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Mr. Molnar,

I introduced myself after your presentation and handed you my business card. I was especially interested in the 5M manufacturing jobs that we have lost since year 2000.

While participating in the session for Technologies with Broad Impact chaired by John Hines of NASA, it appears we may be missing two key “bang for the buck” opportunities. This became apparent when I suggested investing in manufacturing productivity, but Heather Evans the facilitator added “automation”. I then corrected her and said not automation, but “human productivity” which started a discussion with others recommending investing in robotics to improve productivity. I added that we should apply what Roger Smith learned when he was the CEO of GM during the 80’s. He determined that after investing \$1B in robotics that there was very limited savings even with employees making \$70,000 plus benefits of 100%. The exception was on hazardous jobs like gang welding of the auto frames and painting where robotics were justified. Robots are also a hindrance to flexible production and customer demand manufacturing that are required for Lean Manufacturing.

Let me explain the basis of my two recommendations. During my career I have been responsible for the acquisition, integration, and improving the productivity of over 155 companies starting in early 1980’s. What was striking was that on average across all these companies productivity was at a minimum doubled by using the Toyota Production System, HP’s Stockless Production System, and Demand Flow Technology (John Costanza Institute of Technology legacy of Hewlett-Packard).

My first recommendation is for us to invest in Lean Manufacturing technology by assisting manufacturers that are producing product in the US in implementing the technology, and assisting companies that have outsourced manufacturing out of the US, to bring it back to America either to their own factories or the factories of contract manufacturers.

There was an excellent study on offshore outsourcing (summary attached) by Boothroyd Dewhurst Inc. and Neoteric Product Development that utilized Milwaukee Tool's costs for their power hand drill. They determined it was not cost effective to move manufacturing to China. Plus the study did not take into consideration the even greater savings of keeping manufacturing in the US if Milwaukee had implemented Lean Manufacturing.

Therefore we can bring many of those lost 5M jobs back to America by assisting these companies or their contractors by training their management and employees on "Lean Manufacturing" technology. Why don't we bring all those Apple jobs back from China? If we strategically pick the manufactures that have offshore manufacturing and partner with them, we could fund the Lean training for less than \$50M. Plus we can assist these companies in setting up the new Lean factories and transferring the technology. These reclaimed jobs would immediately increase employment with higher paying jobs, and the additional taxes would help reduce our deficit. Why wait for "new technologies", new companies, and new jobs that will take 5 – 20 years to develop, when we have today's technologies? Plus we will be prepared to assist new companies and their new products in the future to implement Lean.

The second investment should be assisting the commercial interstate trucking to convert from diesel to natural gas (NG) for the estimated 2M 18-wheel tractors on the road. Already there are high-pressure carbon fiber NG fuel tanks. But we need new engine designs that efficiently burn NG for these large tractors plus local delivery trucks including postal mail. And we need to assist the interstate truck stops to add NG refueling to service these trucks. Then we need to convert the 13.5M mid-size commercial delivery trucks in our metro areas to NG.

Diesel produces 129,500 BTU's per gallon of gasoline equivalents (GGE), while NG produces 114,003 BTU's (GGE) or 12% less energy. A gallon of diesel is equal of or 127 cubic feet of NG. Diesel is selling for \$3.80 to \$4.00/ gallon at the pump including distribution cost. For an equivalent amount of NG to equal a gallon of diesel, NG cost \$0.288 / gallon equivalent at the wellhead plus distribution cost. The industrial cost of NG is \$2.65 / gallon or 32% less than diesel. This would reduce shipping cost for all products and the raw materials for manufacturers, which would reduce the cost of living in America, reduce manufacturing cost, and reduce our dependence on oil imports. Plus NG is cleaner burning with 38% less CO2 than diesel. NG conversion is a win-win-win for America.

In closing, my partner is a Black Belt Six Sigma trainer and I am certified to teach and implement Lean Manufacturing. Attached are our bios.

Best regards,

Tom Hildreth

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