


# Principles of Ecology and Management:

## International Challenges for Future Practitioners

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Design and setting by P.K. McBride

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# Resource Depletion

## Contents

### Energy inputs

- Global supply/demand scenarios
- Outlook for traditional energy sources

### Non-energy inputs

- Industrial mineral resources
- Biological resources

## Learning objectives

After reading this chapter, you will be able to:

- Identify supply and demand pressures affecting conventional energy sources
- Compare the outlook for different energy sources
- Chart scenarios for other manufacturing inputs (mineral and biological)

## ■ Introduction

The industrial economic model has traditionally been a linear scheme in which material resources undergo transformation processes that then produce products and services – along with unwanted waste. This architecture relies on two conditions: the availability of inputs at an economic price; and the imperative that pollutant by-products appearing at the **end-of-pipeline** do not accumulate to the extent that they endanger the ecosphere within which the activity occurs. These two constraints, the subject of the next two chapters of this book, embody the ecological imperative as most managers experience it.

**End-of-pipeline:** ■  
Total output following the completion of all transformation processes.]

In the absence of a ‘closed loop’ production system that has been ecologically optimised so that companies’ outputs become inputs to use in subsequent manufacturing cycles (Chapter 6), the acquisition of physical resources is the first step for all material economic activity. Whether inputs are acquired from external sources or produced by a corporate entity specialising in the early, **upstream** stages of a good’s value chain is irrelevant to analysis at this point (albeit important in determining the length of a company’s overall supply chain, hence its environmental footprint). What counts is whether a company’s competitive position allows it to access resources cheaply enough to be able to transform them into sellable products at a profitable price. In turn, this depends on the company’s ability to pass on its own inflationary pressures on to **end users**. In some markets, this can be a difficult proposition due to customers’ own solvency constraints or because such behaviour leaves the producer open to accusations of profiteering (Hutton 2008). In other markets, price pressures are alleviated through government aid that will often materialise upstream in the form of tax credits or subsidies paid to companies to ensure the viability of a minimum, strategic level of production. The purpose of such measures is to help companies to lower costs so that they can drop their prices to consumers. Even more dramatically, interventions of this kind occasionally seek to stave off the kind of social unrest that will occur when prices skyrocket on staples such as energy or food (as witnessed most recently in summer 2010 when devastating fires in Russia wrecked this country’s grain harvest, which usually make an important contribution to global supplies). However, subsidies of this kind are often subject to a number of criticisms. On one hand, market-friendly, **neo-liberal** economists tend to disapprove of the way they distort ‘normal’ price

**Upstream:** ■  
Early value chain activities undertaken when processing or transforming a product or service.

**End users:** ■  
Ultimate customers of a product that is not destined for further enhancement.

**Neo-liberal:** ■  
Belief in a minimal interference of government in the economy.

mechanisms. On the other, many environmentalists also disapprove of such expenditures, regretting the way that the enormous sums distributed year in year out to typical recipients (farmers, energy companies, etc.) diminish their incentive to migrate towards more energy-thrifty behaviour, while reducing the amount of money available to fund new green activities such as renewables production (Monbiot 2007; Thomas and Chomitz 2009). Yet it remains highly unlikely that a market as significant as energy might ever operate without some degree of government supervision. Certainly, in historical terms this has never been the case.

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**Key issue**

In classical economic theory, where a company struggles to pass higher costs on to customers, this should motivate it to innovate, enhance inputs' productivity (Barbiroli 2009) or adopt substitutes, if any exist. The problem is that certain resources have become indispensable to current transformation processes, with such enormous sums being sunk into input-specific industrial apparatuses (internal combustion engines, gas-fired power plants, etc.) that it would be prohibitively expensive for the company involved to re-engineer its systems. This is one reason why so many managers have been so slow to acknowledge the ecological imperative – adaptation is expensive, and they hope to avoid this cost during their own careers, leaving it to future generations. In a world facing a risk of environmental destruction, such calculations are morally dubious. Given the pressing nature of the ecological imperative, they also appear unsustainable and even irrational. Supply and demand trends for many if not all of the world's natural resources are already signalling the demise of the classic industrial economic model. All indications are that resource depletion is occurring sooner rather than later and constitutes a clear and present danger for companies today.

? Why have companies been slow in weaning themselves off oil?

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**Chapter extract**

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