Speech by

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GEOTHERMAL ENERGY BILL

Dr DOUGLAS (Gaven—LNP) (4.04 pm): In 150 years the world has grown in a spectacular fashion, largely on the back of transmitted energy during industrialisation. Fossil fuels, starting with coal, have largely driven that growth. Coal is still and will remain the key ingredient that drives global growth. Here in Queensland coal remains our key mining export, supplying the second and third biggest economies in the world with feedstock for their power stations and their steel-making plants. Here in Queensland we are diversifying our energy exports to include gas—both CSG and UCG—to a demanding market globally. Enhanced geothermal systems—geothermal energy—is a major new baseload energy producer. In fact, it is the only known method and source of renewable energy as defined with the capacity to carry a large baseload.

The bill, whilst having a primary focus on geothermal energy, also involves the adjustment of those laws regarding land access. The minister in his second reading speech stated that the new changes have been developed collaboratively with key resource and agricultural sector stakeholders. Fortunately the bill introduces new provisions for access to private land and compensation. This is to be supported. The minister's description of the five key points are reassuring for all. They have been described today as: compliance with a single land access code of conduct; notice of entry requirements; conduct and compensation agreements; prescribed negotiations; and improved compliance and enforcement powers. With these changes coming in well in advance of the extensive rollout of EGS—that is, the enhanced geothermal systems—landholders can expect to be more fairly dealt with. The issues relating to those affected by UCG primarily would reasonably lead anyone to say that these changes are appropriate, measured and respond to the problems that have been consistently raised by landholders on some of our prime agricultural land. It has been well described in parliament today and earlier.

The critical changes to be implemented as a result of this bill are those changes I referred to earlier relating to the management of property, access and dispute resolution. There are some other changes in the bill relating to the Electricity Act and the Timber Utilisation and Marketing Act. These are reasonable. Queensland has a fairly long history of access and mining leases and what to do and what not to do. The hope of this bill is that we might just do things a little better. The shadow minister has gone into this extensively. It would be repetitive to go through the issues he raised. I will not go there.

I too remain very disappointed that the fringe green groups have attempted to attach themselves to local farming groups on the Downs challenging primarily UCG groups. Hypocritically, these groups have struck rigid preference deals with federal Labor to facilitate Labor's re-election federally. How anyone could conceivably entertain open discussion with such pretenders is beyond me. Such are sometimes the actions of desperate people. I do hope that the changes in this bill can give new hope to farmers, their families and local communities that they will not be sold out cheaply to facilitate others' rights pre-emptively.

I intend to focus primarily on the issue of EGS and its technical aspects. I endorse some of the comments made by the member for Yeerongpilly in relation to alternative systems globally. EGS has as its core application the use of heat exchange technology; using superheated water pumped from one shallow underground water reservoir to superheated granite fractured seams three to five kilometres underground

by very deep wells. The steam produced powers very largely distantly located power plants. The demonstration power plant of geodynamics, which is a one megawatt station, seems to have been reasonably successful as a renewable energy producer. Unfortunately, the power is being generated a long way from where it is needed. As has been described, it currently costs $1 million per kilometre for transmission. It may provide a long-term solution for us and a medium-term solution for baseload supplies for regional communities currently supplied by diesel electric generators. There are plenty of regional centres in Western Queensland that fall into this category. In New South Wales alone over the last three years baseload electrical demand has increased by 2.6 per cent and peak demand by 2.9 per cent consistently.

The concern from an environmental management point of view is what is the impact of injecting groundwater into deep seams of fractured granite. These concerns range from groundwater contamination to Great Artesian Basin contamination to possible alteration in the earth's seismic activity. Whilst Australia is at low risk of earthquake, we have had severe earthquakes in Newcastle where there has been extensive deep mining underground and blasting.

