# Introduction to Internal Flow Energy Conversion

One of the most common requirements of a multiphase flow analysis is the prediction of the energy gains and losses as the flow proceeds through the pipes, valves, pumps, and other components that make up an internal flow system. In this chapter we will attempt to provide a few insights into the physical processes that influence these energy conversion processes in a multiphase flow. The literature contains a plethora of engineering correlations for pipe friction and some data for other components such as pumps. This chapter will provide an overview and some references to illustrative material, but does not pretend to survey these empirical methodologies.

As might be expected, frictional losses in straight uniform pipe flows have been the most widely studied of these energy conversion processes and so we begin with a discussion of that subject, focusing first on disperse or nearly disperse flows and then on separated flows. In the last part of the chapter, we consider multiphase flows in pumps, in part because of the ubiquity of these devices and in part because they provide a second example of the multiphase flow effects in internal flows.