Speech by

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GEOTHERMAL EXPLORATION BILL

Mr CHOI (Capalaba—ALP) (3.00 p.m.): It gives me great pleasure today to rise in support of the Geothermal Exploration Bill 2004. The electorate of Capalaba is the commercial and financial hub of the Redlands. It has the beautiful bayside and a very good environment. I say in the first instance that there are no mines, let alone hot rocks. The biggest exploration in my electorate would be kids playing in parks, digging up their sand dunes. I have a personal interest in this particular bill. I wish my honourable colleagues in this House to realise that, without the contribution of engineers—of which I am one—there would be no exploration let alone a geothermal exploration bill.

In speaking on the Geothermal Exploration Bill 2004 I would like to address the matter of what we are actually dealing with—geothermal energy—a little more fully. Geothermal energy is essentially heat. This heat has been transferred to rocks in the Earth's crust from the underlying mantle or has been generated internally by low-level radioactive decay of minerals within the rocks. Distribution of this heat in the Earth's crust is not uniform. The heat is concentrated in hot spots, with rock temperatures exceeding 200 degrees Celsius at a depth of less than 5,000 metres. To place this resource potential in context, a lot of my colleagues have already mentioned that one cubic kilometre of rock at 250 degrees Celsius has the stored energy equivalent of 40 million barrels of oil. With oil prices at $US30 to $US40 a barrel, that equates to $US12 billion to $US14 billion per cubic kilometre of energy stored in the rock.

This geothermal energy can be accessed in one of three ways. The heat carrying capacity of water is, however, critical in each of those instances. The traditional approach has been to directly tap steam and hot water emerging from the ground in volcanically active areas. This method has been used since prehistoric times to provide domestic heating and hot water for cooking and cleaning. Electricity generation from this source dates back to the beginning of the 20th century.

The hot wet rock approach used naturally occurring hot underground water in aquifers that have been accessed through deep bores. Generally this water is primarily extracted for stock watering, domestic or irrigation purposes. Queenslanders in the state's west have also conveniently used it as a source of domestic hot water for quite some time. Recent developments in heat exchange technology have meant that in some locations this bore water can also be used to generate electricity. For example in Birdsville, near-boiling bore water from the town's water supply is first passed through a heat exchanger. This smart innovation not only helps to cool the water to a drinkable temperature but also generates much of the town's electricity.

The hot dry rocks approach is a more recent development. This approach creates artificial geothermal systems by first drilling into and fracturing hot dry rocks at depth and then pumping water into them. These rocks are typically, but not always, granites that are buried several kilometres below the surface. Heated water is then extracted from these artificial aquifers and passed through heat exchangers before being pumped back into the aquifer to repeat the process. The extracted heat boils special liquids in the heat exchangers, and these liquids turn the turbines. Once cooled, these liquids are returned to the heat exchanger to similarly repeat the process again.

The first generation of electricity from a traditional geothermal power source took place in Italy in 1904—almost 100 years ago to the day. Since then, traditional geothermal electricity has grown worldwide to about 8,000 megawatts. Geothermal power is generated in over 20 countries, including the Philippines, Italy, France, Indonesia and Japan.

Interest in using hot dry rocks to generate power was first investigated in the United States in the early seventies. Since then, more than $US500 million has been spent globally on researching this potential resource. Many of the earlier attempts failed, due mainly to poor understanding of the geology. This resulted in the creation of vertical rather than horizontal fractures in the artificial aquifer, with resultant water and heat loss into the surrounding rocks, which is clearly not acceptable. Recent achievements in France have, however, successfully demonstrated the potential of this approach.

Current thinking suggests that Queensland contains significant resources of such hot dry rocks under favourable geological conditions. We also have significant potential arising from hot bore water in the numerous aquifers of the Great Artesian Basin. Increasing interest and efforts are consequently now being shown in the potential development and exportation of geothermal energy in Queensland and Australia. Current geothermal exploration near Innamincka in South Australia is investigating a similar geological setting to the Queensland resources. Initial results appear to be favourable, with strong horizontal development of the artificial aquifer being achieved. Planning is now under way for the drilling of the recovery hole to test the process further.

Recent developments and improvements in heat exchanger technologies have also significantly improved the efficiency of such plants. Use of binary and low vaporisation temperature fluids now enable this heat exchanger to extract more energy and from cooler water. Developments of this nature have enabled the Birdsville plant to expand capacity from a nominal 20 kilowatts to almost 150 kilowatts over the last few years.

Geothermal energy may also present certain and perhaps surprising spin-offs for Queensland. The Smart State can certainly take advantage of this. Heat may not be the only thing to come up with the hot water. Indications are that this water, particularly from deeper sources, may also contain quantities of helium and other gases and minerals in solution. The helium alone represents a possible import replacement industry if found in sufficient quantities.

The Geothermal Exploration Bill provides the necessary first step for this state to become involved in leading-edge technology in an exciting new world—new energy to replace the old. It also provides access to sustainable resources for the benefit of all Queenslanders. A major function of this bill is the proposed provision of a form of tenure—the geothermal exploration permit—that would give the holder the right to explore for geothermal material over land included within the geothermal exploration permit for which access has been allowed. The holder will also have the right to carry out activities associated with such exploration.

As geothermal exploration permits are intended only as an interim measure to encourage active exploration, no provision will be made under this bill for the renewal of geothermal exploration permits. Such provisions are planned for the complex exploration and production regime to follow in the future. One hundred years after the first geothermal electricity generation in Italy, now it is Queensland's turn. I fully commend the bill to the House.