powder in the presence of an ignition source. Damaging and fatal explosions have been reported by the silicon industry. The raw material, from which silicon is made, quartz or quartzite, is one of the sources of silicosis. Most of the hazards are related when quartz/quartzite is quarried, exposure taking place during drilling, crushing, loading and bulk handling. Several protection methods must be applied to the quarries and to the metallurgical plants to prevent silicon dust explosion and silicosis. Volatile silanes such as monosilane and chlorosilanes are extremely reactive in the presence of oxygen, water or moisture. They are also classified as hazardous chemical substances whose handling requires special care. Saturated long chain silanes, polysiloxanes as well as amorphous silica are known to be chemically inert and not toxic. Because of that they are widely used in pharmacy, food industry and cosmetics.

The production of metallurgical silicon and electronic grade silicon has an environmental impact through energy consumption, associated with climatic and polluting gases principally CO_2, NO_x and SO_2. However, it must be noticed that the corresponding nuisances and energy consumption involved in manufacturing and installing PV systems are "paid back" by the same system in the form of emission-free "green" electricity only after about four to five years of an average existence of more than 25 years. More quantified examples about environmental and energy "payback" are reported from Europe, Japan and Australia and commented in [12].

5.2.4 History and Applications of Silicon

Since antiquity, silicon has been of great importance to humanity. However, the first applications were based on naturally occurring forms of silicon, for instance, flint (silex-silicis in Latin), a variety of quartz used from the Stone Age to the Neolithic Era to make tools, weapons and later potteries. Glass made of silicate dated back to 12 000 B.C. Elemental silicon was prepared for the first time in 1824 by Berzelius, passing silicon tetrachloride over heated potassium. Silicon tetrachloride could be prepared by chlorinating silicate/silica. The first crystalline silicon was made accidentally in 1854 by Sainte-Claire Deville working on aluminium electrolysis. The first preparation of silicon/silicon rich alloys in an electric arc furnace was performed by Moisan in 1895 and the industrial production was by Bozel and Rathenau independently from 1897 to 1898. Acheson also discovered accidentally in this period silicon carbide while trying to make artificial diamond. Silicon alloys, particularly ferroalloys, have from the end of the nineteenth (XIX) century played an important role in the production of steel. Silicon metal (silicon content higher than 96% according to definitions outlined by trade organisations) was not current until the Second World War. Three major applications have since greatly stimulated the production and purification of silicon, that is, aluminium, silicones and solid-state electronics. Silicon carbide has also found a broad range of applications taking advantage of its hardness and chemical noble character. More recently SiC has found applications in electronics because of its excellent semiconductor properties and tends to become a strategic material for cutting silicon and boules into thin wafers.

At the beginning of the new 2000 millennium, approximately one million metric tons of metallurgical grade silicon, also called *silicon metal* in the industry because of its appearance and not because of its physical properties, are produced and sold in the world