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President and CEO  
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## CURRICULUM VITAE

### EDUCATION

Bachelor of Commerce, University of Victoria, Canada

### CAREER

**2010-present:** President and CEO, Diamond Energy

**2009-2010:** Director, power markets and regulatory strategy, Chevron Corporation

**2005-2008:** Director, business development, Diamond Energy

## IN FIGURES

Annual value of Singapore's reserve markets

**\$62.1 million**

Wholesale trader licensees in Singapore

**13**

Wholesale electricity market established

**2003**

Demand response potential in Singapore

**100-200 MW**

## New force

Diamond Energy develops carbon-footprint reduction models and is the first wholesale trader to enter Singapore's electricity market. The company began trading in 2006 after the deregulation of the electricity industry and the establishment of Singapore's electricity market in 2003. Diamond Energy trades interruptible load, a form of demand response, in the reserve market.

### What is the profile of Diamond Energy's operations in Singapore's electricity market?

Our company is a new animal in the wholesale electricity market. The catalyst was the passing of the Electricity Act in 2001, which laid out the industry reform plan and anticipated growth in the wholesale electricity market. Although the wholesale electricity market was established in 2003, Diamond Energy did not commence

“With the entry of new power generation capacity, particularly as the unit size increases, the reserve requirements will also increase.”

trading until 2006, as the wholesale trader regime took time to establish. Diamond Energy now adds to the competition and market efficiency in Singapore through a demand response initiative. Reserves are required to maintain electricity system stability and reliability.

If there is a loss of supply, the power system relies on reserves to fill the gap. Typically, reserves are provided by generators with surplus or stand-by capacity. Diamond Energy's approach is that we trade the interruptibility of demand. By curtailing large energy intensive electrical loads located within industrial facilities, the same result can ultimately be achieved.

### How has Singapore adapted its regulatory framework to cater to a changing market?

One of the things that we have been waiting for is full retail contestability, meaning that all electricity consumers down to the household level will be available for competitive supply. Only customers that consume more than 10,000 kilowatt hours per month currently satisfy the contestability requirements. There is currently an ongoing effort to review the threshold

level and perhaps reduce it, which means more consumers could come in and obtain competitive supply from electricity retailers. This is an opportunity for our retailing operation, once it is actually up and running. In April 2012, we received an electricity retail licence from the Energy Market Authority, which allows us to sell electricity to end users.

This will provide us access to end-use customers, such as manufacturing plants, industrial facilities, or even commercial buildings. At the moment, the market is dominated by players that are vertically integrated. This means they own power generation capacity and they retail electricity to end users. It is all done under one roof. Not being owned by an existing power generator, Diamond Energy is currently positioning itself as the first independent electricity retailer in the marketplace.

### Singapore's LNG terminal will bring in more gas by 2013. Could trading interruptible gas supply be a potential business activity?

We already have the trading capability established for interruptible power, so trading on the fuel side may be a natural extension. Trading interruptible gas could be similar to trading electricity reserves. It's interesting in its own right because Singapore has had some gas issues in the past. Interruptible gas trading could help to mitigate the consequence of such events if they are to occur again. With the introduction of LNG in 2013, the natural gas system as a whole may become more diversified and robust. Interruptible gas supply is certainly something that some gas customers may be able to contend with if their operations are flexible.

### The Energy Market Authority is exploring ways to introduce electricity futures trading in Singapore. As the market grows, what players may move into this?

We see two pools of potential traders of electricity futures in Singapore. The first is utilities that are already here and active in the electricity market. Having an electricity futures trading capability could provide another avenue for these players to manage market risk. Secondly, the established oil trading companies could be interested in trading electricity futures with

many already supplying fuel to the utilities as well as providing risk management services. Banks and financial institutions constitute another important pool of potential traders, in that they are trading similar products in other markets that have already been established.

In fact, there are a number of banks located here in Singapore that are already trading Australian electricity futures from Singapore. Electricity is traded in both the physical and financial markets in Australia and this is what Singapore, as an established trading hub, should ultimately aspire to. It is not that the capability does not exist in Singapore, it is just that the market framework is not yet in place. This will add another dimension to the utility business here in Singapore, which has not had electricity futures trading in the past.

