

## Green Manufacturing An introduction from TDK-Lambda

### Abstract

The term 'Green Manufacturing' is one which is being increasingly used although there is no clear consensus as to what the term actually means, perhaps caused by the way in which it is inextricably interlinked with 'Lean Manufacturing'. Here Phil Scotcher, General Manager of TDK-Lambda's power supply manufacturing facility in Ilfracombe, Devon outlines what he understands by the term and how it applies in regards to his site.

### Introduction

The term 'Green Manufacturing' defies definition although the explanation given by David Foster\* of the Blue Green Alliance is an enlightening one. Foster says, "Green Manufacturing is a philosophy rather than an adopted process because it motivates ongoing improvement efforts, even though it may be impossible to achieve."

This ongoing improvement element closely matches the Lean Six Sigma business improvement model that was started at TDK-Lambda's Ilfracombe site ten years ago. As the name suggests Lean Six Sigma is a combination of the Lean Manufacturing and Six Sigma models that uncover where quality improvements, additional efficiencies and cost savings might lie.

### Implementing Lean can also be Green

Since starting Lean Six Sigma the Ilfracombe manufacturing site has undergone two major re-alignments to move from a cell manufacturing model to a more flexible, modular manufacturing set up that facilitates mass customisation.

This approach achieved a notable success recently with the launch of the revolutionary EFE series of embedded front-end power supplies that take digital control to the next level. As well the impressive technical performance, the EFE series meets TDK-Lambda's design brief for environmentally responsible products that consume less energy in manufacture and use, have fewer parts, weigh less and have a long life expectancy.

However, Lean Six Sigma is essentially about establishing processes which may offer 'green' benefits, such as a reduction in the use of resources, but it is not its *raison d'être*. Green manufacturing, to my mind, is an entirely separate element but one which inevitably crosses boundaries.

Often, projects can have complimentary aspects. For example, a recent project to improve quality within our Surface Mount Technology process began as a desire to introduce nitrogen reflow. However, space constraints forced us to look at alternatives, and a Six Sigma project identified vapour phase reflow as a sound alternative. Not only would we improve solder joint integrity, but we would also reduce our electricity consumption.

In another project, we replaced an aging, unreliable compressor with a new one, and relocated it. Not only do we expect to reduce service costs, we also expect to save electricity, and improve our noise footprint, which is important for our neighbours as we are located in a residential area.

### Where to start?

For those who are excited by the idea of Green Manufacturing, but don't know where to start, then ISO 14001 accreditation is a strong beginning. The environmental management system is structured similarly to ISO 9001 and therefore its procedural requirements can be integrated easily.

As part of TDK-Lambda's ISO 14001 accreditation at its Devon site, a 'Waste and Recycling Team' was established that quickly identified a number of different initiatives that would have great environmental and cost-saving effects. Polypropylene and polystyrene trays used in the production department are now returned to the supplier and re-used, saving the company £40,000 per year. Additionally, drinking cups are now recycled and made into office equipment by a local supplier. In conjunction, simply by purchasing a baling and compacting system the number of 1100 litre bins collected per week has been cut by 79%. Also, a recent initiative has extended as far as excess packaging and now the Vega products are being packaged in a much, much smaller box which demonstrates a great use of resources and also a willingness to address every area of the process.

### Managing the change effectively

A quick history lesson is necessary at this point as the timing in relation to the above is instructional. Prior to the acquisition of Lambda by TDK a green movement had already begun at the Ilfracombe site involving a wide spread of personnel in terms of seniority and department. This led to the huge success of several simple environmental projects which if they had been management sponsored would not have had such great effect. Therefore, when TDK acquired the company and introduced its own environmental beliefs it was less of a culture shock than it might once have been.

If Green Manufacturing is a philosophy, then TDK-Lambda's parent company (TDK) encourages it through the reporting work that we are undertaking in Ilfracombe. Our Safety, Health and Environment Manager, Andy Dorr, reports monthly to the group on the use of: paper; card; wood; textiles; chemicals; water; energy; emissions; wastes; effluents; utilities etc. Such information will help as we embark on an ambitious project to calculate the true 'carbon footprint' of one of our products, a cradle to grave analysis.

## Continual pursuit to change

As I have touched upon in this brief article Green Manufacturing is not about fulfilling one or two environmental criteria as part of Lean Manufacturing and then labelling the entire process as 'Green'. Green manufacturing is about having additional environmental policies, entirely separate from Lean, and pursuing them separately for their own ends.

It is worth noting though that both Green and Lean are continuous journeys, and here at TDK-Lambda we are not the finished article, the nature of which means that the more closely you look the more you find in the continual pursuit to change lean and green into gold.

## For further information

David Foster is Executive Director of the Blue Green Alliance:  
[www.bluegreenalliance.org](http://www.bluegreenalliance.org)

Green Manufacturing presentation given by Jennifer Tran can be downloaded from:  
[www.freequality.org/documents/training/Green%20Manufacturing2.ppt](http://www.freequality.org/documents/training/Green%20Manufacturing2.ppt)

To learn more about the EFE series, please visit:  
<http://uk.tdk-lambda.com/efe>

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