Chapter 13
Engineering Ethics, Global Climate Change, and the Precautionary Principle

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ABSTRACT

Besides respecting relevant codes of professional ethics, engineers should heed the principles of common morality and international law, including the Precautionary Principle, which requires action to prevent serious or irreversible harm in advance of scientific consensus, when reasons exist to credit such harm. In this chapter, this principle is shown to be applicable to many kinds of technology. An objection that seeks to assimilate it to policies of Maximin is shown to miscarry. The principle is further interpreted as concerning avoidable reductions of future quality of life. The phenomenon of anthropogenic climate change is then shown to involve challenges for engineers. In addition to principles of justice and of benevolence, the Precautionary Principle is found to be relevant once again to such decision making. Finally, considerations of humanity's limited carbon budget are adduced to indicate, in the light of these principles, the inappropriateness of extreme forms of energy extraction.

AN EXPLICATION

As well as respecting relevant codes of professional ethics, engineers engaged in decision-making should heed the principles of common morality and of international law. One relevant principle recognized in international law (and agreed at the Rio Conference on Environment and Development of 1992) is the Precautionary Principle, which requires action to prevent serious or irreversible environmental harm in advance of scientific consensus, when reasons exist to credit the prospect of such harm.

The Precautionary Principle is introduced and shown to be applicable to several kinds of technology, such as the production of biofuels, and of engineering, such as tar sands extraction. This Principle has been accused of involving policies of Maximin. However, the crucial difference between the two stances or principles is clarified and explained. Policies of Maximin could involve abandoning scien-

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tific progress, together with all forms of adventurousness, whereas the Precautionary Principle does not involve any of this, and can even mandate activism in cases where inaction is likely to generate serious or irreversible harms. But some applications of technology also risk generating such harms—or their equivalent, a reduction of future quality of life. Thus, biotechnologists need to be trained to understand the Precautionary Principle and its implications, so as to distinguish benign innovations from innovations which it would be unethical to introduce on precautionary grounds.

The phenomenon of global climate change, and the associated exposure of millions of people to dangers they have not caused, raises further ethical issues for decision-making in engineering. The risks include the inundation of coasts and small islands, and increasingly frequent and intense extreme weather events, as well as the spread of diseases like malaria and dengue fever, and the dispossession of millions of environmental refugees. Such central principles of common morality as benevolence and justice require policies of mitigation, as well as of adaptation to climate change, policies which involve the participation of engineering decision-makers. These policies are also required by the precautionary principle, as there are clear reasons to credit serious and irreversible harm (or equivalent) from climate change, and hence action is required despite the absence of complete scientific consensus.

In view of the dangers attendant on a temperature increase of over two degrees (Celsius) above pre-industrial levels, and the need to limit carbon (or equivalent) emissions to 1 trillion tonnes to attain a 50% chance of avoiding such dangers, certain further engineering practices should be avoided, such as methods of extreme extraction of hydrocarbons, in view of the importance of not putting to use all the known hydrocarbon reserves. In these circumstances, some practices (such as fracking and drilling beneath the Arctic Ocean) that are apparently morally neutral prove to be unjustifiable on precautionary and other ethical grounds.

INTRODUCTION

The ethics of engineering includes abiding by professional codes of conduct and of professional proficiency. Thus, the bridges an engineer builds must not fall down, and the tunnels she constructs must not become flooded or undergo the collapse of walls or roofs; and in general obligations to clients should be satisfied. But these responsibilities are only a part of engineering ethics. Engineers should also comply with common morality, for example, treating everyone justly and without exploitation, including those aspects of common morality that are enshrined in international law.

This chapter focuses in part on one such aspect, the Precautionary Principle, which (as we shall shortly see) was unanimously endorsed by the Rio Conference on Environment and Development of 1992, also known as the Earth Summit, and thus has the status of international law, and carries the recognition and support of just under 200 countries which participated in that Summit. This Principle is elucidated, an objection is considered and rejected, and the scope of the Principle is further elicited; its importance turns out to be such that all students of engineering should be introduced to it and its implications. Later the chapter moves on to ethical principles and decision-making related to global climate change, which turn out to have a considerable bearing on decisions to which engineers are party, and on the scope of projects that they should embark upon. But let us focus to begin with on the Precautionary Principle.