The geothermal research in Campania region (Italy), started since the 1930, and continued until the '80. Such exploration activity highlighted that most of the volcanic districts of the Campania Region have a very high geothermal gradient and heat flow. In particular, inside the Campi Flegrei caldera and at Ischia island the geothermal gradient measured inside the deep wells reaches temperatures above 100°C between few tens and few hundreds of metres of depth, while the heat flow varies between 120 to more than 500 mWm-2. The geothermal potential is about 6 GWy for the Campi Flegrei and 11 GWy for the Ischia island showing a geothermal reservoir with water and vapour dominant respectively. This results in strong potential interest for economic exploitation of the geothermal resource, both in the range of low-medium enthalpy at few hundreds of meters depth and of high enthalpy at depths of 1-2 km. Analyses of the recent unrest at Campi Flegrei have highlighted key topics to be investigated to improve assessments of the caldera's potential for eruption. These include extended monitoring of gas geochemistry, detailed analysis of the rheological behavior and accumulation of stress in the crust, and their applications to understanding the behavior of the geothermal system and mechanisms of shallow-level magma intrusion. Analyses to date have been confined to geodetic, geophysical, and geochemical measurements made at the surface. Major advances are expected by incorporating new data from borehole measurements below the surface. At Campi Flegrei, a new offshore drilling program is being designed to augment the onshore CFDDP program. Beyond Campi Flegrei, data from both these initiatives will be likely complemented by those from parallel deep drilling programs planned in other volcanically active regions, including the Krafla Magma Drilling Project in Iceland, the Newberry Volcano Deep Drilling Project in the USA, and the Japan Beyond Brittle Project. Thus, the next decade may lead to a transformational change in our understanding not only of large calderas, such as Campi Flegrei, but also of the mechanisms that drive eruptions at volcanoes worldwide.