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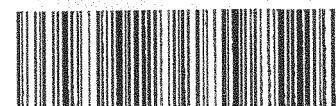
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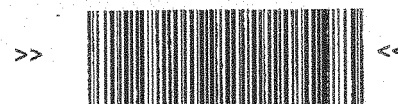
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ROLE OF SOLAR ENERGY IN DEVELOPMENT IN BOTSWANA

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Abstract—The Republic of Botswana in Southern Africa has one of the fastest growing economies in Africa. However, its remotely isolated rural areas pose problems to rural energy management and development because of (i) poor road links with the urban centres, and (ii) remoteness from the national electrical transmission grid. Development of renewable energy sources, therefore, has a vast potential in Botswana. Solar energy, with excellent sunshine of over 3300 hrs per year, is of paramount importance, the applications of which are already quite significant and are growing at a steady rate. Use of solar energy is incorporated in the National Energy Master Plan, and it has contributed to almost all aspects of development in rural as well as urban areas. They include solar water heating for domestic and commercial uses, solar desalination to provide potable water, passive solar buildings, photovoltaic devices for lighting, water pumping, refrigeration, communication and fence electrification. This paper reviews various applications of solar energy and their contribution to development in Botswana and discusses future prospects of solar energy in Botswana.

1. INTRODUCTION

1.1. Geography, population and energy sources

The Republic of Botswana is a land-locked country in Southern Africa, lying between latitudes 17°S and 27°S and longitudes 20°E and 30°E. It shares its borders with Namibia in the west, Zimbabwe in the north and north-east, Republic of South Africa in the south and south-east, and a small stretch of border with Zambia in the north. Gaborone, located at 24.5°S and 26°E, in the south-east is the capital of the country (Fig. 1). The country covers an area of 581,730 square kilometres with an estimated population of 1.35 million. About 26% of the population lives in the urban areas and the rest is the rural population [1, 2]. The country has vast reserves of coal but it is an importer of petroleum products for which it has to depend on road routes through the neighbouring countries. There is no potential for hydro-electric power in the country and all the power generation is from coal.

1.2. Problems of rural energy management and development

Transport links with the rural areas are not well developed. In most cases transport to these areas is very expensive because of remoteness, vast distances involved, low population density and poor, undeveloped roads which are generally deep sand tracks requiring four-wheel drive vehicles. Likewise, the rural areas are also far from the electrical transmission

grid. Thus the rural areas of Botswana can neither be supplied with electricity economically because of low demand and remoteness of the areas, nor can they be provided with coal and petroleum products regularly and at an affordable price because of the poor road links. The rural population, therefore, largely depends on woodfuel as their only source of energy which is

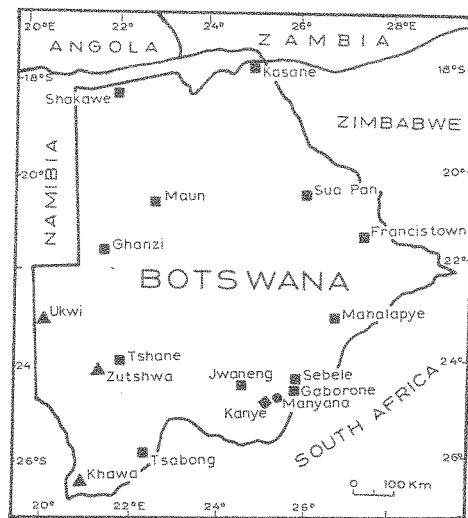


Fig. 1. Republic of Botswana and its neighbours. Places shown have facilities for R&D and have major application sites for solar energy.

