McCullough Research

Robert F. McCullough, Jr.
Principal

Date: October 10, 2017

To: British Columbia Utilities Commission

From: Robert McCullough

Subject: Problems with British Columbia Hydro's F1.6 Response

British Columbia Hydro has continued to forecast successful completion of the proposed LNG Canada LNG export terminal in spite of clear economic evidence:

> One major justification for including the three LNG projects in the Current Load Forecast is the fact they are requesting electricity service. Service requests from industrial sector customers, including LNG, are generally included in our industrial load forecast.
>
> LNG Canada executed a Load Interconnection Agreement, an Electricity Supply Agreement and a Studies Agreement in November 2014. We have completed a system impact study and are currently doing additional study work pursuant to those agreements.[1]

LNG export terminals are fundamentally a straightforward economic and engineering calculation. Natural gas is delivered by pipeline, refrigerated and compressed, and then loaded onto LNG tankers for delivery.

Industry practice is to compare the cost effectiveness of a proposed LNG facility as the charge per mmbtu. The primary determinant of cost per mmbtu is the capital cost of the facility – dollars per million tonnes per annum (MTPA).

The competitive standard for LNG export terminals is set by the Cheniere corporation at their two rapidly expanding facilities on the Gulf Coast. We have filed expert testimony in this proceeding on September 29, 2017.[2]

LNG Canada has widely publicized its basic cost data. The export facility is expected to cost C$40,000,000,000 and export 26 mtpa. This equals US$1,222,000,000/mtpa.

[1] British Columbia Utilities Commission Information Request No. 2.16.0 Dated: September 20, 2017 British Columbia Hydro & Power Authority PUBLIC Response issued October 3, 2017, page 5.
[2] F35-11, Question 16: LNG Prospects.

Cheniere is expanding at US$500,000,000 to US$600,000,000/mtpa. Cheniere is able to sell its services at less than half the projected prices at LNG Canada.

The 50% price differential between Cheniere and LNG Canada explains why Cheniere has closed numerous transactions with Asian counterparties in recent years. Economists call this "revealed preference." Counterparties are choosing the enormous price differential even though the location adds an additional week of sailing time.

Our monte carlo analysis of market conditions required to make LNG Canada viable is dour – approximately 3%. In the remaining 97% of cases, LNG Canada is not a viable investment. BC Hydro's response only presents the macroeconomics of future LNG demand. To understand the probability that LNG Canada will even be able to compete successfully for that future demand requires the kind of microeconomic analyses we have provided.