

1 Q. **Reference: Marginal Cost Study Update – 2018 – Summary Report, Nov. 15, 2018,**  
2 **Appendix A (Christensen Associates Energy Consulting, Cost Estimates and Methodology**  
3 **for Generation and Transmission Services, 2021-2029, page 5 (27 pdf)**

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5 Citation:

6 In brief, in the presence of competitive wholesale markets, the prices obtained  
7 reflect opportunity costs, in other words, the highest-valued use of marginal  
8 resources. Such result is fully consistent with least cost dispatch. Generally  
9 speaking, an opportunity cost approach is the preferred methodology, providing  
10 that service providers are actively engaged in competitive markets.

11  
12 a) Please provide some guidance as to determining whether or not a service provider is  
13 “actively engaged in competitive markets”. Should the determination be made based  
14 on:

- 15 • the quantity of off-system sales (and/or purchases) compared to on-system  
16 sales;
- 17 • the extent to which additional off-system sales are possible (i.e., the extent to  
18 which transmission paths would permit additional off-system sales);
- 19 • the extent to which off-system purchases are competitive with on-system  
20 generation or purchases; or
- 21 • other factors.

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23 b) If possible, please provide quantitative benchmarks. For example, if a utility’s off-  
24 system sales account for just 1% of its regulated sales and it has no off-system  
25 purchases, is it appropriate to base marginal costs on “opportunity costs” based on off-  
26 system market prices? What if off-system sales account for 5% of regulated sales, but  
27 no additional sales are possible due to congestion?

1 A. This response has been provided by Christensen Associates Energy Consulting.

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3 Responses are as follows:

4 a. Generally speaking, power systems are involved in wholesale markets if ongoing  
5 trading activity is present. Evidence of trading activity includes observed transactions,  
6 or commitment of resources to monitoring wholesale markets, and internal processes  
7 to facilitate the engagement in viable transactions.

8 With an unconstrained transport path, it is appropriate to set marginal costs according  
9 to opportunity costs under two necessary and sufficient conditions: 1) internal supply  
10 costs are less than net market value, where net market value includes transport  
11 charges; and 2) incremental local supply of power is greater than zero, where  
12 incremental supply is obtained through some combination of increased local power  
13 production and decreased native loads. Note that if internal supply costs are greater  
14 than net market value, Hydro should import power, other factors constant and, second,  
15 path charges reverse. The conditions hold for a constrained path although transport  
16 charges (line losses, and possibly reservation fees) also include redispatch costs.

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18 b. It is not appropriate to set forth quantitative benchmarks for gauging whether or not  
19 opportunity cost is the appropriate cost basis for determining forward-looking short-  
20 run marginal costs.