grid extensions could become economically viable. Some 500 PV systems were installed for this purpose in 1999 and another 5000 were under consideration for the following years. The rationale of this pre-electrification program is to use photovoltaics as a basis to aggregate electrical demand in rural areas. Once the critical mass has been reached, the grid would be extended to the point of highest demand while the PV installation would be moved to another location for the same purpose.

23.4.4 Mexico

About 5% of the Mexican population (almost 5 million people) has no access to electricity from the grid. A highly dispersed rural population and a rough terrain make grid extensions technically difficult and economically unviable. Several attempts were made in the late 1970s to use photovoltaics to power basic electrical services, as mentioned earlier. In 1989, the Mexican Government launched the PRONASOL program for poverty alleviation, which soon became the platform for a large-scale PV rural electrification activity. Today, over 2500 rural communities have been fully supplied with SHS through government programs, which means there are over 60 000 SHS in the whole territory. It is estimated that another 30 000 SHS have been installed outside government programs on a purely commercial basis. In addition, thousands of other PV-powered rural services have been provided, including rural telephones, schools, health centers and communal buildings.

A distinctive characteristic of the Mexican PV rural electrification program has been the active participation of the national electric utility (CFE) as technical normative agency, a central element for quality assurance and sustainability [29]. Under contract to CFE, the Electrical Research Institute of Mexico developed, in the early 1990s, a set of technical standards and specifications for project implementation. Laboratory testing and field evaluation protocols were also developed and implemented. Government-financed projects are carried out by private companies under the technical supervision of CFE and administered by an implementing agency, usually a government office. Contracts to private companies are awarded through a bidding process within the framework of the law for public works. Companies are required not only to supply the physical equipment but also to install the PV systems and train the user in proper operation and basic maintenance. The winning company must also establish a network of contact points for after-sales services.

Finance to purchase the PV systems has been mostly provided by the Federal Government, with lesser contributions from the state and municipal governments. Communities are requested to contribute to the project according to their own economic capacity. In-kind contributions, such as carrying the PV equipment to the community from the nearest point where vehicles have access, is one of the most frequent services by the community in support of the project. Funds are provided by the government as part of the patrimony for the community and, hence, no *a priori* money repayment mechanisms are established. However, communities are free to implement any fund-raising activities that can help them maintain their systems and purchase additional equipment. A popular mechanism is the so-called communal fund, in which members of the community contribute money or man-hours or both to a common fund managed by the community representatives. The communal fund is then used to maintain the PV installations and/or to implement other projects for the benefit of the community, such as water works repair,