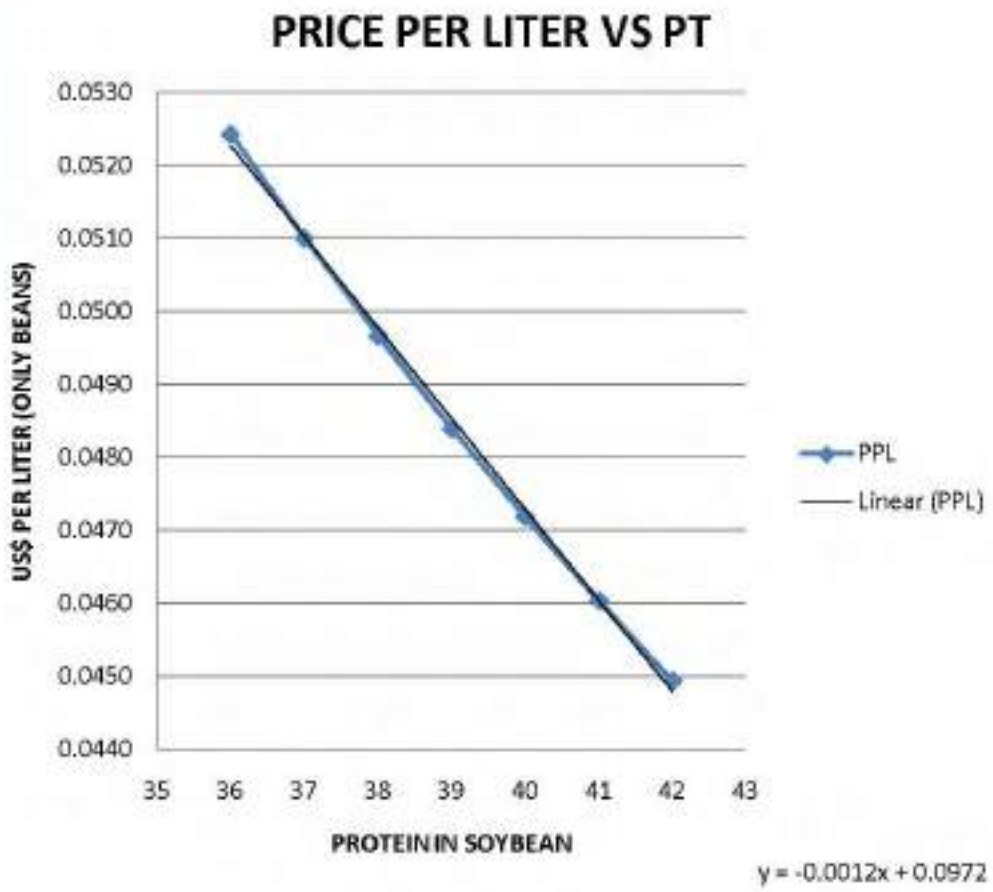

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PT	PB	F	Y	FP	PPL
39	11	7	81	3	0.0471
39	11	8	81	3	0.0475
39	11	9	81	3	0.0480
39	11	10	81	3	0.0484
39	11	11	81	3	0.0488
39	11	12	81	3	0.0493
39	11	13	81	3	0.0497

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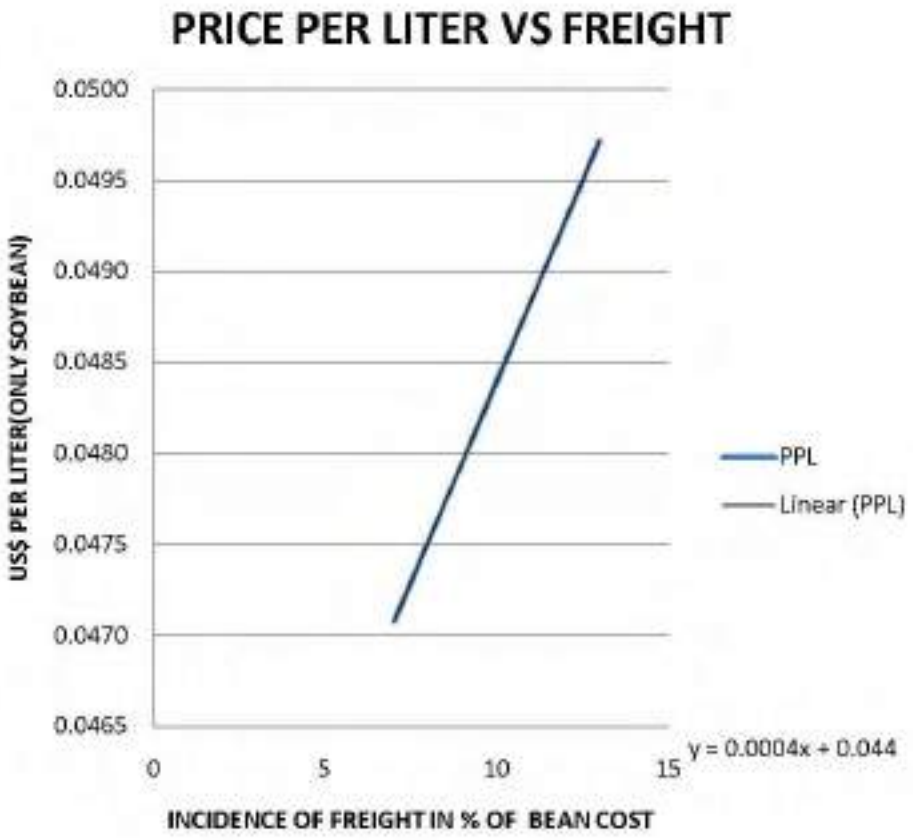