#### In 2005, Singapore's reserve market was worth \$23.9 million. Will a new regulatory framework increase its value over time?

Firstly, the total reserve market is now valued at some \$62.1 million annually. We estimate that potential for the demand response remains in the region of \$23.9 million. However, this potential has yet to be fully realised.

The value of the reserves varies year on year. Some years it is higher and others lower, which is driven by market fundamentals. With the entry of new power generation capacity, particularly as the unit size increases, the reserve requirements will also increase.

One of the things that we have been monitoring is the entry of larger combined cycle units. The largest registered combined-cycle unit recently increased to 431 MW. As that figure increases, we may be seeing a requirement for more reserve. That means that the pie is also expected to grow. The benefit for consumers with more wholesale traders entering the market is that the cost of reserve may come down due to competition, diversification of reserve supply sources and market efficiency gains.

#### Does Singapore's power generation regulatory framework leave room for electricity trading with its ASEAN neighbours?

The Electricity Act, passed in 2001, contains provisions for electricity imports. An electricity export capability from a new power plant and transmission line built in a neighbouring country to supply Singapore has been part of the ASEAN Power Grid Master Plan. However, it has not yet been implemented on a commercial basis. There is an existing security connection linking Singapore's electricity grid and Malaysia's electricity grid. This connection has been in place since before the electricity market was established with the intention of both countries supporting each other's electricity grids to preserve system stability during times of high demand. The security link came into view in 2011 when, facing supply shortages, Malaysia temporarily imported power from Singapore.

This legacy arrangement is an offsetting arrangement, meaning it is not cash settled, but instead electricity is exchanged in a non-commercial barter arrangement. Steps are currently being taken by the Energy Market Authority to establish a regulatory framework that will enable cross-border electricity trading to occur on a commercial basis. The Economic Strategies Committee has looked at some of the existing policies and explored what could be done to bolster the power system and enhance competition. In early 2010, the Economic Strategies Committee recommended that electricity imports and coal fired generation be considered. If Singapore can have a new connection with a power plant in Malaysia, this will add another dimension to the fuel mix.

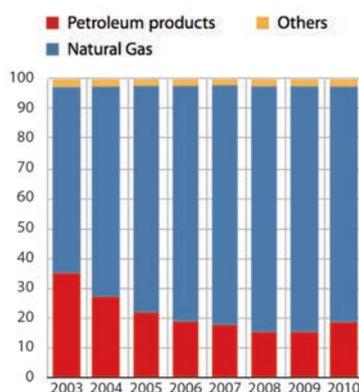
Other energy sources that may be land intensive and not suitable for Singapore, such as coal, may be very possible from Malaysia or Indonesia. This is aligned with greater connectivity across ASEAN. While the ASEAN Power Grid Master Plan includes a number of cross-border linkages to Singapore, progress has been slow. ■

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## DEMAND

### Natural gas is playing a bigger role in Singapore...

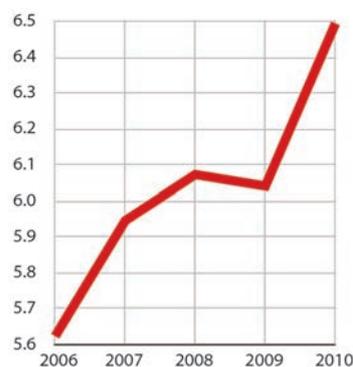
Fuel mix for electricity generation in Singapore, 2003-2010



Source: Energy Market Authority

### ...while electricity demand rises...

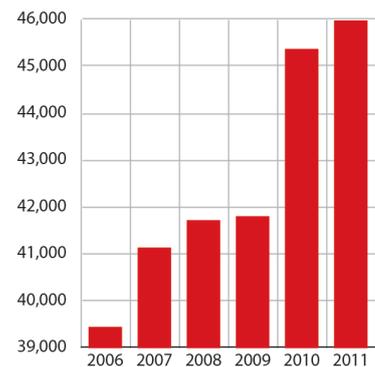
Peak demand in Singapore, 2006-2010 (GW)



Source: Energy Market Authority

### ...and electricity generation increases.

Electricity generated in Singapore, 2009-2011 (GWh)



Source: Energy Market Authority