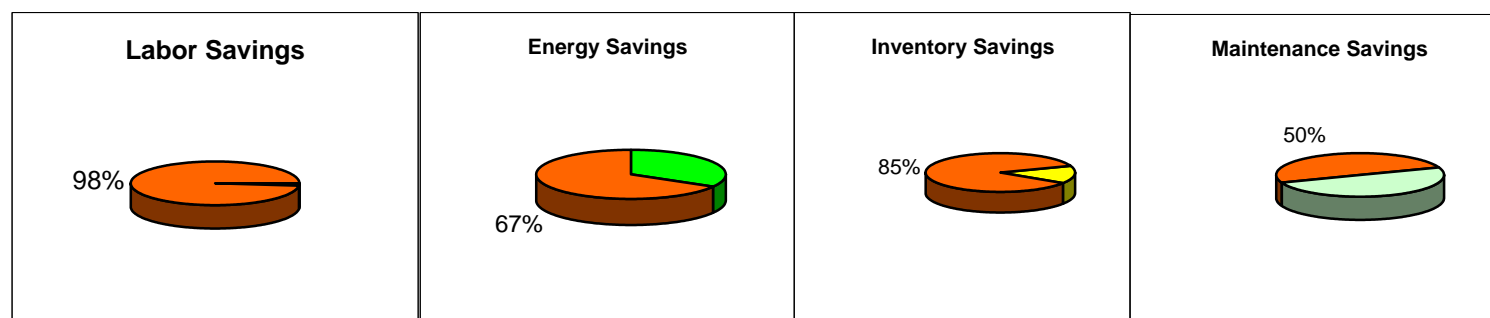


Cleancast for Heads - annual and per head operating costs

150 Heads/hr		Conventional				Cleancast				
900000		Qty/yr	Unit cost	Total Cost/yr	Per Head	Qty/yr	Unit cost	Total Cost/yr	Per Head	Total Savings
Labor	People	15	30,000	\$450,000	\$0.50	0.25	30,000	\$7,500	\$0.01	\$442,500
Energy	MM BTU	26550	7.0	\$185,850	\$0.21	8880	7.0	\$62,160	\$0.07	\$123,690
Process Inventory	Pounds	78408	0.2	\$15,682	\$0.02	11440	0.2	\$2,288	\$0.00	\$13,394
Maintenance & lost time				\$322,550	\$0.36			\$160,000	\$0.18	\$162,550
Total				\$974,082	\$1.08			\$231,948	\$0.26	\$742,134



Notes

1. Labor (at \$30K per year per person) for cleancast is small, conventional 5 people per shift - load, unload, 1/2 forklift, and 2.5 for pneu hammer and shakeout.
2. For Cleancast using vertical flow, energy includes raising both chains and heads from 778F to 914F.
3. Process inventory based on 30 racks of heads (72 per rack) for conventional at \$2 per pound versus 200 heads in cleancast process
4. Maintenance assumed \$160K per year for cleancast based on TAF spending \$550K per year (for longer unit and with forklifts).
5. Lost time 1 hr per day for conventional unit is about \$93,750 lost per year at \$2.50 per casting. Rack replacement every two years is \$67,800 per year
6. Forklift maintenance added at \$6K per year for conventional unit. Also added \$80K/yr for maintenance of hammers and shakeouts
7. Conventional unit is for heads with risers removed and no sand, but with added energy usage in sand reclaim, Cleancast is with incinerator and HX added.