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PT	PB	F	Y	FP	PPL
39	11	10	72	3	0.0545
39	11	10	75	3	0.0523
39	11	10	78	3	0.0503
39	11	10	81.1	3	0.0484
39	11	10	84	3	0.0467
39	11	10	87	3	0.0451
39	11	10	90	3	0.0436

PT	PROTEIN IN SOYBEAN
PB	PRICE PER BUSHELL
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VARIABLE & FIXED COSTS*

PROD PER HOUR L
2000

VARIABLE COSTS							
Packaging	4	7	10	12	15		
Second Pack	0	2	4	6	8		
Liquid	4	5	6	7	8		
Vit. + Min.	0	1	5	5	7	MAX	29.2
Sweet	0	2	4	6	8		
Flavors	0	1	2	3	4	MIN	8

AVG 18.60

INVEST. SPREADED PER LITER PRODUCED AS f(SHIFTS)							
	11.99	13.90	16.68	20.02	24.02	MAX	24
	5.79	6.95	8.34	10.01	12.01		
	3.86	4.63	5.56	6.67	8.01	MIN	3.86

AVG 13.94

LABOR SPREADED PER LITER PRODUCED AS f(SHIFTS)							
	1.62	3.90	6.93	10.29	14.61	MAX	14.6
	0.81	1.95	3.41	5.19	7.31		
	0.54	1.30	2.27	3.46	4.87	MIN	0.54

AVG 7.58

RENT SPREADED PER LITER PRODUCED AS f(SHIFTS)							
	0.32	0.65	0.97	1.30	1.62	MAX	1.62
	0.16	0.32	0.49	0.65	0.81		
	0.11	0.22	0.32	0.43	0.54	MIN	0.11

AVG 0.67

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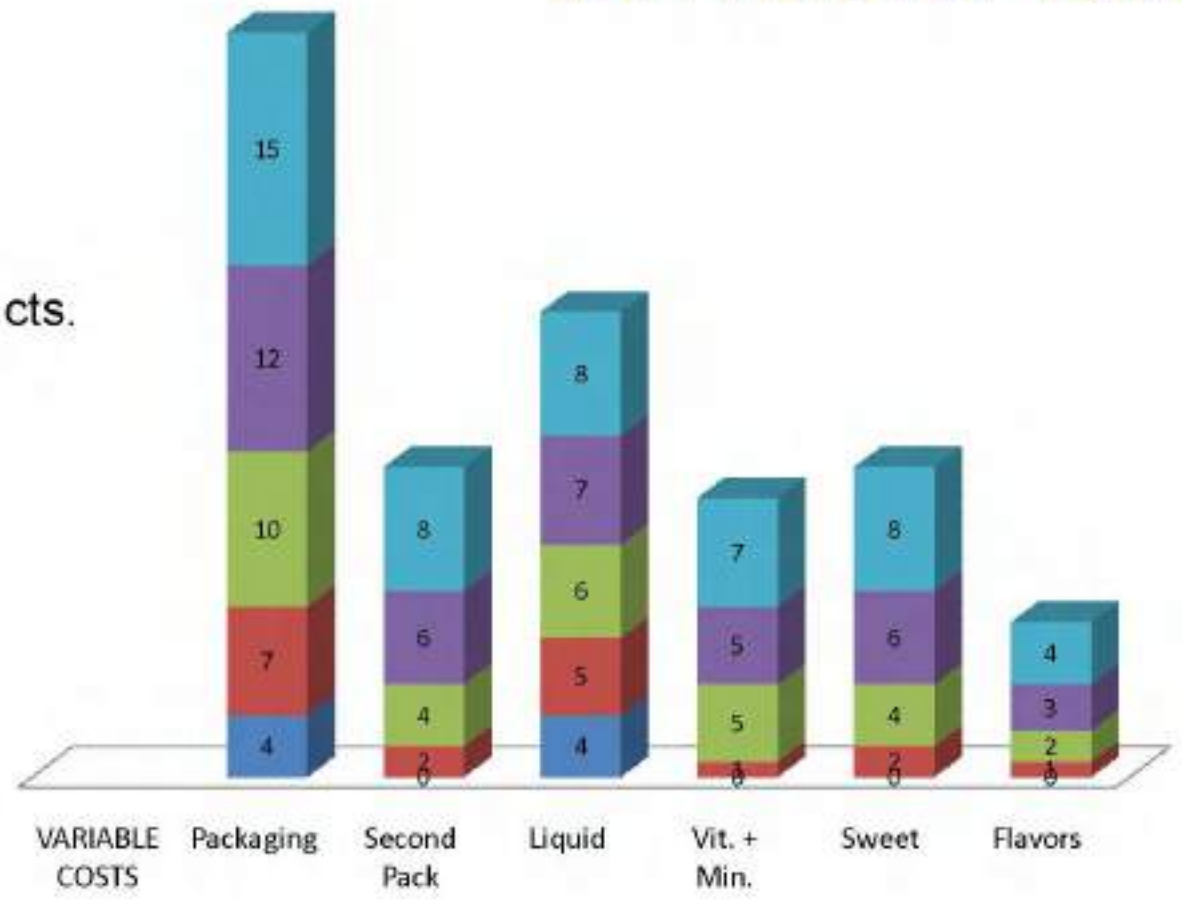
Variable Costs

