

23.4 FOUR EXAMPLES OF PV RURAL ELECTRIFICATION

It is estimated that by the end of the twentieth century, anywhere between 500 000 and one million small PV systems have been installed to power rural homes in developing countries [12]. On top of that, tens of thousands of PV-powered water lifting pumps and other communal services, such as health centers, schools, telephones, street lamps, have been deployed through government programs, donor-led initiatives and entrepreneurial activities. Many such programs have been subject to in-depth reviews as a means to better understand the process that is taking place in the field and to harvest the lessons learned that can be applied to other projects and programs. For details, the reader is encouraged to consult available reports (see for instance, [33–36]). In this section, a few examples of PV rural electrification projects and programs are described.

23.4.1 Argentina

As part of the reform of the electrical sector in Argentina, the provincial electricity markets were divided into centralized and disperse sectors. Each sector has its own structure, its own mission and its own operational form. Then, the program to supply electricity to the rural and disperse population of Argentina (PAEPRA for its name in Spanish) was established by the government in 1994. This program has the goal of providing electricity to 1.4 million people not yet served by the grid, and to electrify around 6000 public services, all this in areas where the low-population density and the long distance to the electric grid makes it too costly to supply electricity by conventional means [37]. PAEPRA operates at the provincial level through concessions to private companies bound by contract to provide electricity services under the supervision and control of the provincial electricity regulatory body [38]. Provincial concessions are awarded through a public bidding process, in which the winning company is the one that requests the least amount of subsidy money on a per customer basis to operate. This subsidy complements the funds collected from the user under a fee-for-service scheme. Participating companies are required to have experience and technical capabilities (1) to operate and maintain electrical systems and other services, such as water supply and telecommunications in a dispersed rural market; (2) to manage electrical systems based on diesel gen-sets, photovoltaics, wind and microhydro turbines; and (3) to manufacture and supply spare parts and components for this type of system. Furthermore, selected companies must be financially healthy.

The PAEPRA program was conceived to operate supported by a loan from the World Bank, but has not moved forward as fast as originally expected for a number of reasons beyond the scope of this work. Since 1986, the Republic of Argentina has a national PV industry with a capacity to produce balance of system components and about 1 MWp per year of PV modules. The current market is based on rural applications for domestic and communal services, water pumping and telecommunications. The presence of this industry is a good element to support the program.

23.4.2 Bolivia

In Bolivia, the National Rural Electrification Program (PRONER) was established to promote and support economic development in rural areas in order to improve the living