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3 December 2018

[redacted]

**Official Information Act #18.107 – Wind Farms**

1. We refer to your request of 4 November 2018 where you asked the Commerce Commission (the Commission) for the following information:

   1.1 does the world operate on a synchronized 50 and 60 Hz frequency;

   1.2 would the Commission or its advisors dispute any part of the following statement: *"all potential Incoming Generators must conform to the normal Synchronization Function of using a Frequency Synchro-scope Instrument, that will align and "Lock In" the Equal and Compatible existing Grid and Incoming Generators Three Phases, to then Produce useable Energy by Physical Manipulation of a Speed Drooped Control Governor, to a 0.1% Tolerance Levels to maintain the Frequency, also, the requirements of an Automatic Voltage Excitation Adjustment System, that maintains within 2% of Leading and Lagging Voltages that supplies the Reactive loading requirements of the System as a Whole*";

   1.3 if [1.2] is disputed, what part of the statement is conflicting to the Commission or its advisors;

   1.4 are all wind farm turbines "*basic, within the wider sense, three phase induction motors*"; and

   1.5 how can a standard three phase induction motor connect to the system without a synchroscope?

2. We have treated this as a request for information under the Official Information Act 1982 (OIA).

**Our response**

3. We have decided to grant [1.1], [1.4] and [1.5] of your request.

4. We have decided to decline [1.2] and [1.3] of your request, because you have asked for our opinion rather than for information we hold.

5. In response to [1.1] of your request, globally, grid connected electricity AC systems are either synchronised 50Hz or 60Hz.

6. In response to [1.4] of your request, wind generators use a number of different types of generators. Utility scale wind farms include induction generators, doubly fed induction generators, induction generators with slip rings, and synchronous generators; among others.

7. In response to [1.5] of your request, induction motors do not require synchronising (nor do any other motors). Induction generators self-synchronize with the frequency of the electricity system they are connected to by using the source to produce an initial magnetic field. Therefore the magnetic field is synchronized with the frequency of the source. The generators stay in sync and generate electricity as long as they are rotating above their synchronous speed.

8. If you are not satisfied with the Commission's response to your OIA request, section 28(3) of the OIA provides you with the right to ask an Ombudsman to investigate and review this response. However, we would welcome the opportunity to discuss any concerns with your first.

9. Please note the Commission may publish this response to your request on its website. Personal details will be redacted from the published response.

10. If you have any questions in regard to this request, please do not hesitate to contact us at oia@comcom.govt.nz

Yours sincerely

*H.R. Wadham*

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