In US cts.



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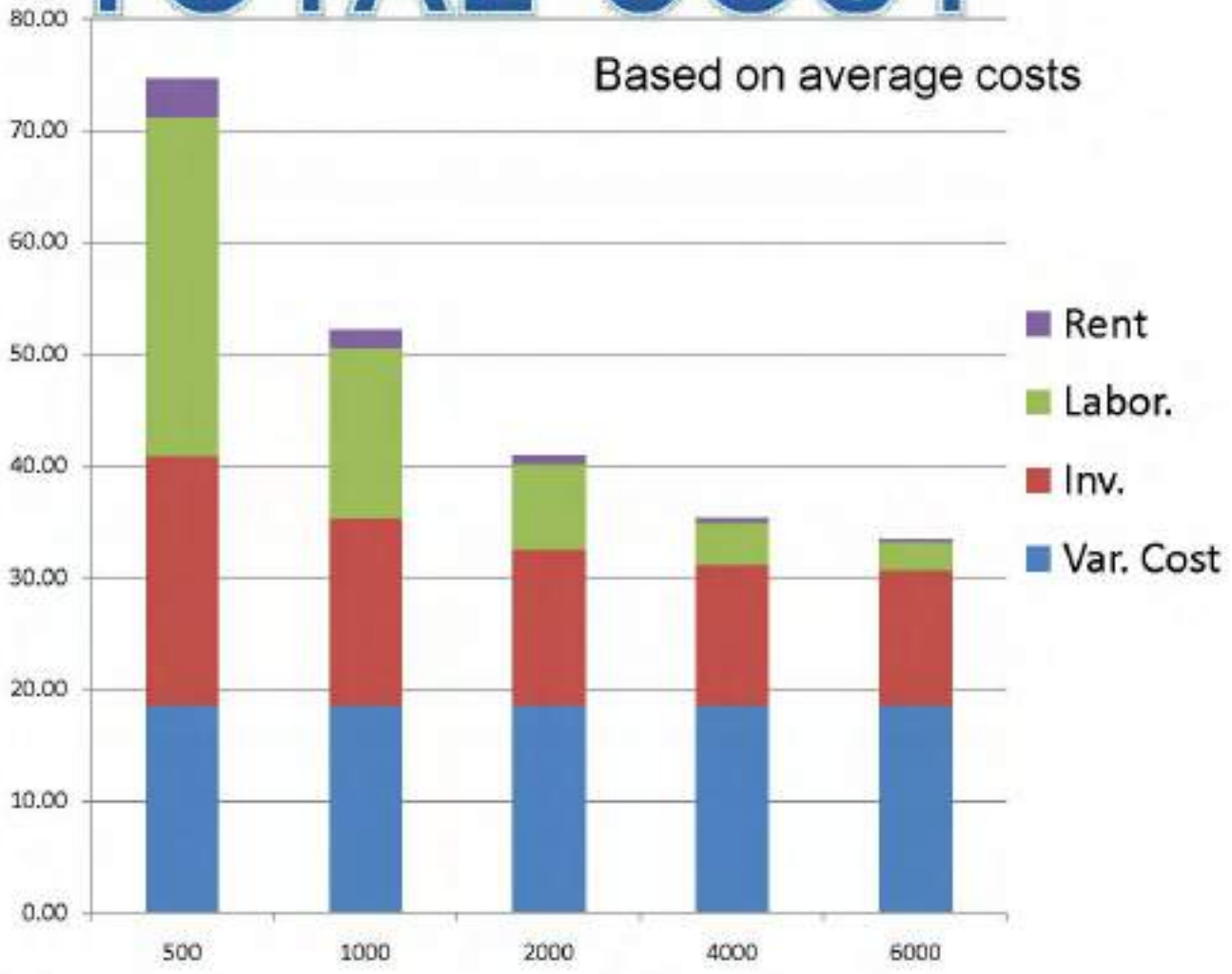
TOTAL COST



