

# Chapter 1

## Introduction



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Nowadays, wind energy is at last reaching its potential as this book fully illustrates. It has developed from humble beginnings over 80 years ago when modern turbines were first developed to provide 10–20 kW power. These early wind turbines were mainly used for pumping water and in small-scale, mainly domestic, electricity production. Since then, the technology has grown exponentially and the only obstacle to their widespread use is political and not technical. Many countries utilise wind power as a major source of electricity generation, and with the greater realisation of the immense danger of climate change, the importance of wind energy to meet the growing demand for the energy with the lowest carbon footprint is now accepted. Such is the sophistication of the current generation of wind turbines which embody machines without gearboxes capable of producing more than 8 MW which is enough to provide electricity to a community of over 10,000 inhabitants.

Early wind turbines had blades 10–15 m in length and a tower height of 20–30 m, whereas current turbines can have blades of 160 m and a tower more than 300 m in height. Cost-wise, electricity generated from wind turbine is on a par with that generated by fossil fuels. Wind turbines have the lowest embedded carbon among various forms of renewable energy generation, and unlike nuclear energy they present no long-term danger to humanity and are considerably cheaper. Installation of wind turbines whether onshore or offshore is much speedier than that of other energy sources and the time scale of investment to production is much quicker. Their productive life also compares favourably to other energy sources, and the cost of decommissioning is significantly less and presents no hidden risks.

Each chapter of this volume outlines an important aspect of wind energy generation as experienced in a variety of nations and economics, taking into consideration both technology and policy. It is envisaged that this book will be useful to readers involved in the technological development of wind energy as well as those who are

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responsible for energy planning. During the last 80 years, wind turbines proved to be cost-effective in generating electricity; they require smaller number of people to run and a small space to operate. They are reliable and can sustain production of electricity, in most cases, without storage.