

Six Keys to Sustainable Manufacturing

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The federal government estimates that manufacturing uses about one third of the energy consumed in the U.S., so manufacturing companies can play an important role in building a sustainable future.

The good news is that engineers, especially design and manufacturing engineers, are already stepping up to the plate. Every day, they design products that conserve energy, reduce waste, and eliminate pollution while

manufacturing those products in a sustainable way.

But there's more to do. And the present climate of economic and environmental concerns challenges engineers to optimize manufacturing processes and make them more sustainable.

Here are six key steps in making manufacturing more sustainable. The first two are pretty obvious, and many of us are doing a good job with these. But the last several are things design engineers need to be thinking about constantly.

1. Optimize current use of fossil fuels.

This is a given. Cutting energy cost is a win-win situation in today's environment. There seems to be little argument that we are close to "peak oil," when half the known oil reserves in the world have been consumed. The only argument left is when it will (or did) occur. Save today by turning machinery off when it is not being used. Replace a single-speed motor with a variable-speed or servo drive to reduce energy consumption. Use a variable-speed hydraulic pump. Also take a look at other alternative sustainable sources of energy—whether it's wind, solar or hydroelectric.

2. Eliminate waste.

Another no-brainer. Only consume what you need for the final product. Sounds very simple to us today, but I think we all know that, in the past, our primary objective was to reduce cost or time to market. Nobody knew or cared whether we were using more than we needed. This applies to every industry, whether it's the amount of metal, paper, packaging material, etc. used. Reevaluate whether investing in precision manufacturing equipment can be justified by waste reduction.

3. Reduce or, hopefully, eliminate pollution.

When you walk around a trade show these days, one of the hot topics is how to reduce environmentally unfriendly materials used in products, as well as byproducts in manufacturing processes. You hear things like renewed interest in dry or near-dry machining, using as little coolant as possible while you're doing metal removal. Or deburring, taking the burrs off of

finished material after you've cut it, another process using quite a few powerful chemicals.

4. Recycle.

Look at the amount of metal chips that are made in metal removal processes. People used to just fill up huge hoppers, and haul them to a recycling facility. Now they're starting to look at the cost of energy involved. One solution is "chip puckers," devices that compress chips, remove the coolant and turn them into "hockey pucks" that are a lot easier to transport and use a lot less energy. Or, even better, a chip management facility in-house that melts chips and processes them into small billets that can be transported to foundries for reuse.

5. Recover energy, don't turn it into heat!

Hybrid cars recover energy otherwise wasted during braking. Did you know machines can do it too? Power sharing has its roots in machine tools, where the servos used in metal cutting machines and seam machines share power through a single power supply. We can actually take power during deceleration and return it to the main lines. In the past, that energy was wasted, turned into heat, like the brakes on a car.

Another great example is in coordinating the cycles of several metal presses. At first you might think, "Have all the presses go up and down together and then move the material." But we found that if you skew the cycles slightly, you can use the decelerated, regenerative power in one to help accelerate the other one. That has no effect on the process time, no effect on the cycle time, and it doesn't cost more. But it saves energy.

We've started to apply our knowledge of shared servo power to other industries like packaging machinery, automation and printing presses.

6. Save Time.

Just saving time, by itself, is indirectly an energy savings. If you can run a cycle faster without using more energy to do it, you can shut it down and save power. Or if it's a large-scale, high-production facility, you can reduce the number of machines you need to produce the same quantity of material.

The challenge of the future.

These are challenges engineers are meeting that will make manufacturing sustainable in the coming years.

Here at Bosch Rexroth, we've got a whole lot of Dilberts in our facilities who just love a good challenge like "How can I make this product consume less energy?" and "How can I make the product using as few resources as possible?" You can really see it on people's faces every day.

Unfortunately, when most people hear about sustainability, they think of big-ticket items—like solar panels or wind farms. But, though they may not have the glamour or get all the attention, it's the "workhorse" devices like servo drives, hydraulic pumps and bearing assemblies that will create the sustainable manufacturing of the future. I think we prove that to ourselves and to our customers on a daily basis.