Concerns may be more perceived than based in reality. The earth is 4.6 billion years old with a relative depth of 6,371 kilometres radius and a core temperature estimated to be between 5,000 and 7,000 degrees Celsius. The crust's temperature is 1,000 degrees Centigrade. Australia is indeed an ancient land. Similarly, its geology is comparatively very old. The areas that are intended to be drilled and tapped are very old volcanic segments of the earth's crust. One needs to be very careful about potentially destabilising both subsurface ground-holding water and underlying deeper, largely impenetrable rock, creating new aquifers. There are legitimate concerns that the wells either may have a relatively short life or need to be intermittently left empty because the heat contained within the rocks needs to renew itself. Certainly the earth has a deep molten core with vast amounts of retained energy, but the earth is very deep at 6,500 kilometres and the heat can take some time to be conducted to those energy depleted areas in the top 0.088 per cent of its thickness. I intend to go into the details of those granite rocks a little later.

The energy in those areas is stored energy. It is only renewable energy by virtue of the fact that the energy may otherwise be lost, it does not have to be burnt to produce heat, it does not produce greenhouse gases and its energy coefficient is stored in a different form to those other commonly used materials, that is, it is in rocks. It is different to solar energy for that energy is supplied by the sun and releasing that energy is radiation. EGS is energy coming from the earth, so it is incorrect to group it with solar, wind, tidal, wave and hydroelectric. It may be considered to be nuclear energy. Maybe it is not a true renewable, but with vast energy reserves due to retained heat it is almost inconceivable that these types of stations will have any impact on the quantum of energy needed to retain the earth's energy homeostasis. As I said, this energy is trapped in granites by overlying rocks acting as an insulating blanket.

The Queensland site most studied is the Cooper Basin, where 320 million years ago granites were extruded from the earth's molten core and covered by four kilometres of sedimentary layers of the earth's crust as an insulating blanket. Primarily, this contains oil, gas and coal, as we know. When it was extruded it was super heated by solar radiation and much of that energy was retained within it. The energy is measured at an average temperature of 250 degrees Centigrade, which is considerably higher than the average core temperature of 180 degree Celsius in Europe, where the geology is more recent. The heat in the rocks is largely naturally occurring through radioactive decay. Therefore, the heat results from both earth contribution and solar sun contribution. As such, it blurs the definition of truly renewable energy. For those who missed the critical words, those core extruded granites contain 50 parts per million thorium 232, 20 parts per million uranium 238235 and four per cent potassium, some as potassium 40. Those radioactive substances are in slow decay and generate 10 microwatts of heat per cubic metre continuously for hundreds of millions of years. This is nuclear power at work. When they cooled originally, the granites fractured, filled with water and eroded. These mini-nuclear reactors, as they are, then superheated the water in those fractures.

By virtue of the temperature gradient, currently in the Cooper Basin it is 60 degrees per kilometre of depth vertically as the wells descend into the earth's crust, as opposed to 30 degrees Centigrade elsewhere. This reserve is 1,000 square kilometres alone, with one drill hole per square kilometre and each square kilometre containing roughly 40 million barrels of oil equivalent. That means that the Cooper Basin, excluding its existing shale, oil and gas reserves, is a reserve of 50 billion barrels of oil. It is one-fifth the size of Saudi Arabia, 12 times that of the North West Shelf and it has a 25-year, fully developed reserve life if the whole thing is drilled. It is one-fifth the size of the Galilee Basin supply.

Our fossil fuels are primarily accused of causing all our current problems and are, in fact, what we are surviving on at the moment. The reason that we need to look for alternatives is only in a small part driven by their burning and the issue of contributing to climate change. A greater problem for humans is the pollution caused by burning fossil fuels close to our communities. Their supplies are really in slow decline and it is far more difficult to find new supplies at a reasonable cost. The major issue is that the internal combustion engine that we are currently using cannot be made more efficient, because of the issue of

diminishing returns. You get to the point where as the technology gets better the percentage improvement starts to decline. We have been at that point for the past 25 years.

What has been going on externally are the things that we really need to take issue with. The recent massive solar flares and the Finnish volcano eruption released far more harmful radiation and CO_2 than burning 50 years worth of fossil fuels in every country of the world. Strangely, fossil fuels derive their energy coefficient by virtue of photosynthesis. For those who may have forgotten, that is using solar energy and CO_2. Plants use carbon to store energy and produce O_2 as a by-product when burnt energy is produced. It is only deemed nonrenewable because the production of CO_2 is deemed to be a greenhouse gas. Geothermal energy does not produce greenhouse gasses and is deemed to be renewable by virtue of the fact that no-one yet knows whether we will reduce the earth's capacity to capture and store CO_2 by interfering with its own retained energy that is in the rocks. There are only six sites in Australia where this technology is applicable. Those reservoirs are defined as areas where the earth's temperature is above 225 degrees Centigrade at five kilometres of well depth vertically. As I said, the two major zones are the Galilee Basin and the Cooper Basin, and it is the Cooper Basin that has been most defined.

