

Box 19.1: Kenya now eighth in the world for geothermal power

When the Olkaria V geothermal power plant (172 MW) came online in November 2019, it pushed Kenya's geothermal production capacity up to about 860 MW, enabling Kenya to overtake Iceland (755 MW) to rank eighth worldwide.

Today, more than 35% of Kenyan households rely on geothermal power. The Olkaria geothermal fields are the second-most productive in the world after The Geysers field in the USA.

Necessity is the mother of invention

The first exploration wells were drilled in the Kenyan Rift Valley in the 1970s. This led to construction of Kenya's first geothermal power plant, Olkaria I (45 MW), over 1981–1985.

Things accelerated in 2008 with the launch of *Kenya Vision 2030* and its emphasis on renewable energy to reduce dependence on imported fossil fuels and broaden access to electricity. By 2030, the aim is to achieve a geothermal production capacity of at least 3 000 MW.

Olkaria IV (150 MW) came on line in October 2014 and Olkaria IAU (150 MW) four months later. Olkaria VI (150 MW) should follow by 2022.

In the past five years, Kenya has become a world leader for development of the so-called *Wellhead Technology*, whereby single wells are used to supply steam to small turbines (~5 MW each) for power production,

thereby ensuring a rapid return on investment.

These turbines are now producing about 84 MW in Olkaria. To this can be added two small turbines in Olkaria and the Eburru geothermal field. The former turbine is operated by the locally run Oserian Greenhouse Farm.

Two Kenyan companies leading exploration

The country's two main geothermal companies are the Kenya Electricity Generating Company (KenGen), partly (30%) privatized in 2006, and the Geothermal Development Company (GDC), a fully government-owned undertaking founded in 2009.

KenGen has been responsible for developing the Olkaria field, together with OrPower, owned by Ormat International.

GDC, meanwhile, has been developing the Menengai geothermal field about 100 km north of Olkaria. In 2019, GDC began drilling exploration wells in the Paka geothermal field farther north, with promising results.

A prototype geothermal spa and farm

Several countries along the East African Rift System have recently shown interest in the potential of geothermal energy for drying, heating, bathing, fish farming and other purposes.

Both Kenyan companies have seized upon this commercial potential. KenGen has built a geothermal spa in Olkaria that is proving popular with the public (see

photo, p. 496) and Oserian has become the largest geothermally heated greenhouse farm in the world. It uses steam to grow roses under plastic over 50 ha.

In Menengai, meanwhile, GDC has developed a resource park which showcases different types of steam use, including milk pasteurization, laundry and dryer units, heated fish ponds and a greenhouse.

A geothermal training programme

Between 2010 and 2019, 89 Kenyan geoscientists and engineers attended the six-month course run by Iceland's Geothermal Training Programme, double the number over the entire period from 1982 to 2009. Most participants are employed by KenGen and GDC. Twenty-four have since returned to Iceland to complete an MSc degree and a further three have received a fellowship to complete a PhD in Iceland.

Originally part of the United Nations University (UNU), the Geothermal Training Programme is now part of GRÓ, a (category 2) centre operating under the auspices of UNESCO.

In 2019, Japan provided Kenyan geologists with research grants within a new project entitled Comprehensive Solutions for Optimum Development of Geothermal Systems in the East African Rift Valley (see Table 24.1).

Source: Lúdvík S. Georgsson, former director of UNU Geothermal Training Programme