

Chapter 18

Sustainable Operations

Seven billion. That is the estimate of the world's population in October 2011, projected to rise to 9 billion by 2050. It is a lot of people, and it is just one reason that sustainability has become an important topic of discussion. This chapter explores how operations influences sustainability and how sustainable thinking can influence operations management. We start with some background to motivate the topic of sustainability, and then we outline the business case for focusing attention on sustainability. Finally we conclude with a discussion of how the tools of good operations management can be applied to a sustainability initiative.

18.1 Sustainability: Background

Sustainable business practices are said to be those that sustain people and the planet. That is, by implementing these practices we will be as well off in the future as we are now. This is a broad definition, and so sustainable business practices can be divided into many domains. We highlight five of them:

- Energy
- Water
- Materials
- Agriculture, fishing, and forestry
- People

We primarily focus on energy, but the others are discussed briefly as well.

Energy

Sustainability is often associated with “global warming” or, the more preferred term, “climate change.” The evidence for climate change comes from many sources. Figure 18.1 displays the steady increase in our atmospheric carbon dioxide. (This is also referred to as the Keeling curve, in recognition of the scientist Charles Keeling, who began collecting these data more than 50 years ago.) Interestingly, we can see the Earth “breathing” in these data—because there is more land in the Northern Hemisphere than the Southern Hemisphere, carbon dioxide levels drop as vegetation grows in the northern summer and then increases again as the vegetation dies off in the winter.

Carbon dioxide is not harmful to humans or plants, but it does cause the Earth to retain heat, as if adding a blanket to our atmosphere: We are already about 1°C warmer than we were at the start of the Industrial Revolution. This temperature change may not seem large, but it has already contributed to melting glaciers and rising sea levels. In fact, it has been estimated that if all of the ice sitting on Greenland were to melt, sea level would rise more