a European and global level, thus allowing safe development, introduction and daily operation of hydrogen-fuelled vehicles on public roads and their associated hydrogen refuelling stations [9]. A generic risk-based maintenance and inspection protocol for hydrogen refuelling stations has also been developed. A study has been undertaken to define the potential for the introduction of environmentally friendly hydrogen technologies in stand-alone power systems (H-SAPS). Barriers and potential benefits of promoting new technological applications on a wide scale and the market potential for SAPS have been widely analysed in select cases of existing small- and medium-sized systems with power rating from 8 to 100 kW (Gaidouromantra, Kythnos Island, Greece/PV-diesel-battery/∼8 kW; Fair Isle, UK/wind-diesel/∼100 kW; Rauhelleren, Norway/diesel/∼30 kW; Rambla del Aqua, Spain/PV-battery/∼11 kW) [10]. On the basis of the analysis, several interesting observations have been made. In order to introduce hydrogen energy technologies in autonomous power systems, a renewable energy source should be incorporated and in addition it should always be overdimensioned to cover power demand and use an excess electricity to produce hydrogen. It was shown that the replacement of conventional power sources with hydrogen is probably more economically viable in power systems having year-round load demand than those having seasonal power demand (power systems with seasonal power demand require seasonal energy storage; thus water electrolyser and hydrogen storage should be overdimensioned). The cost of fossil fuels in remote locations is higher (due to the increasing costs of fuel transportation); therefore the replacement of conventional power equipment by hydrogen energy equipment is expected to be beneficial from the financial point of view. Furthermore, such systems can successfully be used in short to medium market niche applications and have certain environmental advantages, especially in remote communities [10]. It is expected that hydrogen may play a considerable role in the future global energy systems. As stated by MacCurdy [11], “The degree of civilization of any epoch, people, or group of peoples, is measured by ability to utilize energy for human advancement or needs.” Growing interest of hydrogen in transportation sector has been recognized and hydrogen-powered fuel cell vehicles (FCVs) are demonstrated successfuly in Asia, the United States and Europe. Hydrogen-fuelled cars are reported to be about 1.5–2.5 times more efficient than gasoline-advanced cars on a TtW basis (tank to wheels) and produce no emissions, thus offering good performance; a distance of 500 or more kilometres can be refuelled within a few minutes [12]. A very famous example is theBMWseven series with a compressed hydrogen tank and with more than 35 years of experience in hydrogen usage (Figure 1.1). As transitioning to hydrogen fuels and fuel cells still remains a challenge, there may be a need for an intermediate phase, where both hydrogen and conventional fuels are used together in the same vehicle. As stated, “The solution to meet this transitional requirement is the manufacturing of bi-fuel vehicles running on both hydrogen and gasoline using current internal combustion engine technologies … This bi-fuel approach will stimulate the creation of a hydrogen-refuelling network thus allowing for a full transition to a hydrogen powered vehicle economy” [13].