In US cts.

PLANT SIZE in L/hr

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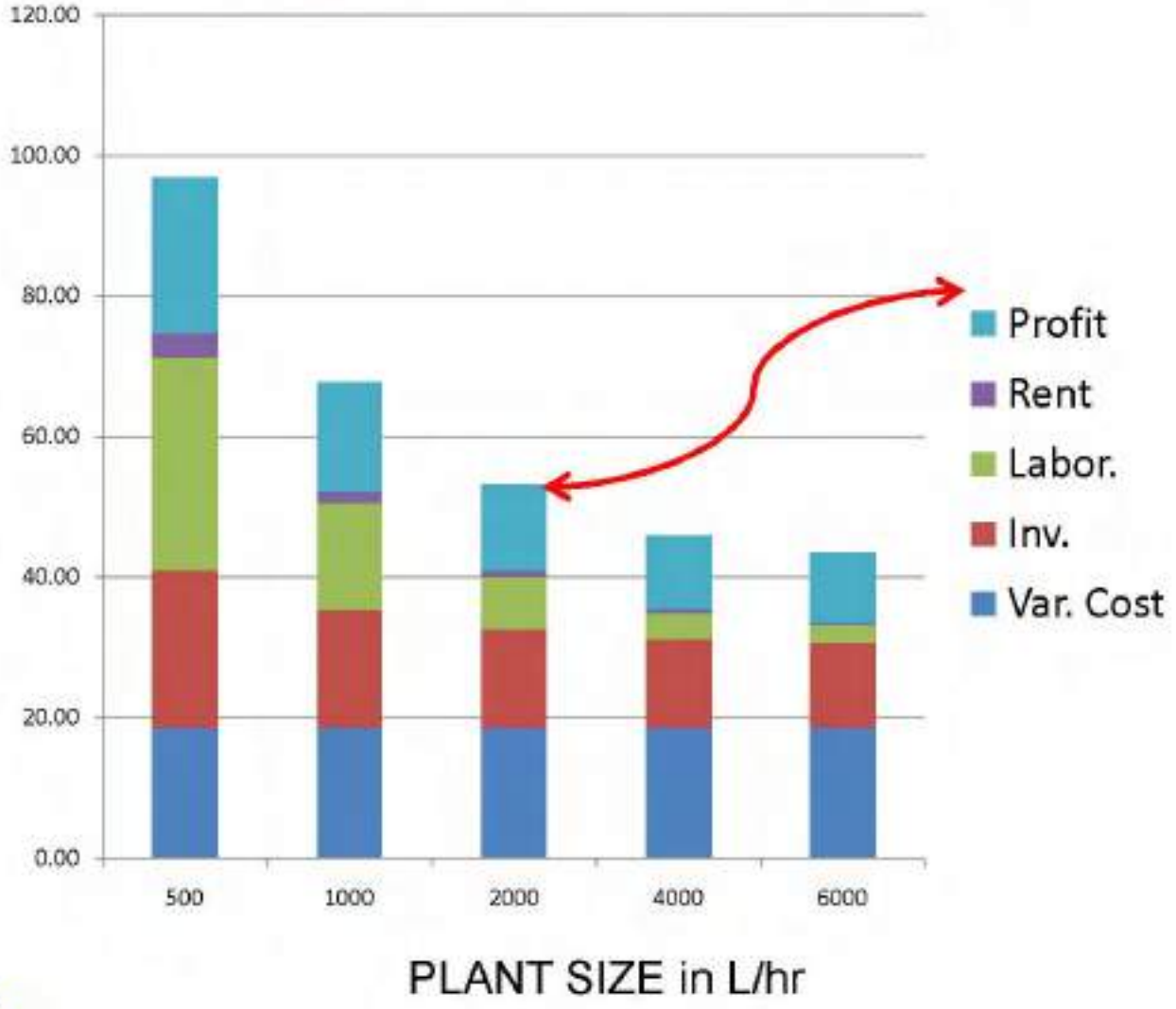
Profit = 30 % of Tot. Cost

In US cts.