One cubic kilometre at 250 degrees Centigrade will, tentatively, yield 40 million barrels of oil. Australia consumes 953,000 barrels of oil annually. The USA consumes 20.8 million barrels of oil. Currently we import 687,200 barrels, we export 300,000 barrels, we produce 586,400 barrels and we are in slow decline. As at July 2009, in Australia 48 companies are exploring for geothermal energy. With $1.5 billion forecast to be spent through 2013, this is potentially big business for Australia. In terms of costings, which I think are relevant at this point, currently the cost for clean coal is 6.5c per kilowatt hour and for black coal the price is 3.5c per kilowatt hour. The cost for solar and wind is 8c per kilowatt hour and is not deemed to be commercially viable. Basically, at the current cost of geothermal energy, the projected cost looks to be 4c per kilowatt hour with green credits, which seems to be within the ballpark of affordability for the nation. Currently, gas costs 4.2c per kilowatt hour.

Basically, to enable EGS geothermal exploration, we need to understand that we have a 20 per cent renewable target, which it is reasonable to work towards. This is potentially big business for Australia. As I say, currently the power plant will produce only one megawatt, but the intention is to get to a 25 megawatt plant within 10 years. Basically, a 50 megawatt plant with nine wells, five production and four injection, and multiples can be scaled up to a 500 megawatt system as opposed to volcanic plants, which were discussed earlier by the member for Yeerongpilly. They do not emit potentially dangerous gases and elements as do those plants. Technically, they are not renewables under the current guidelines. The gases that are emitted are primarily hydrogen sulphide and cyanide. EGS does not emit those at all, but it does fracture the granites to unlock the heat.

Currently, 9,000 megawatts of power generated by these systems are installed world-wide. In comparison, for those who may know, the latest nuclear systems are largely 2,400-megawatt systems. That is the general norm. As has been said, these systems are throughout the world. Unfortunately to date, the long-term success of the technology is to be driven in part by need, regional location of power supply, tax breaks and possibly future green energy credits. Without those green energy credits, when it comes to the future growth of the industry, in a world where the global price of a barrel of oil is only currently US$75, it may be that we get to that target a little slower.

Rather than listening to all the noise about those who claim to be green but have no idea about accessible technology for energy generation, one might consider that the EGS is a small but uniquely applicable alternative energy source that has a unique application to Queensland and Australia. It will never be a major input, but it might be comparable to solar. This is true solar, not the kind that has currently been implemented in places like Cloncurry, where they only had four panels installed instead of 1,200. We have talked a little bit about solar. Basically solar can be generated by smaller units. Solar installations can range from three-kilowatt units that the average home should be looking at to the massive five-megawatt units which power some communities.

The issue of biomass was raised earlier. In my electorate of Gaven, the tip at Molendinar, which is a considerable landfill site, will close over the next couple of years. By installing a methane gas extraction system, utilising harvest wells and watering from above using treated recycled water, this continuous system has the potential on the current site to yield five megawatts of power and massively reduce smell and future groundwater contamination. This is green energy at work and does not require much more than a methane concentrator, water and a heat exchanger. It puts all old landfill sites to work long past the dumping of household and commercial waste. This is also a form of geothermal energy. Every megawatt of power generated should earn a measurable green energy credit.

When the oil price was double the current price, the technology was strongly viable independent of green credits. But, even with green credits currently, it is said that the technology is almost at the point where, at the current cost of coal and with those carbon credits, a fully costed power station with geothermal will break even in comparison to any new coal fired power station. As I say, it comes with obvious economic benefits. We need to ensure that whatever plan comes forward, particularly by the incoming government, it addresses the issue of these green credits that attach to the EGS that can make it represent a key ingredient of the alternative baseload energy mix, particularly in a decentralised state like Queensland.