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Motivation for Photovoltaic Application and Development

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Photovoltaics is the technological symbol for a future sustainable energy supply system in many countries. A considerable amount of money is invested in research, development and demonstration; several governments set up substantial market introduction programs and industry invests in larger production facilities. No other renewable energy technology receives such a strong appreciation by the public and to an increasing extent also by the politicians and the industrial and financial sectors. This is a remarkable situation since at the same time photovoltaic (PV) electricity is regarded as much too expensive compared to conventional grid electricity. The high and justified recognition of photovoltaics may be understood on the basis of a description of the main positive features of this kind of solar electricity conversion.

2.1 CHARACTERISTICS OF PHOTOVOLTAIC ENERGY CONVERSION

Photovoltaics aims at two areas of application. One is the power supply for off-grid professional devices and supply systems (e.g. telecommunication equipment, solar home systems) and the other is large-scale electricity generation as a substitute for and a complement to today's non-sustainable energy processes. With respect to the latter, the global potential of PV electricity is of key importance. Figure 2.1 shows the technical and the theoretical potential of several renewable energy sources. The theoretical potential does not take into account land use restrictions, conversion efficiencies, storage requirements and so on. The technical potential on the other hand must not be confused with short-term economic potentials, since price situations and capital requirements for activating these energy sources on a large scale are not considered.