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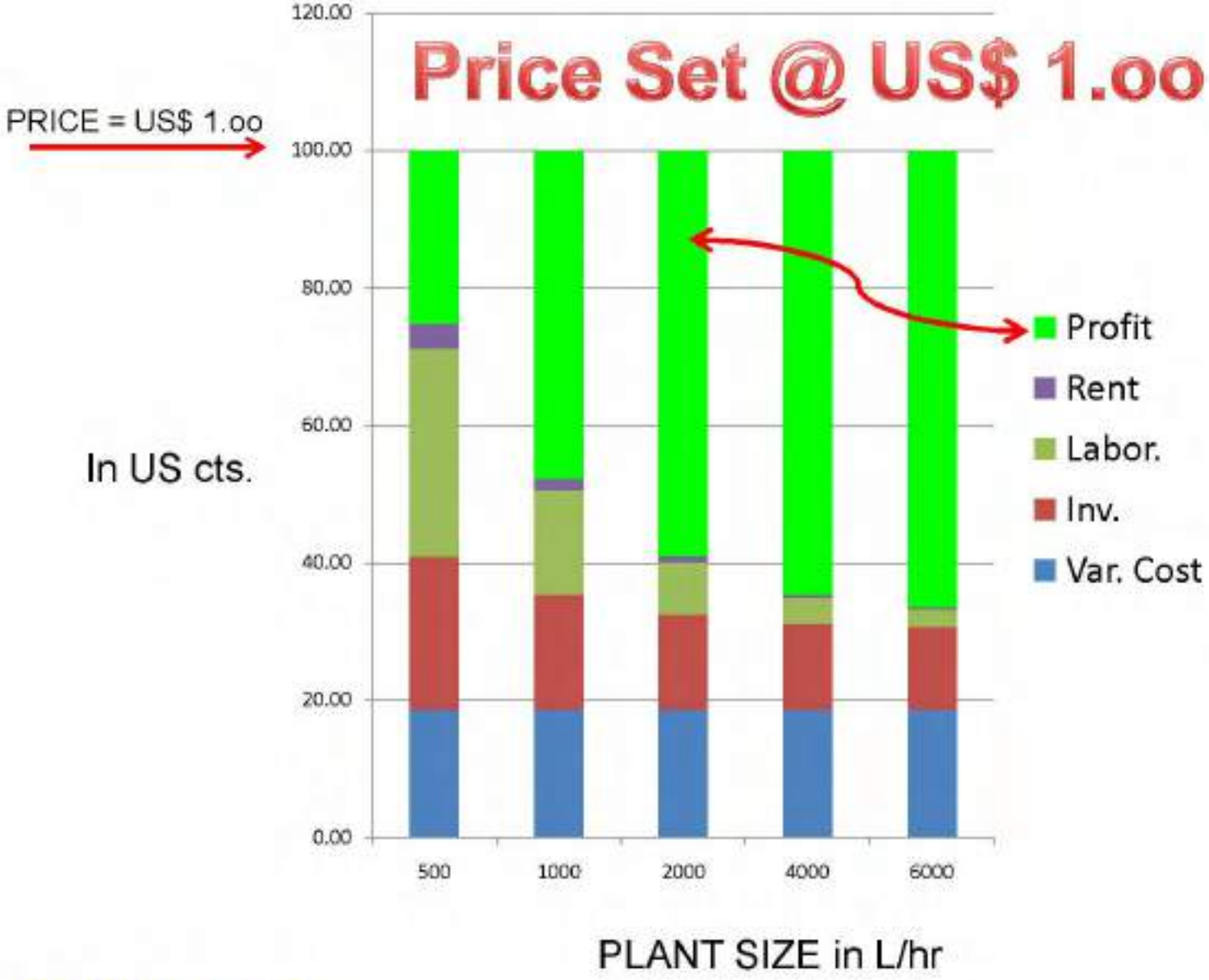
Price Set @ US$ 1.oo



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Cost Sensitivity has nothing to do with feelings
It's all about how costing elements add up to the final Price.

When Pricing, remember:
There is no such thing as "Elasticity of Demand"

When demand for your products goes down, as an answer to your pricing... assume it will never go up.

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